

12TH ANNUAL EARLY CAREER SCIENTIST CONVENTION



**LEADERSHIP AND
ENTREPRENEURIAL
CONTRIBUTION IN THE
NEXT DECADE**

SAMRC HEAD OFFICE, CAPE TOWN
17 - 19 OCTOBER 2018
HOSTED BY: RESEARCH CAPACITY DEVELOPMENT (RCD)

TABLE OF CONTENTS

1. Meet our Executive Head of Research Capacity Development	4
2. Message from Division Manager	5
3. Keynote speakers and facilitators	7
4. RCD Funding Categories	16
5. RCD Programmes	18
6. Abstracts	31
7. List of completed scholars	152

MEET OUR EXECUTIVE HEAD OF RESEARCH CAPACITY DEVELOPMENT



Jeffrey Mphahlele, PhD

Professor Jeffrey Mphahlele, PhD, is the Vice President for Research at the South African Medical Research Council (SAMRC). He is an elected member of Academy of Science of South Africa (ASSAf) and NRF C1 rated researcher. He is affiliated to Sefako Makgatho Health Sciences University (formerly MEDUNSA) in Pretoria where he previously served as an academic for over 20 years in various capacities: Prof Mphahlele's research interests in prevention and control of human viral diseases span a wide range of topics, including viral hepatitis, gastrointestinal viral infections, human papillomaviruses, epidemiology of HIV, genomics of infectious diseases and vaccination control of infectious diseases. He serves on several governance structures and committees including the General Assembly of the European and Developing Countries Clinical Trials Partnership (EDCTP), Global Research Collaboration for Infectious Disease Preparedness (GloPID-R) and WHO Scientific Advisory Group of Experts (SAGE) on Polio, Working Group.

Prof Mphahlele is as a member of the Executive Management Committee of the SAMRC responsible for the Division of Research Capacity Development (RCD). As such he has a keen interest in the success of the beneficiaries of grants and scholarships channeled through the Division. Under his leadership, the Division has grown in both vision and number of programs. A recent brainchild of Prof Mphahlele is the Biostatistics Capacity Development initiative. The SAMRC has partnered with the Belgian Government to help address the scarce skills where Biostatistics is concerned in South Africa. A few days ago an RFA has been advertised for funding Masters and PhDs in Biostatistics. It is the vision of Professor Mphahlele that this is the start of a long fruitful relationship between the two countries of South Africa and Belgium to develop capacity in the Biostatistics area.

MESSAGE FROM OUR DIVISION MANAGER



Dr Thabi Maitin

To say that it is a joy to bring once again all SAMRC funded beneficiaries under one roof is an understatement. Seeing the actual faces of the next generation of Health and Clinical researchers that South Africa is developing through this Division and other entities in South African Universities is truly inspiring.

When the Masters and PhD scholars are away at their universities during the course of the year, it is easy to forget just how important this mission of capacity development is. It is also easy to lose awareness of the urgency of this mandate. Thus, an opportunity to meet face to face at our annual conference with these bright, young people is very important so that the mandate and its urgency is kept fresh in our minds

The Early Career Scientist Convention (ECSC) provides an opportunity to network, share experiences, share successes and challenges, and have healthy competition as a generation of upcoming young scientists. Equally, it is important for the

funder, the SAMRC through RCD and our partners to use this opportunity to remind our young scientists how absolutely proud we are of you, how valued you are by the SAMRC and how crucial it is that you succeed. South Africa needs you to succeed and get your degrees, especially the PhDs, and as research has shown, help to change the economy of South Africa. It is a well-documented fact that the number of PhDs in a country is one of the indicators of the success of that country's economy.

The financial year of 2017/18 till to date has recorded an impressive increase in performance by almost all indicators. However, it is the number of 25 graduates in this period, mostly PhDs coming out of all the post graduate programs that stands out as something for all parties to pat themselves at the back for. Similarly, the number of publications, briefs and other research outputs has increased both in quality and number.

RCD itself is growing in the number of staff as funding programs increase in

number and complexity. Today we boast established partnerships with various countries to help us develop capacity in strategic areas such as Vaccinology (with Switzerland), Biostatistics (with Belgium) to name a few. In terms of staff resource, RCD is happy to have welcomed Dr Anniza De Villiers who will be overseeing the writing of scientific publications of RCD work and outputs. That way, South Africa and all other stakeholders will know what the SAMRC is doing to grow the next generation of scientists in health /clinical research, and how SAMRC's funding portfolio continues to be innovative. We have also welcomed Ms Colleen Van Wyk who is assisting with streamlining work flow and processes between the Division Manager's office and all Program administration desks. This is invaluable addition to the Division and we are working towards increasing the staff a little more in order to increase efficiency.

It is with a heavy heart that I say a very sad goodbye to Ms Jean Fourie come end of 2018/19. I have a fairly long experience working in academia, but I have met very few people who have the excellence that I have enjoyed with Jean editing RCD work

and more particularly the abstracts by scholars for the Convention. I will be hard pressed to find a matching replacement. But I thank Jean so profusely for the warmth that was felt not just by myself over the years working with her, but by the scholars themselves. Some actually turned her into their own personal editors, and Jean smiled all this away...thank you Jean! You are always welcome for a coffee in my office for as long as I am at SAMRC.

Lastly, to our Masters, PhDs, Post docs, Mid-Career Scientists, PIs from the RCDI (aka HDIs), Vaccinology cohorts, the new Biostatistician PhDs, National Medical scholars at UCT& Pretoria, Medical PhDs from the special node at Wits- I know almost all of you by name or other, and I have a soft heart for each of you to be the bright stars that you are. SAMRC does not support mediocrity, so you know "if you are on our roll, you rock!!!". All the best for 2019/20. Remember, don't chew through your (sometimes imagined) difficulties alone, my office is always open to you.

CONTRIBUTORS

KEYNOTE SPEAKERS

1. Prof Nokwanda Pearl Makunga – University of Stellenbosch
2. Mr. Kenneth Mhlongo – Custocare Consultants
3. Mr Zuko Mandlakazi – Project Manager

MASTERCLASS CONVENERS

Thesis Writing and Presentation Skills

1. Mr. Alfred Thutloa – Head of Communication (SAMRC)
2. Dr Lawrence Mabasa – Biomedical Research and Innovation Platform (SAMRC)
 - Dr Ntevheni Thovhogi – Biomedical Research and Innovation Platform (SAMRC)
 - Dr Ibrahim Samodien – Biomedical Research and Innovation Platform (SAMRC)
 - Dr Tarryn Wilmer – Biomedical Research and Innovation Platform (SAMRC)
3. Dr Tamara Credo – Cochrane South Africa (SAMRC)

SCIENTIFIC PRESENTATIONS SESSION CHAIRS

1. Dr Alison Wiyeh – Seasoned Scientist Cochrane South Africa
2. Dr Jillian Hill – Non-Communicable Research Unit (SAMRC)
3. Dr Nadine Burnhams – Alcohol, Tobacco and other Drug Research Unit (SAMRC)
4. Ms Nontuthuzelo Somdyala – Burden of Diseases Research Unit (SAMRC)
5. Ms Shibe Mhlongo – Gender and Health Research Unit (SAMRC)

WITH GRATEFUL THANKS...

Research Capacity Development (RCD) would like to acknowledge the following colleagues who have been contributing to the work of RCD diligently and selflessly over the years. They are indeed the extended RCD team:

	SAMRC Portfolio	Contribution and Role at RCD
Prof Johan Louw	Director – Biomedical Research and Innovation Platform (BRIP)	Chair: RCDs Grants and Scholarships Selection Committee (MSc/PhD/ Postdoc programmes)
Prof Andre Kengne	Director – Non-Communicable Diseases Research Unit (NCDRU)	Chair: RCDs Grants and scholarships Selection Committee (MD. PhD programme)
Dr Shaheen Mowla	Research Scientist – University of Cape Town (UCT)	Member: RCDs Grants and Scholarships Selection Committee
Ms Jean Fourie	Language Practitioner/ Senior Scientist	Editor: RCD print and other resources
Ms Sumaya Behardien	Senior Legal Advisor - SAMRC	Advisor: RCD legal matters, processes, and resources
Mr Clive Glass	Grants Manager – Grants, Innovation, and Product Development	Member: RCDs Grants and Scholarships Selection Committee
Ms Noluthando Sikhutshwa	Business Partner: Project Management and Accounting Office SAMRC	Oversight: RCD Financial matters, processes, and budgets



BIO-SKETCH

MR. KENNETH MHLONGO

Kenneth Mhlongo holds an MBA from the North-West University and is currently enrolled for LLB (3rd year) with UNISA. He is the Founder and Managing Director of Custocare Consultants, a Business Consulting firm offering among other things accounting, tax, BEE verification, business start-ups, financial advisory, business financing, business advisory and mentoring services focusing on small, medium and micro enterprises (SMMEs).

Kenneth is an all-around and astute Business Manager who has held several management positions at junior, middle

and senior management levels for more than a decade in various industries in private and public sectors. Over the years he has amassed valuable governance and strategy skills having served on boards and committees of diverse institutions. Based on his passion for education, he worked part-time for Institutions of Higher learning, MANCOSA tutoring MBA students and UNISA tutoring Business Management, undergraduate students.

As a seasoned entrepreneur who owned and managed business entities across business sectors, Kenneth has a passion for setting up and supporting emerging businesses in all compliance and optimisation areas. Hence, he founded Custocare Consultants to realise his dream. In between, he does a bit of motivational speaking and is a strong advocate for the development of sustainable SMMEs as he believes they are a solution to the unemployment monster facing our country.

In line with our 2018 theme Kenneth will talk about, "Leadership geared for creating and growing sustainable SMMEs contributing towards the reduction of unemployment in the next decade".



BIO-SKETCH

PROF. NOKWANDA PEARL (NOX) MAKUNGA

Nokwanda Makunga is a Professor of Biotechnology at Stellenbosch University. She grew up in Alice in the Eastern Cape and attended a private boarding school in Grahamstown. She studied at the then Natal University in Pietermaritzburg and majored in Biochemistry and Microbiology. Her interest in biochemistry and genetics led to entering a postgraduate programme at the Research Centre for Plant Growth and Development under the leadership of Prof J van Staden. She obtained her PhD at the University of KwaZulu-Natal in 2004, working on the molecular biology of plants.

In 2005, she was recruited by Stellenbosch University as the first black female lecturer in the Science Faculty and became an Associate Professor in 2014. She established a new research direction utilising various biotechnological tools including Cape medicinal flora, which

was aimed at micropropagation and genetically modifying *Thapsia garganica* an umbelliferous Mediterranean species which is now known as an 'anticancer hand-grenade'. She used a multidirectional approach that combines the areas of biotechnology, ethnopharmacology and phytochemistry. The research is essential to establish a system for producing plantlets that would lead to commercialisation and conservation of the species. To better understanding of the molecular mechanisms governing the synthesis of secondary compounds in these plants using a functional genomics approach, they apply high-end technologies thus, adding value to local flora intimately linked with traditional plant knowledge.

Prof Makunga has won prestigious awards such as the National Science and Technology Forum Distinguished Young Black Researcher Award in 2011, and the TW Kambule NRF Research Award. In 2017, she was a Fulbright scholar at the University of Minnesota, Minneapolis. She worked with Jerry Cohen on medicinal plants from the Eastern Cape and studied the Stevia plant. She holds a patent for vegetative plant propagation. She has acted as honorary secretary, Vice President and President of the South African Association of Botanists Council.

Prof Makunga is a passionate science communicator, and her talk, "Exploiting our botanical wealth to contribute to the health and the bio-economy" should surely demonstrate this.



BIO- SKETCH

MR. ZUKO MANDLAKAZI

Zuko Mandlakazi studied banking and accountancy. He has worked and acquired experience as an Accounting Officer and as a Project Manager from Guarantee Trust, Absa Bank, Eskom and EduLoan.

He attended workshops on business management at Gibs Business School in South Africa, and masterclasses and leadership innovation, customer development and business management abroad. Some of these are, at the Pioneers

Festival in Austria, at Eureka Innovation Week in Sweden and his participation at the Venture Leaders in Switzerland. The experience has helped him shape Senso as a start-up in developing a wearable wrist device, specifically for use among the deaf or hard hearing persons, which he is currently building.

Zuko's focus is on applying lean methodologies and basic social anthropology to do research, customer development and feedback, then to use all the data acquired for product reiteration. Other responsibilities include innovation leadership, monitoring progress towards achieving objectives and being accountable for all the start-up activities.

He has received several awards and acknowledgements of which the Top 150 brightest young minds in South Africa features.

With his title, "Bootstrapping the dream", Zuko will focus on learning insights, while bootstrapping for Senso, which started as an idea to what it currently is.



BIO-SKETCH

MR. ALFRED THUTLOA

Alfred Thutloa is the Head of Corporate & Marketing Communications at the South African Medical Research Council (SAMRC). Alfred joined the SAMRC in April 2017 as the Corporate Relations Manager. He was the Head of Marketing and Communications for a pan-African research and advocacy non-governmental

organisation (NGO), also Marketing and Strategic Partnerships Manager for a hospitality group in Cape Town and Mauritius.

He also has experience as a Communications Specialist focusing on health communications for MMI Holdings. His NGO experience includes coordinating the philanthropy programme for the South African Institute for Advancement and coordinating communications for mothers2mothers, a non-profit organisation that employs, trains and empowers HIV-positive women as community health workers. Alfred's qualifications include a master's degree in Intercultural Communication, a postgraduate degree in Cultures and Heritage Studies and a bachelor's in international studies from Stellenbosch University. He is completing a PhD in linguistics with a focus on health communication at the University of the Western Cape.



BIO-SKETCH

DR LAWRENCE MABASA

Born and raised in Limpopo, Dr Lawrence Mabasa is a former Fulbright Scholar who obtained his MS and PhD degrees in Nutritional Physiology at North Dakota State University (NDSU), Fargo, USA, under the supervision of Prof Chung Park. His research centred on the role of maternal nutrition (mainly canola oil and methyl donor nutrients) on mammary and breast cancer biology in the offspring. Dr Mabasa has authored/co-authored eight peer-reviewed articles published in Journals such as *Carcinogenesis* and *Nutrition and Cancer*, while also contributing approximately R10 million worth of research grant during his stay at NDSU. Upon returning to South Africa, he spent a year at the University of Cape Town in Prof Sharon Prince's laboratory as a Postdoc. He then joined the South African Medical Research Council (SAMRC) as a Postdoctoral Fellow in 2017. Currently, Dr Mabasa is co-supervising four PhD students in Dr Rabia Johnson's laboratory at the SAMRC.



BIO-SKETCH

DR.TAMARA KREDO

Tamara Kredo is a Senior Specialist Scientist at Cochrane South Africa, based at the South African Medical Research Council, Tygerberg. She is a medical doctor with a specialist qualification in Clinical Pharmacology. She works in the field of evidence-informed healthcare, in particular, evidence synthesis. Her research focus includes exploring the South African primary care guideline landscape and developing partnerships for enhancing guideline activities in South Africa. Other areas of work include supporting capacity development initiatives for evidence-based healthcare in South Africa and Africa through the work of the Cochrane African Network along with optimising communication of evidence to relevant stakeholders to inform healthcare decision-making.

FACILITATORS



BIO-SKETCH

DR ALISON WIYEH

Alison Wiyeh is a seasoned scientist at Cochrane South Africa, an intramural Unit of the South African Medical Research Council (SAMRC). She holds a Doctor of Medicine degree from the University of Buea Cameroon and a master's degree in Clinical Epidemiology from Stellenbosch University. She is a passionate clinician, driven by her determination to ensure that health care decisions, especially in Africa, are evidence-informed. She has been involved in research projects that have influenced national health care decisions. Her main area of interest is maternal and child health, with a strong emphasis on vaccine-related research. She is also involved with capacity building on the conduct and use of Cochrane systematic reviews locally and in other countries within Africa.



BIO-SKETCH

DR JILLIAN HILL

Jillian Hill is a Senior Scientist appointed at the Non-Communicable Diseases Research Unit at the South African Medical Research Council, Tygerberg. Jillian qualified at the University of the Western Cape obtaining the degrees, B. Psych, MPH, and PhD Public Health. Currently, she is the Project Manager/Coordinator of the South African Diabetes Prevention Programme. The overall purpose of this project is to develop and evaluate a culturally-relevant model of diabetes prevention for South Africa using evidence from successful diabetes prevention effectiveness and implementation programmes. Her research focus in recent years has been in the food environment, healthy lifestyles and non-communicable diseases prevention. Her interests lie in community participatory research, interventions and project evaluation.



BIO-SKETCH

DR NADINE BURNHAMS

Dr Nadine Harker Burnhams is employed as a Specialist Scientist in the Alcohol, Tobacco and other Drug Research Unit of the South African Medical Research Council. She completed her PhD at the University of Cape Town and currently holds the position of honorary research associate at the UCT School of Public Health and Family Medicine. She has authored and co-authored peer-reviewed journal articles, technical research reports, and policy documents on the topic of substance abuse prevention,

and presented at conferences locally and internationally. She has co-authored a book titled *Alcohol, Drugs and Employment*. She has advised local, provincial and national government on issues related to alcohol and drug abuse prevention and policy and has acted as a technical advisor and consultant to the United Nations Office on Drugs and Crime (UNODC) on the drafting of guidelines for substance abuse prevention initiatives in the workplace as well as the UNODC International Prevention Standards for Drug Use. She has taught various undergraduate and postgraduate courses at the University of Cape Town and Stellenbosch. Dr Burnhams is currently the national head of the South African Community Epidemiology Network on Drug Use (SACENDU), a project that aims to provide community-level public health surveillance of alcohol, tobacco and other drug (ATOD) use trends and associated consequences. Her specific interests are in improving the quality of substance abuse prevention services, monitoring and evaluating the performance and outcomes of such services, and designing and implementing substance abuse prevention services for the work sector.



BIO-SKETCH

MS. NONTUTHUZELO IRIS MURIEL SOMDYALA

Ntuthu is a graduate nurse and midwife who specialised in nursing administration and education. She joined the South African Medical Research Council (SAMRC) in 1998 as a Research Technologist. She started setting up a cancer registry to support research conducted by SAMRC scientists in understanding why there is a high risk of oesophageal cancer in a particular population group. Currently, she is a Senior Scientist and Head of

Eastern Cape Province Cancer Registry which she manages; the only functional population-based cancer registry in South Africa. Development and survival of this registry was the result of the strong relationship that Ntuthu developed and maintained between the SAMRC and project collaborators at the Eastern Cape Department of Health, Cancer Association of South Africa, and Eastern Cape community, specifically traditional leaders. Ntuthu has extensive training and practical experience in cancer registration, methods and principles. Direct sharing of knowledge through formal teaching remains her key responsibility as an established scientist. As a recognised cancer surveillance expert, she has been invited to present her work in local and international meetings, workshops and conferences. She teaches Public Health Masters students at the University of Cape Town and has a team which is mentored and mainly developed in the field of public health and cancer surveillance. Her focus is to reduce unnecessary premature deaths caused by cervical cancer in women, and her main interests are cancer surveillance, prevention and early detection.



BIO-SKETCH
MS. SHIBE MHLONGO

Shibe Mhlongo is a data manager and statistician for the Gender and Health Research Unit (GHRU) RICE study, based in Pretoria. She holds a degree in BSc Mathematics and Statistics from the University of Zululand and an Honours degree in Statistics from the University of Western Cape. She is currently working towards a Master's in Biostatistics with the University of Stellenbosch, and her interest area is in the analysis of longitudinal studies. She works closely with Drs Carl Lombard (Biostatistician) and Naeemah Abrahams (Deputy Director, GHRU) on the impact of rape in women on HIV acquisition and retention and linkages to car.

RESEARCH CAPACITY DEVELOPMENT (RCD) STAFF

Left to right: Ms Pumla Zonke, Ms Philistia Joshua, Dr Anniza de Villiers (senior scientist), Dr Thabi Maitin (Division Manager), Ms Colleen Van Wyk, Mr Thobile Mabuya, as well as Jorene Naidoo (insert)



Administrators	Scholarship program/grant type	Target Group	Purpose/importance	Value of scholarship/grant
Mr. Thobile Mabuya	SAMRC Intramural (Postdoctoral) Programme.	Excellent Postdoctoral support	Incentive early investigators career development program.	R350 000.00 p.a x 5 years
Mr. Thobile Mabuya	SAMRC Clinician Researcher Development MD. PhD programme	Post MBChB/ D.D. S studying towards their PhD degree	Response to dearth of MD. PhD cadre within the health research team in SA and Globally	R500K p.a salary contribution x 4 yrs.
Ms. Jorene Naidoo	SAMRC Internship scholarship programme	MSc's and PhDs research training for generic black scientists	Directly supports transformation. In-house research skills transfer program.	PhD: R200K p.a x 3yrs. MSc R160K p.a x 2yrs (package incl. tuition)

Administrators	Scholarship program/grant type	Target Group	Purpose/importance	Value of scholarship/grant
Ms. Jorene Naidoo	SAMRC Research Development Grant	Once-off, last year PhD funding for strategic PhDs by university/ health sector staff	Directly support transformation, to help fast track PhD completion for senior staff at institutions or at strategic places/level of employment	Up to R250K p.a. x 1yr.
Ms. Pumla Zonke	National Health Scholarship Programme (NHSP)	Doctoral (and Masters where compelling) Research training Internships for SA young Scientist	Gold standard Public Private Partnership for PhD development in SA. (Stakeholders, NHRC, NDoH, PHEF and SAMRC partnership)	Various: equivalent to after tax take home package for profession according to SA Government Full-time Cost of Employment figures.
Ms. Philistia Joshua	SAMRC Research Capacity Development Initiative (RCDI) programme at Selected Universities	Target institutions rather than Individual Researcher Capacity Development: Project leaders in selected under resourced institutions	Directly support transformation: to develop research capacity and to work towards closing the gap in rate of generation of knowledge between established research intensive universities and under resourced universities	R1ML p.a. per selected university for 5 years
Ms. Philistia Joshua	Mid-Career Scientist Programme	Excellence Mid-Career Scientist development program in five strategic research areas		R1.2ML for the 1st year and R1.5ML for the 2nd year

Day 1: Masterclasses ▶ 17 October 2018 ◀

09h30 – 10h00	Arrival/Registration	
10h00 – 12h00	Masterclass 1 (Plenary): Taking science to the masses and building effective communication (Convener – Mr Alfred Thutloa)	
12h30 – 13h15	Lunch	
13h15 – 14h15	Masterclass 2: Thesis writing (Convener - Dr Lawrence Mabasa)	Masterclass 3: Presentation skills (Convener - Dr Tamara Kredó)
14h15 – 14h30	Tea break	
14h30 – 15h30	Master class 1 (cont.)	Masterclass 2 (cont.)
16h00 – 16h30	Shuttle to Hotel	

Day 2: Convention ▶ 18 October 2018 ◀

Session 1: Opening ceremony ▶ Auditorium ▶ Programme Director: Dr Verusia Chetty

09h30 – 10h00	Arrival/Registration	
10h00 – 10h10	Welcome and Housekeeping	Dr Thabi Maitin
10h10 – 10h30	Welcome address	Prof Mark Cotton
10h30 – 11h00	Keynote 1- Exploiting our botanical wealth to contribute to health and the bio economy	Prof Nokwanda Makunga
11h00 – 11h20	Tea break	

Session 2: Oral Presentations (Parallel sessions)

	Parallel session 1: Non-communicable diseases ▶ Auditorium ▶ Facilitator: Dr Jillian Hill	Parallel session 2: Health systems/social science ▶ Restaurant ▶ Facilitator: Dr Nadine Harker
11h20 – 11h30	Introduction	Introduction
11h30 – 11h40	P1.1: <i>Prevalence of obesity, hypertension and erectile dysfunction among HIV –ve and newly diagnosed HIV +ve ART naïve patients. V Mbombela</i>	P2.1: <i>“Codeine Is My Helper”:</i> <i>Misuse of and Dependence on Codeine-Containing Medicines in South Africa. S Dada</i>
11h40 – 11h50	P1.2: <i>A 12-week exercise intervention improves insulin sensitivity in sedentary black obese South African women: The role of ectopic lipid content. M Fortuin-de Smidt</i>	P2.2: <i>Sustainable financing options for mental health care in South Africa: findings from a situation analysis and key informant interviews. S Docrat</i>

11h50 - 12h00	P1.3: Nanoformulation of <i>Artimisia afra</i> and its potential biomedical applications in type 2 Diabetes. B Pearce	P2.3: Impact of Nyaope on physical health and organ functions. K Mokwena
12h00 - 12h10	P1.4: Effect of different formulations of Banana peel and Grape seed in preventing obesity in Sprague Dawley rats. O Aboyade	P2.4: An intersectoral collaboration model for the implementation of the integrated school health policy in the Eastern Cape Province, South Africa. S Mswana
12h10 -12h20	P1.5: Understanding the mechanism of Doxorubicin-induced Cardiotoxicity. N Sangweni	P2.5: Health related quality of life in patients treated with antiretroviral therapy only versus chemotherapy and antiretroviral therapy for HIV-associated Kaposi sarcoma: a randomized control trial. F Shaik

Session 3: Plenary session ▶ Topic: Leadership and Entrepreneurial Contribution in the next Decade ▶ Auditorium ▶ Facilitator: Dr Verusia Chetty

12h20 - 13h00	Keynote 2 - Bootstrapping the dream	Mr. Zuko Mandlakazi
13h00 - 13h30	Award Ceremony	Dr Thabi Maitin and Ms. Nontuthuzelo Somdyala
13h30	Shuttle to Hotel	
14h00	Marcos Event	

Day 3: Convention ▶ 19 October 2018 ◀

09h30 – 10h00	Arrival/Registration	
Session 4: Oral Presentations (Parallel sessions)		
	Parallel session 3: Molecular/Bio Sciences ▶ Auditorium ▶ Facilitator: Ms. Shibe Mhlongo	Parallel session 4: Communicable diseases ▶ Restaurant ▶ Facilitator: Dr Allison Wiyeh
10h00 – 10h10	Introduction	Introduction
10h10 – 10h25	P3.1: Proteomic analysis of geometrically and ethnically classified human hair in a South African cohort. H Adeola	P4.1: Simulation and modelling of longitudinal HIV viral load measures during pregnancy and breastfeeding. T Glass
10h25- 10h40	P3.2: Design, synthesis and in vitro bio-analytical tests of new chemical entities as CYP17A1 inhibitors: targeting prostate cancer. NJ Gumede	P4.2: Knowledge, Attitudes and Practices on Schistosomiasis in Sub-Saharan Africa: A systematic review. H Sacolo

10h40 - 10h55	P3.3: Investigation of the influence of genetic variation on the expression efficiency of the promoter region of SLC47A2/MATE-2K gene. C Masilela	P4.3: Percutaneous pericardioscopy in a population with a high prevalence of tuberculous pericarditis – improving the diagnostic yield and advancing the time to diagnosis. C Kyriakakis
10h55 – 11h10	P3.4: Whole-genome Transposon Mutagenesis to Elucidate the Genetic Requirements for Vitamin B12 Biosynthesis and Assimilation in Mycobacteria. R Mbau	P4.4: Impact of Implementation of Gene Xpert Ultra on TB diagnosis in South Africa. H Moultrie
11h10 – 11h25	P3.5: Genetic variation within the coding region of CCR5 in Chronically HIV-1 infected South African individuals. N Matume	P4.5: Application of the IMVACC program in the workplace. T Khoza
11h25 – 11h35	Tea Break	

Session 5: Plenary session ▶ Auditorium ▶ Programme Director: Dr Verusia Chetty

11h35– 12h10	Keynote 3 - Leadership geared for creating and growing sustainable SMMEs contributing towards the reduction of unemployment in the next decade	Mr. Kenneth Mhlongo
12h10– 12h30	Closing remarks and thank you	Dr Thabi Maitin, Ms. Nontuthuzelo Somdyala
12h30 – 13h15	Lunch	
13h15	Delegates depart to airport	

SAMRC INTRAMURAL (POSTDOCTORAL) PROGRAMME

No	Initials	Surname	University/ Research Unit	Abstract Title
1.	M.	Aboyade	Tshwane University of Technology	Effect of different formulations of banana peel and grape seed in preventing obesity in Sprague Dawley rats
2.	J.	Bantjes	Stellenbosch University	We try our best, but it's probably not our best": Health professionals' experience of providing emergency care to self-harm patients in a South African hospital
3.	T.	Brombacher	University of Cape Town	The role of CD4+ T-cell subsets in cognitive function
4.	C.	Ealand	University of the Witwatersrand	Resuscitation-promoting factors are required for <i>Mycobacterium smegmatis</i> biofilm formation
5.	C.	Ginsburg	University of the Witwatersrand	Health-care utilisation and internal migration in rural and urban South Africa
6.	B.	Sumner	Alcohol, Tobacco and Other Drugs Research Unit	'We are here for our patients' – resilience amidst challenges in primary care managers
7.	W.	Chirinda	Health Systems Research Unit	Unmet need for contraception, unplanned pregnancy and contraceptive use among HIV-infected and HIV-uninfected women in South Africa
8.	J.	Coetsee	Gender and Health Research Unit	Modelling HIV and associated factors among sex workers in South Africa
9.	J.	Dietrich	Health Systems Research Unit	A baseline investigation of factors associated with viral suppression among young women and girls from the HERStory Study in ten South African districts
10.	P.	Dludla	Biomedical Research Innovation and Platform	Investigating a dose-dependent effect of palmitate and simvastatin on cell viability and production of reactive oxygen species using an in vitro model of diabetic cardiomyopathy
11.	M.	Klopper	Centre for Tuberculosis Research Unit	Isoniazid resistance determination: challenges in practice

12.	A.	Mutshambele	Tuberculosis Platform (PTA)	The potential of single nucleotide polymorphisms within virulence genes as lineage and sub-lineage markers of <i>Mycobacterium tuberculosis</i>
13.	C.	Naidoo	Centre for Tuberculosis Research Unit	Oral, airway and gut microbial communities are altered in patients with active tuberculosis
14.	A.	Ngwane	Centre for Tuberculosis Research Unit	Proteomic analysis reveals that sulfamethoxazole induces oxidative stress in <i>M. tuberculosis</i>
15.	B.	Pearce	University of the Western Cape	Nanoformulation of <i>Artemisia afra</i> and its potential biomedical applications in type 2 diabetes
16.	T.	Sylvester	Centre for Tuberculosis Research Unit	Novel qPCR assays for the measurement of immune gene expression in African lion (<i>Panthera leo</i>) whole blood
17.	N.	Thovhogi	Biomedical Research Innovation and Platform	Effects of rooibos phenolic compounds on microbiota regulation and prevention of the metabolic syndrome

SAMRC CLINICIAN RESEARCHER CAPACITY DEVELOPMENT (M.D PHD) PROGRAMME

No	Initials	Surname	University/ Research Unit	Abstract Tittle
18.	M.	De-Smidt	University of Cape Town	A 12-week exercise intervention improves insulin sensitivity in sedentary black obese South African women: The role of ectopic lipid content
19.	L.	Githinji	University of Cape Town	Longitudinal changes in spirometry in perinatally HIV-infected adolescents on antiretroviral therapy in Cape Town, South Africa
20.	J.	Holness	Stellenbosch University	The reliability of estimated glomerular filtration rate in South African children
21.	A.	Jabar	University of Cape Town	The introduction of violence and injury observatories suggests a reduction in violence-related injury in adult populations. A systematic review and meta-analysis
22.	W.	Jassat	University of the Western Cape	The decentralised drug-resistant TB programme in South Africa: From policy to implementation

23.	C.	Kyriakakis	Stellenbosch University	Percutaneous pericardioscopy in a population with a high prevalence of tuberculous pericarditis – improving the diagnostic yield and advancing the time to diagnosis
24.	C.	Marsay	University of Witwatersrand	Postnatal mood and socio-economic context among low-income women in Johannesburg, South Africa
25.	H.	Moultrie	University of Witwatersrand	Impact of implementation of Gene Xpert Ultra on TB diagnosis in South Africa
26.	F.	Shaik	University of KwaZulu-Natal	Plasma Kaposi's sarcoma herpesvirus DNA as a prognostic biomarker
27.	L.	Van den Heuvel	Stellenbosch University	Hair cortisol levels in posttraumatic stress disorder patients versus controls
28.	E.	Zitha	University of Cape Town	A prospective study of the epidemiology of severe cutaneous adverse drug reactions and associated neuropsychiatric sequelae

SAMRC INTERNSHIP SCHOLARSHIP PROGRAMME (ISP)

No	Initials	Surname	University/ Research Unit	Abstract Title
29.	Z.	October	Biomedical Research and Innovation Platform	Genetic polymorphisms and <i>in vitro</i> analysis of SLC22A2 and SLC47A2 promoters in the Xhosa population
30.	J.	Arries	Stellenbosch University	Molecular characterisation of proteins involved in iron-sulphur cluster assembly in mycobacteria
31.	I.	Boshielo	University of Witwatersrand	Plasma cytokine biomarkers to predict Tuberculosis treatment response
32.	N.	Ellman	University of Cape Town	Adipose tissue antioxidant expression in visceral and subcutaneous abdominal depots and the association with cardiometabolic risk factors in an obese population
33.	N.	Ellman	University of Cape Town	Effect of Roux-en-Y gastric bypass surgery versus a conventional weight-loss programme on cardiometabolic risk factors at one and six months post-intervention
34.	N.	Hlengwa	Biomedical Research and Innovation Platform	Influence of <i>Lessertia frutescens</i> and <i>Echinacea purpurea</i> on the bioavailability and metabolism of ethinylestradiol based contraceptives

35.	L.	Keet	Stellenbosch University	The effects herbal teas (Rooibos and Honeybush) in the regulation of inflammatory responses during skin carcinogenesis
36.	N.	Khuboni	Biomedical Research and Innovation Platform	An anti-steatotic effect of Aspalathin-rich green Rooibos extract on oleic acid induced steatosis in C3As
37.	S.	Mabhida	University of the Western Cape	Understanding the role inter-individual genetic variation plays in the development of uncontrolled hypertension in patients with concomitant type 2 diabetes mellitus at Tygerberg Academic Hospital, Western Cape South Africa
38.	N.	Mabuza	University of KwaZulu-Natal	Background qualifications, self-perceived competencies and leadership development practices among public-sector hospital managers in KwaZulu-Natal
39.	N.	Malaza	University of Witwatersrand	The association between polymorphisms in the vitamin D receptor and metabolizing enzyme genes and type 1 diabetes mellitus in the South African Indian population
40.	C.	Masilela	University of the Western Cape	Investigation of the influence of genetic variation on the expression efficiency of the promoter region of SLC47A2/MATE-2K gene
41.	R.D.	Mbau	University of Cape Town	Whole-genome transposon mutagenesis to elucidate the genetic requirements for vitamin B12 biosynthesis and assimilation in mycobacteria
42.	S.	Modiba	University of Witwatersrand	Development and validation of antiretroviral drug levels for therapeutic drug monitoring using dried blood spots
43.	H.	Mutayhatsindi	Stellenbosch University	Prospective evaluation of candidate host immunological biosignatures as tools for the diagnosis of TB disease
44.	Y.	Ntamo	Biomedical Research and Innovation Platform	Metabolic profile of rat Insulinoma beta-cell spheroids (INS-1)

45.	C.	Ntsapi	Stellenbosch University	Sustained autophagic flux with cell death onset in an in vitro model of Alzheimer's disease
46.	E.	Oduwole	Stellenbosch University	Investigating vaccine hesitancy and validating a measuring tool in the Western Cape Province
47.	S.	Pitts	Stellenbosch University	Genome-wide associations between host genotypes and <i>M. tuberculosis</i>
48.	N.	Sangweni	Biomedical Research and Innovation Platform	Prevention of Doxorubicin-induced cardiotoxicity: A mechanistic study
49.	M.	Shaku	University of Witwatersrand	A peptidoglycan recycling and amidation enzyme in <i>Mycobacterium tuberculosis</i> as a new drug target for tuberculosis

NATIONAL HEALTH SCHOLARSHIP PROGRAMME (NHSP)

No	Initials	Surname	University/ Research Unit	Abstract Title
50.	T.	Assegai	University of the Western Cape	Supervision system of WBOT in North West Province Districts
51.	K.	Barnard	Stellenbosch University	Diversity and ecology of astroviruses in South African bats
52.	W.	Barnett	University of Cape Town	Maternal exposure to trauma and child adverse growth outcomes in a South African birth cohort
53	K.	Berner	Stellenbosch University	Biomechanical analysis of specific motor impairments contributing to early functional decline in adults living with HIV/AIDS: sub-study to the Cape Winelands HAART to HEART/ EndoAfrica study
54.	K.	Brittain	University of Cape Town	Patterns and predictors of HIV-status disclosure among pregnant women in South Africa: Dimensions of disclosure and influence of social and economic circumstances
55.	B.S.	Carpenter	University of Kwa-Zulu Natal	Understanding treatment individualisation and its impact on study design and analysis
56.	S.	Dada	Alcohol, Tobacco and Other Drugs Research Unit	Codeine is my helper": Misuse of and dependence on codeine-containing medicines in South Africa

57.	A.	Damons	Stellenbosch University	Introducing an arteriovenous fistula pre-cannulation assessment care-bundle to reduce complications in patients with an arteriovenous fistula on haemodialysis
58.	S.	Docrat	University of Cape Town	Sustainable financing options for mental health care in South Africa: findings from a situation analysis and key informant interviews
59.	L.	Frigati	University of Cape Town	Multisystem impairment in perinatally HIV-infected South African adolescents on ART
60.	P.	Gina	University of Cape Town	<i>In vivo</i> and <i>in vitro</i> studies to investigate the role of autophagy in human tuberculosis
61.	T.	Glass	University of Cape Town	Simulation and modelling of longitudinal HIV viral load measures during pregnancy and breastfeeding
62.	D.	Govindasamy	Health Systems Research Unit	Well-being among youth living with and without HIV in South Africa: A health economic perspective
63.	H.G	Sacolo	University of KwaZulu-Natal	Knowledge, attitudes and practices on schistosomiasis in sub-Saharan Africa: A systematic review
64.	L.J.	Nzuzi Khuabi	Stellenbosch University	Factors influencing high school re-entry and school participation following the onset of a traumatic brain injury
65.	K.	Kgoadi	University of Cape Town	Dendritic cells and other antigen presenting cells induce protective Th1 immunity in mice infected with central nervous system tuberculosis
66.	H.	Koch	University of KwaZulu-Natal	Becoming an interventionist-researcher during the research process
67.	G.	Mahumane	University of Witwatersrand	3D scaffold for neural tissue engineering
68.	S.	Manie	University of Cape Town	Pulmonary rehabilitation for people with tuberculosis in a high HIV-positive setting: A randomised control trial
69.	K.	Montjane	University of Cape Town	Pharmacogenetics of tenofovir
70.	M.	Mutemwa	University of the Western Cape	Developing an education programme designed to improve quality of life of people living with HIV on antiretroviral therapy in the Johannesburg Metropole

71.	M.	Nglazi	University of Cape Town	An analysis of overweight and obesity in South Africa: The case of women of childbearing age
72.	J.	Nothling	Stellenbosch University	Genome-wide differentially methylated genes associated with PTSD in female rape survivors
73.	Z.	Ogle	Stellenbosch University	The quality of life of primary health care patients diagnosed with hypertension and/or diabetes in the Eastern Cape, South Africa
74.	M.	Osman	Stellenbosch University	Finding former tuberculosis patients - a high-risk group for tuberculosis-associated morbidity and mortality in Cape Town, South Africa: A pilot study
75.	A.	Papadopoulos	University of Witwatersrand	A novel metallo-endopeptidase required for peptidoglycan remodelling during osmolarity changes in <i>M. tuberculosis</i>
76.	S.	Pasche	Stellenbosch University	Harm-reduction in the management of adolescent self-harm: ethical and practical considerations in a South African context
78.	N.J.	Philips	University of Cape Town	HIV-associated cognitive disorders in children and adolescents: methodological investigations and validating a quick screening tool
79.	R.D.	Pietersen	Stellenbosch University	Mouse macrophages upregulate Mx1 and Mx2 upon infection with mycobacteria
80.	C.M.	Pule	Stellenbosch University	Deciphering the physiological state of drug resistant <i>Mycobacterium tuberculosis</i> strains
81.	C.	Schutz	University of Cape Town	High early mortality in patients hospitalised with HIV-associated tuberculosis: Characterising the immune response associated with death
82.	N.V.	Sibiya	University of Cape Town	Understanding and defining blood biomarkers of subclinical tuberculosis and their relationship to inflammation at the site of disease

SAMRC RESEARCH DEVELOPMENT INITIATIVE PROGRAMME (RCDI)

No	Initials	Surname	University/ Research Unit	Abstract Title
83.	N.E.	Bam	Walter Sisulu University	Determinants of type-2 diabetes mellitus among HIV/AIDS patients on antiretroviral drugs in the OR Tambo district, South Africa
84.	T.	Apalata	Walter Sisulu University	Factors associated with recent unsuppressed viral load in HIV-1-infected patients receiving first-line antiretroviral therapy in an NHI pilot district in Eastern Cape, South Africa
85.	T.	Apalata	Walter Sisulu University	Task-shifting for antiretroviral treatment delivery and quality of HIV/AIDS care initiated by nurses at primary health-care level in Eastern Cape, South Africa
86.	A.	Boggenpoel	University of the Western Cape	The proposed adaptation and implementation of acute care clinical guidelines in the management of traumatic spinal cord injuries for the South African context: A Delphi consensus study protocol
87.	P.K.P	Chokoe	University of Limpopo	Integrative analysis of epigenetic modifications in a breast cancer cell line treated with a bioactive extract of <i>bidens pilosa</i>
88.	H.	Gomwe	University of Fort Hare	Developing a model for promoting physical fitness and healthy lifestyle of primary school learners in the Eastern Cape Province, South Africa
89.	D.T.	Goon	University of Fort Hare	Training needs for the implementation of the 2012 Integrated School Health Policy in the Eastern Cape Province
90.	N.	Gumede	Mangosuthu University of Technology	Design, synthesis and <i>in vitro</i> bio-analytical tests of new chemical entities as CYP17A1 inhibitors: targeting prostate cancer
91.	T.	Magoro	University of Venda	STAT-1 is required for the induction of interferon independent cholesterol 25-hydroxylase
92.	K.	Malemela	University of Limpopo	Investigation of the probable anti-cancer effects of the crude methanol extract of <i>Dicerocaryum senecioides</i> , (klotzch) j. abels, leaves on cervical HeLa cancer cells

93.	N.D.	Matume	University of Venda	Genetic variation within the coding region of CCR5 in chronically HIV-1 infected South African individuals
94.	V.	Mbombela	Walter Sisulu University	Prevalence of obesity, hypertension and erectile dysfunction among HIV –ve and newly diagnosed HIV +ve ART naïve patients
95.	N.	Mchunu	University of Zululand	<i>In vitro</i> assessment of cytochrome P450 and drug transporters modulation by polyphenolic constituents of <i>Cyclopia genistoides</i>
96.	S.	Mnwana	University of Fort Hare	An intersectoral collaboration model for the implementation of the integrated school health policy in the Eastern Cape Province, South Africa
97.	M.	Moloantoa	University of Limpopo	Phytochemical analysis of ethyl acetate and methanol extracts of <i>Senna italica</i>
98.	M.	Mudalahothe	University of Limpopo	<i>Momordica balsamina</i> induces p53-mediated apoptosis associated with G0/G1 cell division cycle arrest in lung A549 cancer cells
99.	R.	Musoliwa	University of the Western Cape	Genetic diversity of SLCO1B1 within indigenous South Africans and impact on enalapril therapy
100.	E.	Seekoe	University of Fort Hare	Challenges faced by school health nurses in the implementation of the 2012 Integrated School Health Policy in the Eastern Cape Province, South Africa
101.	A.P.	Okeyo	University of Fort Hare	Evaluating the school food and nutrition environment in the Eastern Cape South Africa: Implication for healthy eating of secondary school learners
102.	M.	Raboshakga	University of Limpopo	The analysis of the phytochemical profile and antioxidant activity of crude methanolic and sub-fractions of <i>Bidens pilosa L</i>
103.	E.	Seekoe	University of Fort Hare	The conceptualization of the 2012 Integrated School Health Policy: In the lens of principals, Life Orientation teachers, school governing bodies and ward counsellors in the Eastern Cape, South Africa

105.	M.	Tolo	University of Limpopo	Phytochemical constituent profiles and antioxidant activity of six different extraction formulations for analysis of <i>Bidens pilosa</i> L crude extract and its sub-fractions
106.	T.	Tshidino	University of Limpopo	<i>In vitro</i> antidiabetic and cytotoxicity properties of <i>Commelina benghalensis</i> acetone extract against 3T3-L1 cells

SAMRC MID-CAREER SCIENTIST PROGRAMME (MCSP)

No	Initials	Surname	University/ Research Unit	Research Title
107.	H.	Adeola	University of Cape Town	Proteomic analysis of geometrically and ethnically classified human hair in a South African cohort
108.	M.	Alkelani	University of Cape Town	The role of stem cells in the pathogenesis of scarring alopecia
109.	K.	Chabaesele	University of Cape Town	Is there an association between frontal fibrosing alopecia and sunscreen actives?
110.	E.	Cloete	University of Cape Town	Interdependence between geometric, tensile and chemical bond behaviours of untreated curly hair fibres
111.	S.	Da Silva	University of Cape Town	The use of hair to detect and monitor hyperglycaemia – a pilot study
112.	M.	Gabier	University of Cape Town	The identification of novel microbial signatures as biomarkers in traction alopecia
114.	O.	Kgasha	Sefako Makgatho University	The Stop Rheumatic Heart Disease Through Awareness Raising, Surveillance, Advocacy, and Prevention Research Programme: Longitudinal Studies of Primary and Secondary Prevention of Rheumatic Heart Disease
115.	H.A.	Adeola	University of Cape Town	Differential genomic profiling for staging and diagnosis of traction alopecia: A pilot study
116.	A.	Khine	Sefako Makgatho University	Impact of Nyaope on physical health and organ functions
117.	T.	Skhakhane	University of Cape Town	Molecular approaches for characterisation of cicatricial alopecia



SAMRC INTRAMURAL (POSTDOCTORAL) PROGRAMME

MR THOBILE MABUYA – PROGRAMME ADMINISTRATOR

EFFECT OF DIFFERENT FORMULATIONS OF BANANA PEEL AND GRAPE SEED IN PREVENTING OBESITY IN SPRAGUE DAWLEY RATS

¹O. Aboyade, ¹T. Gumata, ¹D. Katerere

¹Department of Pharmaceutical Science, Tshwane University of Technology, Arcadia, Pretoria

BACKGROUND

Worldwide, obesity has reached epidemic proportions. This condition is a major contributor to the global burden of chronic disease and disability affecting many, regardless of their age, gender and race. In recent studies, the potential use of plant products to prevent obesity has been explored.

OBJECTIVES

To determine the protective effect of different formulations of banana peel and grape seed on the prevention of obesity in Sprague Dawley rats.

METHODS

Three different formulations of banana-peel and grape-seed powders were tested in Sprague Dawley rats for 12 weeks. The rats (n=40) were divided into five groups and fed the following diets: normal diet (negative control; group 1); high-fat diet (HFD; positive control; group 2); HFD + BPGS 1 (group 3); HFD + BPGS2 (group 4) and HFD + BPGS3 (group 5). The animals were terminated after 12

weeks. Biochemical and histopathological analyses were performed on the rats.

RESULTS

Although all the treatment groups and the negative control group had significantly higher food intake compared to the positive control group, weight gain in all these groups was significantly lower ($p < 0.001$). The levels of triglycerides and high-density lipoprotein (HDL) observed in all treatment groups were higher than those of the control group. However, the HDL level was only significant in group 3 ($p < 0.05$). All the treatment groups had significantly higher ALP and ALT compared to the positive control ($p < 0.001$). Histopathological evidence showed that these changes in the liver are usually associated with increased metabolic activity.

CONCLUSION

In this study, we showed that although these formulations prevented weight gain, they significantly increased the triglyceride and liver enzyme levels.

“WE TRY OUR BEST, BUT IT’S PROBABLY NOT OUR BEST”: HEALTH PROFESSIONALS’ EXPERIENCE OF PROVIDING EMERGENCY CARE TO SELF-HARM PATIENTS IN A SOUTH AFRICAN HOSPITAL

¹J. Bantjes, ¹A. Nel, ²K. Louw, ³I. Lewis

¹Department of Psychology, Stellenbosch University, Stellenbosch; ²Department of Psychiatry, Stellenbosch University, Tygerberg; ³Department of Psychiatry and Mental Health, University of Cape Town, Cape Town

BACKGROUND

Self-harm patients presenting at an emergency room (ER) are a clearly delineated group at elevated risk of future acts of nonfatal and fatal suicidal behaviour. ERs are potentially effective, albeit underutilised, sites for targeted suicide prevention interventions.

OBJECTIVE

In this qualitative study, we aimed to document the experiences of health professionals tasked with providing emergency medical and psychiatric care to self-harm patients in the ER of a South African hospital.

METHODS

Data were collected via semi-structured interviews with 29 medical staff and analysed using thematic analysis.

RESULTS

Providing emergency care to self-harm patients is described as challenging and anxiety provoking. Factors perceived to contribute to these challenges include resource constraints; lack of access to community-based psychosocial care; the perception that suicide risk and intent cannot be assessed accurately; belief that self-harm patients do not provide reliable accounts of themselves; and a perception that medical professionals are

legally responsible for preventing suicide. Participants describe employing several strategies to contain the anxiety of caring for self-harm patients including avoiding asking patients about current suicidal ideation or intention; rigidly over-relying on protocols, procedures and psychometric scores; and shifting responsibility and “turfing” self-harm patients to psychiatry. Participants describe how the emergency care of self-harm patients has been organised into two distinct and potentially adversarial systems – a medical system (focused on patients’ physical needs) and a psychiatric system (that attends to patients’ psychosocial contexts).

CONCLUSIONS

Participants perceptions and the strategies they employ to contain their anxiety and intolerable feelings work against adherence to evidence-based best practice guidelines, and the provision of integrated, collaborative and person-centred care for self-harm patients. Cartesian dualism is alive and well in emergency medicine and emergency psychiatry. The mind-body split and medicine’s progression towards sub- and superspecialism may potentially compromise the care of self-harm patients in ERs.

THE ROLE OF CD4+ T-CELL SUBSETS IN COGNITIVE FUNCTION

¹T. Bogale-Brombacher, ¹K. de Gouveia, ¹O. Tamgue, ¹M. Scibiorek, ¹F. Brombacher

¹Cape Town Component International Centre for Genetic Engineering and Biotechnology, Division of Immunology Institute of Infectious Disease and Molecular Medicine Health Science Faculty, University of Cape Town, South Africa Medical Research Council, Cape Town

BACKGROUND

Various researchers have demonstrated that T cells are important for cognitive functions by secreting Interleukin-4 (IL-4) and IL-13 during Morris water maze (MWM) training. These ligands stimulate astrocytes via IL-4Receptor alpha/gamma c (IL-4R α / γ c) and IL-4R α /IL-13R α 1, respectively to produce brain-derived neurotrophic factor (BDNF) in the meninges to foster cognitive functions.

OBJECTIVES

To gain insight into the possible downstream neural mechanism mediated by meningeal and brain parenchyma cytokine milieu, the effect of different cytokines and their combinations on astrocytic expression of pro- and anti-inflammatory products were examined following MWM training.

METHODS

For the MWM task, mice were trained on acquisition for four days, given four trials per day from varying entry points. This was followed by a single probe trial on day five to determine effects on memory formation. Immunological and

neurological cell populations influenced by specific IL-4R α deficiency on T cells were characterised. EthoVision XT 8 was used to record data, with statistical analyses by ANOVA or Student t test. Protocols (No. 050/015) were approved by the animal ethics research committee of the University of Cape Town, South Africa.

RESULTS

To better understand which T-cell subsets are important, we used a loss of function strategy by generating T-cell-specific IL-4Ra deficient mouse models. This included Pan T-cell IL-4Ra deficient mice, CD4+CD8- T-cell IL-4Ra deficient mice, CD4+g/d-T-cell IL-4Ra deficient mice, as well as FoxP3-IL-4Ra deficient mice compared to wild-type mice. Of interest, all T-cell subsets showed reduced learning and memory compared to controls.

CONCLUSION

MWM studies using various T-cell IL-4Ra deficient mice showed impaired learning and memory, suggesting that all T-cell subsets, including regulatory T cells, contribute to cognitive function.

RESUSCITATION-PROMOTING FACTORS ARE REQUIRED FOR *MYCOBACTERIUM SMEGMATIS* BIOFILM FORMATION

¹C. Ealand, ²B. Rimal, ²J. Chang, ¹L. Mashigo, ¹M. Chengalroyen, ¹L. Mapela, ¹G. Beukes, ¹E. Machowski, ²S.J. Kim, ^{1,3}B. Kana

¹DST/NRF Centre of Excellence for Biomedical TB Research, Faculty of Health Sciences, University of the Witwatersrand, National Health Laboratory Service, Johannesburg, South Africa; ²Department of Chemistry and Biochemistry, Baylor University, Waco, Texas, USA; ³MRC-CAPRISA HIV-TB Pathogenesis and Treatment Research Unit, Centre for the AIDS Programme of Research in South Africa, CAPRISA, Durban, South Africa

BACKGROUND

Resuscitation promoting factors (Rpf) are enzymes that have previously been shown to act as growth cytokines via their lysozyme-like activity on peptidoglycan (PG) in the bacterial cell wall. In *Mycobacterium tuberculosis*, these proteins have specifically been implicated with reactivation of latent disease to its active form. Protein domain architecture reveals the presence of a G5 domain, previously associated with bacterial biofilm formation, suggesting that Rpf may play an additional role in mycobacterial communication.

OBJECTIVE

Mycobacterium smegmatis encodes four distinct rpf homologues, MSMEG_5700 (*rpfA*), MSMEG_5439 (*rpfB*), MSMEG_4640 (*rpfE2*) and MSMEG_4643 (*rpfE*). We hypothesized that strains lacking *rpf* genes would have altered growth phenotypes.

METHODS

In-frame, unmarked deletion mutants (single and combinatorial) were constructed using homologous recombination. Mutant strains were confirmed by PCR and/or Southern hybridisation. Complementation strains were constructed by introducing full-length genes downstream of native promoters at the *attB* site in the chromosome. All strains, including the wild-type, were cultured on

solid and liquid media to assess biofilm formation. The susceptibility to cell wall targeting agents was tested and proposed alterations in PG composition were determined using LC-MS.

RESULTS

Single and combinatorial deletion mutant strains displayed altered colony morphologies and the inability to form typical biofilms. Moreover, any strain lacking *rpfA* and *rpfB* simultaneously exhibited increased susceptibility to rifampicin, vancomycin and SDS. Exogenously Rpf supplementation failed to restore biofilm formation. Relative to the wild-type, LC-MS analysis of PG isolated from the strain lacking all four *rpf* genes, detected a reduced level of 4-3 cross-linked PG dimers concomitant increase of 3-3 cross-linked muropeptides. In addition, the level of PG-repeat units terminating in 1,6-anhydroMurNAC appeared to be significantly reduced.

CONCLUSION

Collectively, our data proves that Rpf play an important role in biofilm formation and antibiotic tolerance, possibly through alterations in PG cross-linking and the production of signalling molecules.

HEALTH-CARE UTILISATION AND INTERNAL MIGRATION IN RURAL AND URBAN SOUTH AFRICA

^{1,2}C. Ginsburg, ¹⁻³M.A. Collinson, ^{1,2}F.X. Gomez-Olive, ⁴M. Gross, ⁴M. Lurie, ⁴R. Wang, ^{1,4}M.J. White

¹ Medical Research Council/Wits Rural Public Health and Health Transitions Research Unit (Agincourt), School of Public Health, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa; ² INDEPTH Network, Accra, Ghana; ³ Department of Science and Technology/Medical Research Council, South African Population Research Infrastructure Network, South Africa; ⁴ Population Studies and Training Centre, Brown University, USA

BACKGROUND

Within South Africa, geographic mobility is high as people engage in permanent resettlement and temporary movement. Mobility, which results in an altered set of circumstances, may compromise health care access and continuity of care for individuals requiring treatment. Not enough is known about health-care utilisation among internal migrants.

OBJECTIVE

For this paper, our objective is to explore health-care utilisation in a cohort of internal migrants and permanent residents originating from the Agincourt Health and Demographic Surveillance System (HDSS) in South Africa's rural northeast.

METHODS

A 5-year cohort study of 3800 individuals, ages 18–40 years, commenced in 2017. The cohort was randomly selected from the Agincourt HDSS platform and includes residents of the Agincourt sub-district and temporary migrants. Data have been collected from 1095 Agincourt residents and 250 temporary migrants living in Johannesburg. Descriptive statistics and logistic regression models were used to examine health service utilisation and its determinants.

RESULTS

Of the Agincourt HDSS residents, 59% reported having utilised health services in the preceding year, compared to 45% of temporary migrant respondents. Migrants were more likely to have accessed private health facilities compared to rural residents (6% of Agincourt respondents and 31% of Johannesburg-based migrants who used services, attended private facilities). Logistic regression analysis revealed that female Agincourt residents were twice as likely to have used health services compared to males, with the odds of service utilisation lower for employed individuals and those with post-school education. Conversely, female temporary migrants had 0.75 times the odds of accessing health services compared to males.

CONCLUSIONS

Provisional results suggest that health service utilisation and its determinants may differ by migrant status. Information on health service utilisation among internal migrants can assist in developing meaningful public health interventions that seek to improve the continuity of health care delivery across space.

'WE ARE HERE FOR OUR PATIENTS' – RESILIENCE AMIDST CHALLENGES IN PRIMARY CARE MANAGERS

¹C. Brooke-Sumner, ¹P. Petersen-Williams, ¹B. Myers

¹Alcohol, Tobacco and Other Drug Research Unit, South African Medical Research Council, Tygerberg

BACKGROUND

The South African primary health system faces pressure from increasing headcounts and shrinking budgets. Facility managers are pivotal to service provision, interacting directly with patients, providers and higher health structures.

OBJECTIVE

In this study, we investigated experiences and challenges of primary care managers in the Western Cape.

METHODS

In-depth interviews were conducted with 20 managers. NVivo 11 was used to manage data. Thematic analysis was employed by two coders, with inductive constant comparative analysis to identify, modify and confirm themes.

RESULTS

Participants described navigating a complex workspace comprising a dynamic relationship between the community served, the powerfully hierarchical health

system, and the interpersonal interactions between facility staff. Most of the participants were women. They described a deep burden of care extending to patients and particularly their staff. This linked to a preference for a participatory management style that they perceived to be in conflict with health system structures. Two substantial causes of stress were commonly reported, (i) seeing first-hand the adverse impact of diminishing resources; and (ii) facing personal accountability for facility statistics in this challenging environment. All but one remained positive of their ability to address ongoing challenges.

CONCLUSIONS

The commitment of primary care managers positions them as a lever influencing public health outcomes. Further investigation into the burden of care is required. Subsequent intervention to promote mental health and support participatory management will avoid eroding this vital human resource.

UNMET NEED FOR CONTRACEPTION, UNPLANNED PREGNANCY AND CONTRACEPTIVE USE AMONG HIV-INFECTED AND HIV-UNINFECTED WOMEN IN SOUTH AFRICA

¹W. Chirinda

¹ Health Systems Research Unit, South African Medical Research Council, Cape Town

BACKGROUND

Reducing unmet needs for contraception and prevention of unplanned pregnancies among HIV-infected women is one of the key components of prevention of mother-to-child transmission (PMTCT) of HIV strategies.

OBJECTIVE

We assessed unplanned pregnancies, unmet need and contraceptive use among HIV-infected and HIV-uninfected postpartum women in South Africa.

METHODS

Secondary data from a nationally representative, cross-sectional survey, conducted in 2012/13 were analysed. Data were analysed for 9277 women who self-reported as being HIV-positive or -negative and consented to participate in the national evaluation. We used a multivariable logistic regression model to estimate factors associated with unplanned pregnancy and unmet need for contraception.

RESULTS

The mean age of the sampled women was 26.3 years (SD 6.35), and their HIV prevalence was 31.7% (95%CI: 30.6-32.7). More than a third (35.5%) were unaware of their HIV-positive status before pregnancy. Overall, 5524 (61%) reported that their pregnancies were unplanned and of these 1656 (29.4%) reported using a contraceptive method before pregnancy. Most (>55.4%) of those using contraceptives were using injectables. Very few (<2%) were using dual methods. In multivariate analysis, maternal age, marital status, knowing their partner's HIV status, disclosure and education were associated with unplanned pregnancy. HIV-infected women were 2.4 times more likely to have an unmet need for contraception compared to HIV-uninfected women. Unmet need for contraception was associated with HIV serostatus, maternal age, marital status, timeliness of first antenatal clinic visit, knowing their partner's HIV status, and disclosure.

CONCLUSIONS

The prevalence of unplanned pregnancy and the unmet need for contraception was high in South Africa. Interventions are required to improve access to effective and reliable contraceptive methods that align with pregnancy intentions; promote dual contraception; and integration of family planning and HIV-prevention services.

MODELLING HIV AND ASSOCIATED FACTORS AMONG SEX WORKERS IN SOUTH AFRICA

^{1,2}J. Coetzee, ^{1,3}R. Jewkes, ³G. Gray

¹Gender and Health Research Unit South African Medical Research Council, Pretoria; ²Perinatal HIV Research Unit, Division of the University of the Witwatersrand, Johannesburg, South Africa; ³Office of the President, South African Medical Research Council, Cape Town

BACKGROUND

South Africa has the highest prevalence of HIV in the world, yet little is known about factors driving the epidemic among key affected populations, such as sex workers (SWs). In South Africa, SWs have been shown to have an HIV prevalence ranging from 36-89%, with 16% of HIV-positive female sex workers (FSWs) in Soweto having HIV-drug resistance. They are known to be exposed to high levels of violence perpetrated by clients and policing officials and suffer from mental ill health. There is no research which explains the complex interconnections of these factors on HIV prevalence in this population to guide evidence-based programming.

OBJECTIVE

To establish a national baseline prevalence of HIV, HIV-drug resistance (HIVDR), adherence to antiretroviral treatment or pre-exposure prophylaxis, violence, and mental ill health among SWs exposed to sex-work programmes across South Africa.

METHODS

We will use a five-stage randomisation process to recruit 2000 SWs from across

ten implementation sites in South Africa. A minimum of one site per province will be included. The sample size was calculated based upon estimated HIV prevalence and to ensure sufficient power for analysis. Participants will undergo a 40-minute, interviewer-administered survey, and a rapid HIV test, urine toxicology test, blood sampling (STIs (all) and HIV-drug resistance phylogenetic testing), and a self-collection vaginal swab (STI screening).

RESULTS

We will analyse the data with STATA or SAS employing uni- and bivariate analyses. Descriptive data will be presented per province/site. An overall multivariate model will be developed from the national data of drivers of HIV and HIVDR among SWs using MPLUS.

CONCLUSIONS

Funding has been secured for data collection to begin by Q4 2018. Milestones and deliverables have been agreed, as has the final budget with contracts being signed.

DEPENDENT EFFECT OF PALMITATE AND SIMVASTATIN ON CELL VIABILITY AND PRODUCTION OF REACTIVE OXYGEN SPECIES USING AN IN VITRO MODEL OF DIABETIC CARDIOMYOPATHY

^{1,2}P. Dlodla, ¹S. Silvestri, ¹P. Orlando, ¹F. Marcheggiani, ¹I. Cirilli, ²R. Johnson, ²C. Muller, ²J. Louw, ¹L. Tiano

¹Department of Life and Environmental Sciences, Polytechnic University of Marche, Ancona, Italy; ²Biomedical Research and Innovation Platform (BRIP), South African Medical Research Council, Tygerberg, South Africa

BACKGROUND

Diabetic cardiomyopathy (DCM) is among the leading causes of death in diabetic patients. Patients with DCM are characterised by distinct cardiovascular disease (CVD)-related symptoms that include early diastolic dysfunction, which may lead to hypertrophy and subsequent myocardial infarction. Oxidative stress, defined as an unbalance between intracellular production of reactive oxygen species (ROS) and antioxidant defences in favour of the former, is a characteristic feature of DCM and a major cause of tissue damage. Currently, there is no specific treatment for DCM. Moreover, recent evidence shows that prolonged exposure to statins, the widely used cholesterol-lowering agents, can worsen CVD-related complications through increasing oxidative stress.

OBJECTIVES

To investigate the dose-dependent effects of palmitate and simvastatin using an *in vitro* model of DCM.

METHODS

An *in vitro* model of DCM was established using H9c2 cardiomyocytes with altered Na⁺/Ca²⁺ exchanger 1 (NCX1) gene. Together with the wild type, which served as a control, NCX1-H9c2 cardiomyocytes

were incubated with various palmitate concentrations of palmitate (0.125 to 1.0 mM) and simvastatin (0.5 to 100 µM) for 24 hours. Hereafter, cell viability, cytosolic ROS and mitochondrial superoxide radical production were assessed using ViaCount, dichlorofluorescein and MitoSOX assays, respectively.

RESULTS

Exposure of wild-type and NCX1-H9c2 cardiomyocytes showed a dose-dependent decrease in cell viability and increased production of ROS. Doses > 0.5 mM for palmitate and > 2.5 µM for simvastatin were the most toxic for wild-type and NCX1-H9c2 cardiomyocytes. The latter showed more vulnerability to high palmitate and simvastatin concentrations when compared to wild-type cells.

CONCLUSION

Our results indicate that hypertrophic cardiomyocytes, representing a model for DCM are more vulnerable than uncompromised cells against dyslipidaemic conditions and oxidative stress. Moreover, these effects can be worsened by prolonged exposure to statins. However, more research is required to confirm these findings.

ISONIAZID RESISTANCE DETERMINATION: CHALLENGES IN PRACTICE

¹S. Nagel, ¹M. Klopper, ¹A. Dippenaar, ¹M. De Vos, ²C.L. Hayes, ³S. Burns, ¹P.D. van Helden, ¹R.M. Warren, ³J.E. Posey, ¹E.M. Streicher

¹SA MRC Centre for Tuberculosis Research, DST/NRF Centre of Excellence for Biomedical Tuberculosis Research, Stellenbosch University; ²National Health Laboratory Services; ³Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, USA

BACKGROUND

Isoniazid (INH) serves as the backbone of combined anti-tuberculosis therapy. However, increasing numbers of *Mycobacterium tuberculosis* strains are becoming resistant to INH through spontaneous mutations in genomic regions of the bacilli, thereby threatening effectivity of treatment regimens. In South Africa, the current diagnostic algorithm dictates that only rifampicin resistant cases are tested for INH resistance. This is done by the MTBDRplus line-probe assay (LPA), which reports INH resistance based on mutations in *katG* gene and *inhA* promoter, followed by a phenotypic drug susceptibility test (DST) to confirm INH susceptibility. However, discrepancies between the results of these tests are frequently reported. This may result in incorrect diagnoses and the prescription of improper drug treatment regimens.

OBJECTIVES

To determine the reason for discrepant LPA and DST results in 398 clinical isolates obtained from the National Health Laboratory Service, Port Elizabeth and to determine the mechanism of resistance in isolates where resistance is not detectable by LPA.

METHODS

The isolates were investigated by minimum inhibitory concentration (MIC) determination, spoligotyping, Sanger sequencing and whole genome sequencing (WGS) to determine the reasons for discrepancies between the LPA and DST.

RESULTS

With MIC determination, spoligotyping and Sanger sequencing, we could resolve 16% of discrepancies. Subsequent WGS of a subset of unresolved isolates revealed several genomic features that may explain INH resistance in the absence of canonical mutations. These include large deletions spanning the *katG* gene, heteroresistance (mixed infections), as well as several potential novel resistance-causing mutations.

CONCLUSIONS

While LPA is conveniently rapid and accurate in most of the cases, phenotypic DST is necessary to detect resistance conferred by less common mechanisms. WGS can be applied to inform researchers and clinicians of such alternative resistance markers. These results will be used to improve current diagnostic methods for detection of INH resistance.

THE POTENTIAL OF SINGLE NUCLEOTIDE POLYMORPHISMS WITHIN VIRULENCE GENES AS LINEAGE AND SUB-LINEAGE MARKERS OF *MYCOBACTERIUM TUBERCULOSIS*

¹A. Mutshembele, ¹L. Malinga, ¹M. van der Walt

¹TB Platform, South African Medical Research Council, Pretoria, South Africa

BACKGROUND

Transmission of drug-resistant *Mycobacterium tuberculosis* (*M. tb*) is a global health problem leading to increased morbidity and mortality. Traditionally, genotyping of *M. tb* based on molecular finger techniques often lacks discriminatory power in some lineages. Whole genome sequencing (WGS) uses single nucleotide polymorphisms (SNPs) that have low levels of homoplasmy and are ideally suited for defining phylogenetic grouping with very high confidence. Genomic regions (virulence genes) within *M. tb* responsible for pathogenesis in the host can develop SNPs for use in lineage/sub-lineage detection.

OBJECTIVES

To analyse and compare SNPs within virulence genes as potential markers of lineages and sub-lineages detection.

METHODS

A bioinformatics analysis of virulence genes from 303 WGS was performed from Brazil (n=2), China (n=23) and South Africa (n=278) downloaded from PATRIC database. Virulence genes (*mazF3*; *vapB17*; *vapC47*; *higA*; *vapC37*; *vapC38*; *vapC6*; *mazF8*; *vapC3*; *mce3B*; *cyp125*; *vapC25*; *vapB34*; *mce3F*; *vapC46*; *mmaA4*)

were compared with H37Rv. A SNP catalog of virulence genes belonging to cell-wall proteins and toxin-antitoxin system was developed.

RESULTS

Specific SNPs within virulence genes were associated with lineages and sub-lineages. Seven virulence genes (*higA*; *vapC6*; *vapC37*; *vapB34*; *mce3B*; *mmaA4*; *mce3F*) with specific SNPs were associated with lineage 2 and 4 (P<0.005). Using *higA* SNPs of C363T and G445T, respectively differentiated strains of Beijing and S sub-lineages with high confidence. Within lineage 4, *vapC6* differentiated strains into S and X3 using G280A and T215A SNPs, respectively. Other sets of SNPs within *mce3B*, *mmaA4* and *vapC37* showed a high level of association with specific sub-lineages.

CONCLUSIONS

A set of detected SNPs within virulence genes may show the evolutionary relationship between lineages. Future studies needed to establish a South African specific *M. tb* SNP catalog of virulence genes, which will complement the WGS data workflows for rapid detection of lineage/sub-lineages.

ORAL, AIRWAY AND GUT MICROBIAL COMMUNITIES ARE ALTERED IN PATIENTS WITH ACTIVE TUBERCULOSIS

¹C. Naidoo, ¹G. Nyawo, ¹Z. Palmer, ²Y. Li, ²B. Wu, ¹G. Walzl, ¹R. Warren, ²L. Segal, ¹G. Theron

¹DST-NRF Centre of Excellence for Biomedical Tuberculosis Research and South African Medical Research Council Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa; ²New York University School of Medicine, NY, USA

BACKGROUND

Tuberculosis (TB) is the leading infectious cause of death globally, however, its association with the microbiome is poorly understood.

OBJECTIVES

To test this association, saliva, sputum and stool specimens were collected from two ongoing randomised controlled trials, BAR-TB and NExT.

METHODS

In BAR-TB, 106 pre-treatment patients with presumptive TB were recruited, where cases and symptomatic controls were classified based on a positive (n=58) or negative (n=47) *Mycobacterium tuberculosis* culture. Patients in NExT had multidrug-resistant (MDR)-TB and were randomised to a 24-month routine arm (n=4) or a 6-month, injection-free intervention arm (n=5). Up to two healthy household contacts (confirmed culture- or Xpert-negative) per patient had the same specimens collected (n=155 in BAR; n=15 in NExT). 16S rRNA sequencing was done using the Illumina MiSeq. Operational taxonomic units were assigned to sequences using QIIME and Greengenes, and statistical analyses done in R. LEfSe was used for biomarker discovery and PICRUSt used for inference of microbial functional content.

RESULTS

In BAR-TB, cases were enriched with anaerobes, *Paludibacter* and *Prevotella* in oral washes and sputum, and had a diverse gut microbiota (Shannon's diversity; p=0.025 vs. healthy controls) dominated by butyrate producers, Lachnospiraceae and *Blautia*. Cases were significantly depleted of health-promoting *Bifidobacterium* compared to healthy controls in the stool specimens. Metabolic pathways encoding short-chain fatty acid production were enriched in cases. In NExT, patients in the intervention arm, but not the routine arm, had reduced diversity and altered microbial composition by 6-weeks of MDR treatment, compared to pre-treatment. These effects are likely mediated by linezolid, a broad-spectrum antibiotic in the intervention arm.

CONCLUSIONS

The gut microbiota of TB cases is significantly perturbed at pre-treatment. Different regimens likely differentially disrupt the microbiome, however, the long-term significance (e.g. role in relapse, post-TB complications) requires further investigation. Future analyses will explore the association of microbiota-derived metabolites with immune markers related to TB.

PROTEOMIC ANALYSIS REVEALS THAT SULFAMETHOXAZOLE INDUCES OXIDATIVE STRESS IN *M. TUBERCULOSIS*

¹A.H. Ngwane, ¹R. Sarkar, ¹C. Mdladla, ¹L. Macingwana, ¹R-D. Pietersen, ¹D.L. Tabb, ¹P.D. van Helden, ¹I. Wiid, ¹B. Baker

¹DST-NRF Centre of Excellence for Biomedical Tuberculosis Research, South African Medical Research Council Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, Tygerberg, South Africa

BACKGROUND

The primary target of sulfamethoxazole (SMX) is folP1 (folate synthesis) in mycobacteria; however, SMX may affect other secondary targets in *M. tuberculosis*. We investigated the potential additional targets of SMX in a clinical isolate of *M. tuberculosis*.

OBJECTIVES

To explore the proteomics profile of *M. tuberculosis* treated with SMX at sub-lethal concentration and evaluate downstream effects other than the primary target.

METHODS

The (MGIT) BACTEC 960 system was used for activity and MIC99 determination for all *M. tuberculosis* strains received from our strain bank. Orbitrap mass spectrometry was used to determine the identities of differentially expressed proteins in a clinical strain of *M. tuberculosis* following treatment with a sub-lethal concentration of SMX for two hours. The gene expression of selected differentially expressed proteins was investigated by qPCR. Based on three biological replicates per condition, a fold change (SMX treatment vs. control) and a p-value (ANOVA) were calculated for each protein. A protein was considered "regulated" if its fold change was greater

than two in either direction and the corresponding q-value from false discovery rate-adjusted ANOVA was less than or equal to 0.05.

RESULTS

We identified approximately 1500 proteins of which 46 were differentially regulated through proteomic analysis. These included 25 upregulated and 21 downregulated proteins. The oxidative stress-related proteins (Rv2428, *ahpC*; Rv2394, *gggB*) and an enzyme from the electron transport chain (*ndh-II*, Rv1854c) were found to be upregulated. We also observed downregulation of deazaflavin-dependent nitroreductase (Rv1558, *ddn*) and upregulation of two efflux pump-associated membrane transporters (Rv2936 *drdA*, Rv1232 *Mg*-transporter) in response to SMX treatment. Our gene expression analysis correlated with the observed proteomic changes. We investigated the anti-folate activity of SMX and oxidative stress generation.

CONCLUSION

SMX may affect various other regulatory pathways at a proteomic and transcriptomic level which could be considered as additional targets of SMX in *M. tuberculosis*.

NANOFORMULATION OF ARTEMISIA AFRA AND ITS POTENTIAL BIOMEDICAL APPLICATIONS IN TYPE 2 DIABETES

¹B. Pearce, ¹N. Liebenberg

¹Precision Medicine Unit, Department of Biotechnology, Faculty of Natural Science, University of the Western Cape

BACKGROUND

Current research classifies type 2 diabetes as one of the most prevalent non-communicable diseases in South Africa. Approximately 285 million people are affected globally with an expected increase to 595 million by the year 2035. Metformin, a first-line drug in the treatment of type 2 diabetes, has been shown to have an efficacy rate of 43% attributable to poor drug uptake and metabolism.

Furthermore, herbs commonly used as traditional medicine have shown promise in the treatment of type 2 diabetes. *Artemisia afra*, also known as African Wormwood, is one of the most widely used herbs in traditional medicine. This specific species has been extensively studied and is believed to affect glucose uptake as well as insulin productivity in the body. Drug delivery and uptake systems are important aspects of precision medicine, the science of ensuring medication works optimally for each one, as they may bypass genetic factors and provide optimal efficacy of these treatments.

OBJECTIVES

To produce encapsulated gold nanoparticles from *A. afra*, by phytosynthesis, and determine their effect on glucose uptake in hepatocytes *in vitro* as an alternative and additive to metformin in non-respondent patients.

METHODS

An *in vitro* evaluation was conducted by performing plant extractions from the mentioned species. Gold nanoparticles, encapsulated by the plant extract, were produced and their effect on glucose uptake determined.

RESULTS

Bioassay-guided characterisation of the plant extract was conducted to identify active phytochemicals. Individual phytochemicals were used to produce varying sizes of gold nanoparticles, capped solely by identified active agents.

CONCLUSION

Gold nanoformulations produced from the active phytochemicals will be evaluated for altered glucose uptake alongside metformin treatment in hepatocytes.

NOVEL QPCR ASSAYS FOR THE MEASUREMENT OF IMMUNE GENE EXPRESSION IN AFRICAN LION (*PANTHERA LEO*) WHOLE BLOOD

¹T. Sylvester, ¹A.G. Loxton, ¹P.D. van Helden, ¹M.A. Miller, ¹S.D.C. Parsons

¹SAMRC Centre for TB Research; DST/NRF Centre of Excellence for Biomedical Tuberculosis Research; Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, South Africa

BACKGROUND

African lions (*Panthera leo*) influence the ecosystem function and biodiversity and infectious pathogens such as *Mycobacterium bovis* and feline immunodeficiency virus (FIV) and may impact the ecology of this species. To better understand how these pathogens affect lion populations, biomarkers that act as indicators of disease states are required. In humans, the measurement of gene expression is a valuable indicator of immune status and this approach has previously been used to detect *M. bovis* infection in lions.

OBJECTIVES

To determine mRNA sequences of selected lion gene transcripts and use these to design and optimise qPCR assays for the measurement of gene expression in lion whole blood.

METHODS

Novel primer sets were designed to measure the expression of *CXCL8*, *IL10*,

GATA3, *TBX21*, *CD4*, *FCGR1A*, *CCL2*, *CXCL11* and *TNFA* mRNA of African lions by qPCR. The amplification efficiencies of all assays were similar, which allowed the determination of gene expression in relation to that of the reference gene *YWHAZ*.

RESULTS

All assays were able to amplify mRNA from whole blood samples of four selected African lions with varying states of *M. bovis* and FIV infection.

CONCLUSION

The assays developed in this study provide tools for the measurement of immune gene expression in African lions and could be used to investigate disease states in this species.

EFFECTS OF ROOIBOS PHENOLIC COMPOUNDS ON MICROBIOTA REGULATION AND PREVENTION OF THE METABOLIC SYNDROME

¹N. Thovhogi, ¹K. Gabuza, ¹J. Louw, ²M. Tobin, ²P. Mobo, ²R. Mundembe

¹Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg; ²Biotechnology Department, Faculty of Applied Science, Cape Peninsula University of Technology

BACKGROUND

Development of metabolic diseases is accompanied by changes in gut microbiota phenotype, including a decrease of beneficial bacterium and increase of pernicious bacteria. Increasing evidence strongly supports that development of type 2 diabetes (T2D) is closely associated with gut microbiota. An unhealthy diet rich in saturated fats and refined carbohydrates, along with sedentary lifestyle is associated with increased risk of developing metabolic diseases including obesity and T2D. Obesity represents a state of chronic inflammation characterised by increased levels of proinflammatory cytokines and chemokines resulting in pathological changes in insulin-sensitive tissues and β -cells. Recent research indicated that gut microbiota plays a crucial role in maintaining health or promoting conditions such as obesity and diabetes.

OBJECTIVES

To define the role of rooibos polyphenols in the beneficial gut microbiota and their effect on biochemical and inflammation parameters in monkey models of obesity and pre-diabetes, respectively.

METHODS

The monkeys on high fat diabetogenic diet were selected and maintained at the SAMRC

Primate Unit, with access to water *ad lib* via an automatic watering device. Treatment consisted of a food bolus containing an aspalathin-enriched unfermented rooibos extract, administered three times daily for 42 days. Baseline blood and faecal sampling were performed for biochemical, inflammatory and immunological cytokine determinations.

RESULTS

The components of gut microbiota from these monkeys were examined to determine the effects of rooibos extract on microbiota, and the shifts in gut bacterial communities were determined by 16S ribosomal RNA gene sequencing. Preliminary results indicated that treating the anaerobic faecal cultures with polyphenols, modulated the growth of bacterial species related to the diet and metabolic diseases. These monkeys' diet has been associated with gut microbiota diversity.

CONCLUSION

Studying the bioactivity of rooibos flavonoids and microbial degradation products would give greater insight into their respective beneficial roles in the metabolism and maintenance of health.



SAMRC CLINICIAN RESEARCHER DEVELOPMENT
(MD.PHD) PROGRAMME

MR THOBILE MABUYA – PROGRAMME ADMINISTRATOR

A 12-WEEK EXERCISE INTERVENTION IMPROVES INSULIN SENSITIVITY IN SEDENTARY BLACK OBESE SOUTH AFRICAN WOMEN: THE ROLE OF ECTOPIC LIPID CONTENT

¹M. Fortuin-de Smidt, ^{1,2}A.E. Mendham, ¹L. Clamp, ³A. Alhamud, ⁴J. Hauksson, ⁵T. Olsson, ^{1,2}J.H. Goedecke

¹Division of Exercise Science and Sports Medicine, Department of Human Biology, University of Cape Town (UCT), Cape Town, South Africa (SA); ²Non-Communicable Diseases Research Unit, South African Medical Research Council, Tygerberg, S; ³Department of Human Biology, MRC/UCT Medical Imaging Research Unit, UCT, Cape Town, S; ⁴Department of Radiation Sciences, Umeå University Hospital, Umeå, Sweden; ⁵Department of Public Health and Clinical Medicine, Umeå University Hospital, Umeå, Sweden

BACKGROUND

Black South African (SAn) women have a high prevalence of obesity and insulin resistance (IR). Ectopic lipid deposition has been linked to IR and type 2 diabetes (T2D). Exercise training is used to prevent and or manage obesity and T2D. However, the effect of exercise on pancreatic and skeletal muscle lipid content is inconclusive.

OBJECTIVES

To evaluate the effect of exercise training on insulin sensitivity (SI) and secretion and to determine whether any changes were associated with changes in body composition, body fat distribution and ectopic fat deposition.

METHODS

Obese black SAn women (mean age 23 ± 3.5 years) were randomly assigned to an exercise (n=23) or control (n=22) group. The exercise group completed 12 weeks of aerobic and resistance exercises; the control group was advised not to change their physical activity. Pre- and post-intervention testing included assessment of

peak oxygen consumption, SI (frequently sampled intravenous glucose tolerance test) and ectopic lipid content of liver, pancreas and skeletal muscle (magnetic resonance spectroscopy).

RESULTS

The exercise and control groups were similar at baseline. The exercise group experienced an improvement in SI (median (IQR): 2.0 (1.2-2.8) to 2.2 (1.5-3.7) (mU/l-1min⁻¹) with no change in the control group (group*time p=0.037). Pancreatic lipid content decreased in the exercise group (8.9% (3.6-24.8) to 6.8% (2.3-11.8)) with no change in the control group (group*time p=0.007). Only in the exercise group, the improvement in SI was associated with a decrease in hepatic lipid content (β -0.03, p=0.038) but not with changes in pancreatic and skeletal muscle lipid content.

CONCLUSION

Hepatic lipid content played a role in the improvement of insulin sensitivity after an exercise programme in black obese SAn women.

ADOLESCENTS ON ANTIRETROVIRAL THERAPY IN CAPE TOWN, SOUTH AFRICA

¹L. Githinji, ¹D. Gray, ¹S. Hlengwa, ¹T. Machemedze, ¹H.J. Zar

¹Department of Paediatrics and Child Health, Red Cross Children's Hospital and MRC Unit on Child and Adolescent Health, University of Cape Town, South Africa

BACKGROUND

Chronic lung disease is common in perinatally HIV-infected adolescents. There is little data on the lung function progression in HIV-infected adolescents on antiretroviral therapy (ART).

OBJECTIVE

To investigate the progression of lung function over two years in HIV-infected adolescents in the Cape Town Adolescent Antiretroviral cohort (CTAAC).

METHODS

HIV-infected adolescents, 9–14 years, on ART, underwent spirometry with bronchodilator testing at enrolment and two years later. Healthy HIV-uninfected, matched controls were also tested. Linear mixed models were used to compute longitudinal changes in lung function.

RESULTS

Of the adolescents tested at baseline and at 24 months, 428 were HIV-infected and 90 HIV-uninfected. Their mean enrolment (SD) age was 12.0 (1.6) years, with 50.4% males, and median (IQR) viral load 2.2 (1.6-

3.3) log copies. HIV-infected adolescents had lower lung function compared to uninfected at both time points, $p < 0.05$. Obstructive or mixed pattern spirometry was more common in HIV-infected adolescents ($p < 0.05$), with no difference in reversibility between HIV-infected and -uninfected groups, $p > 0.05$. Previous pulmonary tuberculosis or lower respiratory tract infection was associated with lower lung function, $p < 0.01$ for both.

CONCLUSIONS

HIV-infected adolescents had lower lung function and more obstructive or mixed spirometric patterns than uninfected lung function tracked over time. In this study, we highlight the importance of strategies to optimise lung function early in HIV-infected children.

THE RELIABILITY OF ESTIMATED GLOMERULAR FILTRATION RATE IN SOUTH AFRICAN CHILDREN

¹J. Holness, ²A. Brink, ³M.R. Davids, ¹J. Warwick

¹Division of Nuclear Medicine, Stellenbosch University and Tygerberg Hospital, Cape Town; ²Department of Paediatrics, Division of Nuclear Medicine, University of Cape Town and Red Cross War Memorial Children's Hospital, Cape Town; ³Division of Nephrology, Stellenbosch University and Tygerberg Hospital, Cape Town

BACKGROUND

Accurate measurement of kidney function is essential in a subgroup of children with chronic kidney disease and those being treated with nephrotoxic drugs. Glomerular filtration rate (GFR) is widely accepted as the best measure of kidney function, yet it is seldom measured in children. In most cases, GFR is estimated using a creatinine-based equation. However, these equations were all developed in predominantly Caucasian populations in North America and Europe. Thus far, they have not been validated in African children. Because of differences in pathology and socio-economic conditions, it is hypothesised that serum creatinine levels will be lower on average leading to higher GFR estimates.

OBJECTIVE

To determine the reliability of estimated GFR in South African children.

METHODS

A cross-sectional study on children referred for GFR measurement at the Red Cross Children's Hospital, Cape Town, took place between February 2014 and November 2017. GFR was measured (mGFR) from

the plasma clearance of Cr-51 EDTA using the slope-intercept method. GFR was estimated (eGFR) from a same-day serum creatinine sample using the new bedside Schwartz formula, Gao's quadratic equation, and the full age spectrum (FAS) equation. The bias, precision and accuracy of each equation were determined, and the agreement between eGFR and mGFR determined using Bland-Altman analyses.

RESULTS

A total of 173 were included (100 female; median age 9 years; median GFR 91.5 ml/min/1.73m²). The correlation between eGFR and mGFR was poor (r²=0.40-0.45). All equations over-estimated GFR with median biases of 16.0-26.8 ml/min/1.73m². RMSE values ranged between 14.8 and 34.8 ml/min/1.73m². The accuracy (P30 values) ranged between 43% and 63%.

CONCLUSIONS

Estimated GFR cannot replace measured GFR in South African paediatric patients because of extremely poor accuracy. There is a need for developing an equation from local data as well as increased availability of GFR measurement.

THE INTRODUCTION OF VIOLENCE AND INJURY OBSERVATORIES SUGGESTS A REDUCTION IN VIOLENCE-RELATED INJURY IN ADULT POPULATIONS. A SYSTEMATIC REVIEW AND META-ANALYSIS

¹A. Jabar, ¹F. Fong, ¹D. Barth, ²M. Chavira, ³M.T. Cerqueira, ¹R. Matzopoulos, ¹M. Engel

¹School of Public Health and Family Medicine, Health Sciences Faculty, University of Cape Town,

²College of Health Sciences, University of Texas, El Paso, ³United States–Mexico Border Office, Pan American Health Organization

BACKGROUND

The introduction of integrated violence and injury observatories (VIO) at local and regional level is promoted for preventing crime and violence. Key strategies to achieve this end include maximising inter-institutional cooperation, information-sharing between stakeholders, timely data analysis and, security policy development initiatives to enhance governance.

OBJECTIVE

To summarise the results from existing studies reporting on the effectiveness of the introduction of violence and injury observatories.

METHODS

We searched several databases, supplemented by searches in grey literature including technical reports. Searches comprised studies from January 1990 to October 2017. Study quality was assessed using a validated quality assessment tool. Disagreements were resolved by consensus among three authors. This review protocol has been published in PROSPERO International Prospective Register of systematic reviews, registration number 2014:CRD42014009818.

RESULTS

Of 3105 potentially relevant unique citations from all literature searches, three

English language empirical studies, three Spanish and one Portuguese technical reports met our inclusion criteria. Studies were conducted in the United Kingdom (n=3), Colombia (n=2), Brazil (n=1) and Uruguay (n=1). Meta-analysis of these studies suggested a 29% reduction in violence-related injury in adult populations following the introduction of a violence and injury observatory (RR=0.79; 95% CI, 0.49 to 1.01). Results from technical reports as a sub-group showed improvement over those from empirical studies (RR=0.58; 95% CI, 0.26 to 1.30) versus (RR=0.92; 95%CI, 0.42 to 2.00). Several potentially eligible studies were excluded because of study-design limitations including poorly-defined outcomes, lack of controls or baseline data, or inadequate sampling.

CONCLUSIONS

This systematic review provides evidence suggesting the effectiveness of the introduction of violence and injury observatories and surveillance systems as an intervention to reduce violence in adult populations. This review may serve as a template for evaluative research in violence and injury observatories and in other applications, such as health-related observatories aimed at producing social change.

THE DECENTRALISED DRUG-RESISTANT TB PROGRAMME IN SOUTH AFRICA: FROM POLICY TO IMPLEMENTATION

¹W. Jassat, ¹H. Schneider, ²M. Moshabela

¹School of Public Health, University of the Western Cape; ²School of Nursing and Public Health, University of KwaZulu-Natal

BACKGROUND

A policy supporting decentralised drug-resistant (DR)-TB treatment provision, was introduced in 2011, but thus far, implementation has been suboptimal. With adequate investment in health, why does good policy fail to be implemented well in South Africa? Drawing on the Policy Triangle framework, it is theorised that content, actors and processes of policy interact in context-specific ways to inform implementation. A better understanding of these implementation dynamics will contribute lessons for strengthening future implementation of DR-TB policy.

OBJECTIVES

To explore the implementation of the decentralised DR-TB programme in South Africa, and specific factors explaining differences in access to and quality of services in two provinces, Western Cape and KwaZulu-Natal.

METHODS

This study design will be a comparative case study of the DR-TB decentralisation policy

implementation in two provinces. In the case study, we will explore the components of the policy triangle to generate a refined theory of DR-TB policy implementation relevant to the South African context. Data collection will combine qualitative and quantitative methods, including routine data analysis, document review, in-depth interviews and observation. A cross-case comparison of the individual case descriptions will be followed by a process of analytic generalisation.

RESULTS

I will present preliminary work including (a) a review of implementation frameworks and theories from different disciplinary perspectives; (b) process analysis (timeline) of DR-TB implementation in South Africa; and (c) a review of DR-TB financing.

CONCLUSION

Through this study, we anticipate providing recommendations to improve the DR-TB programme and contribute to the field of policy analysis and implementation research in general.

PERCUTANEOUS PERICARDIOSCOPY IN A POPULATION WITH A HIGH PREVALENCE OF TUBERCULOUS PERICARDITIS – IMPROVING THE DIAGNOSTIC YIELD AND ADVANCING THE TIME TO DIAGNOSIS

¹C. Kyriakakis

¹Division of Cardiology, Stellenbosch University and Tygerberg Hospital

BACKGROUND

Establishing a definite diagnosis of tuberculous (TB) pericarditis via direct detection of *Mycobacterium tuberculosis* (MTB) is challenging and not always possible using conventional investigations. Previous studies have demonstrated a low yield using either direct microscopy or mycobacterial culture on pericardial fluid alone.

OBJECTIVE

We evaluated the potential advantage of minimally invasive percutaneous pericardioscopic biopsy of the pericardium in the diagnosis of TB pericarditis.

METHODS

Patients presenting with a moderate-to-large pericardial effusion were offered pericardiocentesis via a standard procedure, followed by percutaneous pericardioscopy and pericardial biopsy. Pericardial fluid evaluation included biochemistry, cell count, smear microscopy and TB culture. Pericardial biopsy specimens underwent direct smear microscopy for acid-fast bacilli (AFB), TB culture and histological examination. Definite TB pericarditis was defined as at least one specimen positive for AFB, MTB culture, or presence of granulomas on histology.

RESULTS

A hundred patients of which 59 males participated, their mean age was 37.9 ± 13.5 years, and 60 were HIV infected (mean CD4=192.7 cells/ μ L). A pericardial biopsy could be obtained in 82 participants, and 54 (65,8%) of these had definite pericardial TB. The yield by examining pericardial tissue was significantly higher than by examining pericardial fluid (96,3% (52/54) vs. 72,2% (39/54); $p < 0.05$). 34 tissue samples were positive by smear and/or histology (11 AFB positive, 12 had granulomas, and 11 had both), while 15 tissue samples were only culture-positive. Of the 39 culture-positive fluid samples, ten were smear-positive.

CONCLUSIONS

Histological and microbiological examination of pericardial tissue resulted in a significantly higher yield than an examination of pericardial fluid, with 15 of the 54 confirmed cases (27,7%) identified only on examination of pericardial tissue. In contrast to the assessment of pericardial fluid where a definite diagnosis of TB was mainly dependent on culture, pericardial biopsy enabled a more rapid diagnosis by microscopy or histology.

POSTNATAL MOOD AND SOCIO-ECONOMIC CONTEXT AMONG LOW-INCOME WOMEN IN JOHANNESBURG, SOUTH AFRICA

¹C. Marsay, ²L. Manderson, ¹U. Subramaney

¹Department of Psychiatry, University of the Witwatersrand, Johannesburg; ²School of Public Health, University of the Witwatersrand, Johannesburg

BACKGROUND

Maternal depression is a significant public health problem affecting proportionally more women living in low- and middle-income countries such as South Africa than women in high-income countries. Maternal depression has multiple aetiologies, and social and environmental factors are important contributing factors and determinants of risk.

OBJECTIVES

In this article, we explore the experiences of low-income, urban women living in Johannesburg, who underwent antenatal screening for anxiety and depression and have since given birth. We were interested to find out how their mood changed or remained the same postnatally, and to identify specific contextual factors that might have influenced these changes.

METHODS

We conducted focused ethnographic interviews using informal deductive conversational methods with 20 postnatal

women who were recruited from a high-risk antenatal clinic in Johannesburg.

RESULTS

Women's experiences were common whether or not they had a diagnosis of postnatal anxiety or depression, and reflected the social and economic circumstances in which they lived. Promotion of mental health through action on the social determinants of health is needed, with an emphasis on poverty alleviation, secure employment and enhancing already existing social support structures such as churches and extended family.

CONCLUSION

Social and political strategies can play an important role in mitigating the effects of postnatal depression and addressing its underlying causes for women and their families in South Africa.

IMPACT OF IMPLEMENTATION OF GENE XPERT ULTRA ON TB DIAGNOSIS IN SOUTH AFRICA

¹H. Moultrie, ²S. Candy, ³A. van Rie, ²N. Ismail

¹Medical Research Council: Respiratory and Meningeal Pathogens Research Unit, School of Pathology, University of the Witwatersrand, South Africa; ²Centre for Tuberculosis, National Institute for Communicable Diseases, Division of National Health Laboratory Service, Sandringham, Johannesburg, South Africa; ³Department of Epidemiology and Social Medicine, University of Antwerp, Antwerp, Belgium

BACKGROUND

The Gene Xpert Ultra TB test was implemented in South Africa between October 2017 and June 2018, with Ultra tests comprising >50% of all Xpert tests by January 2018. The sensitivity of Xpert Ultra is 2.2-7.6% higher (depending on smear negativity rates), and specificity 0.7% lower, than Xpert MTB/RIF. We modelled the effects of Xpert Ultra on TB positivity rates and estimated the additional number of TB cases diagnosed.

METHODS

Monthly Xpert MTB/RIF and ULTRA test data were extracted from the NHLS Corporate Data Warehouse between July 2014 to June 2018. Xpert testing data were de-duplicated. TB positivity rates were analysed using negative binomial regression models that allowed for over-dispersion, incorporated Fourier transformations of time to account for seasonality and included an indicator variable for Ultra. Standard time-series

regression methods were utilised to assess the gradual effects of the introduction of Ultra Xpert. The primary *a priori* impact model specified a gradual slope change in the TB positivity rate during the period of Ultra rollout.

RESULTS

The number of patients tested for TB, and Xpert+ TB cases both demonstrated long-term declining trends with seasonal peaks during the winter cough season. In contrast, the TB positivity rate was stable with seasonal peaks during the December and January months. The Xpert positivity rate ratio for Ultra in the final selected model was 1.10 (95%CI: 1.05 – 1.16). Xpert Ultra implementation resulted in an additional 8,600 (95%CI: 2,400 – 14,700) TB cases being diagnosed between October 2017 and June 2018 in South Africa.

CONCLUSION

The implementation of Xpert Ultra increased the TB Xpert positivity rate and diagnosed an additional 8,600 cases.

PLASMA KAPOSI'S SARCOMA HERPESVIRUS DNA AS A PROGNOSTIC BIOMARKER

¹F. Shaik, ¹A. Mosam, ²T.S. Uldrick

¹Department of Dermatology, University of KwaZulu-Natal, Durban, South Africa; ²Global Oncology, Fred Hutchinson Cancer Research Center, Seattle, WA

BACKGROUND

Kaposi's sarcoma herpesvirus (KSHV) is the causative agent of Kaposi sarcoma (KS). Sub-Saharan Africa is burdened with the highest seroprevalence of KSHV infection with estimates ranging from 20–45% in South African adults. KSHV seropositivity is associated with HIV, which markedly increases the risk of KSHV-associated malignancies and KS remains the commonest cancer in HIV-infected patients in sub-Saharan Africa.

OBJECTIVE

To evaluate the relationship between KSHV-seropositivity and viral load (VL) with immunological and clinical KS parameters.

METHODS

KSHV seroreactivity and VL will be correlated with HIV VL and CD4 counts. KSHV VL will also be evaluated as a marker for KS staging (using ACTG criteria) and to predict clinical KS response (graded as complete, partial, stable and progressive disease using ACTG criteria). DNA will be extracted and purified with the QIAamp Blood Kit (Qiagen) according to the manufacturer's

instructions. Quantification of KSHV DNA will be determined by real-time polymerase chain reaction amplification of a conserved region of the open-reading frame (ORF) 26 minor capsid gene. Statistical analysis will be conducted using SPSS with $p < 0.05$ considered statistically significant. Non-parametric testing will be used and results represented as medians.

RESULTS

Pre-treatment analysis of KSHV seroreactivity and plasma KSHV VL will be conducted in 112, ART-naïve South African patients with biopsy-confirmed HIV-associated KS; 50 men and 62 women followed up prospectively over 12 months.

CONCLUSIONS

In this study, we will demonstrate any associations between KSHV seropositivity and VL with immunological as well as clinical parameters. Pre-treatment KSHV VL may predict KS disease progression and therefore considered as a marker to identify those patients who may benefit from more aggressive treatment.

HAIR CORTISOL LEVELS IN POSTTRAUMATIC STRESS DISORDER PATIENTS VERSUS CONTROLS

¹L. van den Heuvel, ²T. Stalder, ³C. Kirschbaum, ¹S. Seedat

¹Department of Psychiatry, Faculty of Medicine and Health Sciences, University of Stellenbosch, Tygerberg, South Africa; ²Clinical Psychology, University of Siegen, Siegen, Germany; ³Biological Psychology, TU Dresden, Dresden, Germany

BACKGROUND

Hair cortisol levels can provide insights into longer-term hypothalamic pituitary adrenal (HPA) axis function, thus providing a possible biomarker of chronic stress. Posttraumatic stress disorder (PTSD) is a disorder characterised by a sustained maladaptive response that develops following exposure to life-threatening traumatic events. Hair cortisol levels may provide insight into the role of a persistently dysregulated endocrine-mediated stress response in PTSD.

OBJECTIVES

We aimed to determine whether hair cortisol levels were associated with PTSD diagnostic status and severity in SHARED ROOTS study participants using a case-control design. SHARED ROOTS evaluated pathogenetic factors that contribute to increased risk for cardiovascular disease, as defined by the metabolic syndrome (MetS), in neuropsychiatric disorders.

METHODS

We administered the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) to determine PTSD diagnostic

status and severity scores in 328 females of mixed ancestry. Hair samples, representing a three-month retrospective window of cortisol levels, were obtained from cases and controls and analysed with liquid chromatography-tandem mass spectrometry.

RESULTS

Hair cortisol levels were significantly higher ($p < 0.001$) in 167 patients with PTSD than in 161 trauma-exposed controls. Hair cortisol levels further correlated with overall PTSD severity ($r_s = 0.22$, $p < 0.001$) as well as the severity of PTSD symptoms on all symptom domains in the sample overall.

CONCLUSIONS

These findings demonstrate an increase in long-term cortisol levels in patients with PTSD, that can be differentiated by trauma exposure per se, with a clear dose-response relationship that provides evidence of a chronically dysregulated neuroendocrine-mediated stress response in PTSD. The association of elevated cortisol levels with metabolic markers in patients with PTSD requires further interrogation.

HAIR CORTISOL LEVELS IN POSTTRAUMATIC STRESS DISORDER PATIENTS VERSUS CONTROLS

¹L. van den Heuvel, ²T. Stalder, ³C. Kirschbaum, ¹S. Seedat

¹Department of Psychiatry, Faculty of Medicine and Health Sciences, University of Stellenbosch, Tygerberg, South Africa; ²Clinical Psychology, University of Siegen, Siegen, Germany; ³Biological Psychology, TU Dresden, Dresden, Germany

BACKGROUND

Hair cortisol levels can provide insights into longer-term hypothalamic pituitary adrenal (HPA) axis function, thus providing a possible biomarker of chronic stress. Posttraumatic stress disorder (PTSD) is a disorder characterised by a sustained maladaptive response that develops following exposure to life-threatening traumatic events. Hair cortisol levels may provide insight into the role of a persistently dysregulated endocrine-mediated stress response in PTSD.

OBJECTIVES

We aimed to determine whether hair cortisol levels were associated with PTSD diagnostic status and severity in SHARED ROOTS study participants using a case-control design. SHARED ROOTS evaluated pathogenetic factors that contribute to increased risk for cardiovascular disease, as defined by the metabolic syndrome (MetS), in neuropsychiatric disorders.

METHODS

We administered the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) to determine PTSD diagnostic

status and severity scores in 328 females of mixed ancestry. Hair samples, representing a three-month retrospective window of cortisol levels, were obtained from cases and controls and analysed with liquid chromatography-tandem mass spectrometry.

RESULTS

Hair cortisol levels were significantly higher ($p < 0.001$) in 167 patients with PTSD than in 161 trauma-exposed controls. Hair cortisol levels further correlated with overall PTSD severity ($r_s = 0.22$, $p < 0.001$) as well as the severity of PTSD symptoms on all symptom domains in the sample overall.

CONCLUSIONS

These findings demonstrate an increase in long-term cortisol levels in patients with PTSD, that can be differentiated by trauma exposure per se, with a clear dose-response relationship that provides evidence of a chronically dysregulated neuroendocrine-mediated stress response in PTSD. The association of elevated cortisol levels with metabolic markers in patients with PTSD requires further interrogation.

A PROSPECTIVE STUDY OF THE EPIDEMIOLOGY OF SEVERE CUTANEOUS ADVERSE DRUG REACTIONS AND ASSOCIATED NEUROPSYCHIATRIC SEQUELAE

¹E. Zitha, ¹R.J. Lehloeny, ²P. Naude, ³J. Peter, ⁴D. Stein

¹Division of Dermatology, Department of Medicine, University of Cape Town (UCT) & Grootte Schuur Hospital; ²Department: Psychiatry & Mental Health, Co-head of the Division of Translational Neuropsychiatry, UCT; ³Division of Immunology & Allergology, UCT and Grootte Schuur Hospital; ⁴Head of the Department of Psychiatry & Mental Health and the Division of Psychopharmacology & Biological Psychiatry, UCT & Grootte Schuur Hospital

BACKGROUND

There are limited data on the epidemiology of depression in epidermal necrolysis (EN). Post-EN depression seems higher, a contextually novel finding that was limited by the challenges of studying rare diseases, viz. small cohorts, lack of ideal control groups, and observer bias. Furthermore, no direct association between EN and depression was adequately established. Consequently, we want to improve on these data and conduct a mechanistic study to uncover the possible correlation between EN and depression.

OBJECTIVES

To determine the risk factors for the development of depression following EN in Cape Town; establish a database (Afro-SCARLI registry) of EN in Cape Town, South Africa; determine the incidence, prevalence and evolution of depression in EN in Cape Town; describe the differences in the levels of pro-inflammatory cytokines (IL-6, IFN- α and TNF- α) in depressed patients with EN; and to show that hair cortisol levels in the period preceding EN, predict depression.

METHODS

We will conduct a prospective cohort study of EN patients with sex-, and an HIV-status-matched comparison group at three time-points to assess for depression using validated tools. We will conduct multiplex bead assays of interleukin (IL)-6, interferon-alpha (IFN- α) and tumour necrosis factor alpha (TNF- α), enzyme-linked immunosorbent assay (ELISA) kit (Arbor Assays) of hair cortisol levels. Linear-mixed models will be used to describe the clinical and laboratory features as outcomes. Data analysis will be conducted using Stata 15 (StataCorp, College Station, Texas, USA).

RESULTS

We are currently addressing the concerns raised by the Human Research Ethics Community at UCT (HREC/REF: 083/2018) for final ethical approval.

CONCLUSION

Will be based on the findings of the study.



SAMRC INTERNSHIP SCHOLARSHIP PROGRAMME (ISP)
MS JORENE NAIDOO – PROGRAMME ADMINISTRATOR

GENETIC POLYMORPHISMS AND *IN VITRO* ANALYSIS OF SLC22A2 AND SLC47A2 PROMOTERS IN THE XHOSA POPULATION

¹Z. Abrahams-October, ¹M. Benjeddou, ²R. Johnson

¹ Precision Medicine Unit, Science Faculty, University of the Western Cape, Bellville;

² Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg, South Africa

BACKGROUND

Membrane transporter genes are responsible for the absorption, distribution and excretion of various endogenous and exogenous substrates. Genetic polymorphisms within transport genes contribute to the variation in drug response among individuals. In previous studies, many single nucleotide polymorphisms (SNPs) within the promoter and exonic regions of genes have been indicated within the solute carrier (SLC) superfamily exhibit variation for metformin transport. Polymorphisms in the promoter region of a gene can influence gene expression and may result in the altered uptake and clearance of drugs.

OBJECTIVES

To determine the haplotype structures of SLC22A2 and SLC47A2 in the Xhosa population of South Africa and to determine the functional significance these promoter haplotypes may have on transcription factor (TF) binding and how it affects promoter activity. Also, to demonstrate that haplotypes rather than individual SNPs regulate transcription and so doing play a significant role in the response of individuals to drug treatment.

METHODS

DNA was extracted from buccal swabs using a standard salt lysis method. The promoter regions of the selected genes were sequenced to identify the various haplotypes present in the population. Samples representative of the haplotypes identified were cloned into a promoter-less vector and promoter activity was measured by the expression of Luciferase.

RESULTS

Seven SNPs, i.e. rs150063153, rs59695691, rs572296424, rs55920607, rs113150889, rs60249401, and a novel SNP were identified within the SLC22A2 promoter region. Furthermore, five SNPs, i.e. rs59939658, rs60994312, rs115376067, rs11656096, and rs7213388 were identified within the SLC47A2 promoter region. The TF binding site predictor PROMO (ALGGEN) was used for *in-silico* confirmation of cis-binding elements to predict potential TF binding sites within the promoter regions.

CONCLUSIONS

We determined the haplotype structures of SLC22A2 and SLC47A2 for the Xhosa population. We will further investigate the effects that the identified promoter haplotypes may have on promoter activity.

MOLECULAR CHARACTERISATION OF PROTEINS INVOLVED IN IRON-SULPHUR CLUSTER ASSEMBLY IN MYCOBACTERIA

¹J. Arries, ²S. Adinolfi, ¹M. Williams

¹Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University; ²Department of Clinical Neuroscience, King's College London, United Kingdom

BACKGROUND

Mycobacterium tuberculosis (*M.tb*) remains one of the world's deadliest pathogens. The ability of *M.tb* to survive within the host is poorly understood, and efforts to elucidate these mechanisms of survival are paramount in the fight against this disease. Iron-sulphur (Fe-S) clusters are ubiquitous cofactors that are required for the maturation of various proteins, many of which are involved in essential biological processes. Multiprotein complexes are required for the *in vivo* assembly of Fe-S clusters, and the SUF system, encoded by the Rv1460-Rv1461-Rv1462-Rv1463-csd-Rv1465-Rv1466 operon in *M.tb*, is thought to be the major Fe-S cluster assembly machinery in this organism. This process is poorly understood in mycobacteria, and it is currently unclear if proteins outside of this operon are involved in Fe-S cluster assembly.

OBJECTIVES

To identify novel proteins involved in Fe-S cluster assembly and characterise the molecular relationship between proteins of the SUF system.

METHODS

We will use immunoprecipitation followed by mass spectrometry to identify potential interacting partners for the main FLAG-tagged Fe-S cluster machinery. Potential interactions will then be confirmed by mass spectrometry. Molecular techniques such as co-purification, cysteine desulphurase activity assay and Fe-S cluster reconstitution will be used to characterise the relationship between proteins encoded by the SUF operon.

RESULTS

Until now, all constructs have been successfully cloned and protein expression performed. Optimisation of affinity purification and protein purification is near completion, and final sample preparation is underway for mass spectrometry analysis and subsequent validation by bimolecular fluorescence complementation.

CONCLUSION

With this work, we will establish the methodology for identifying novel protein-protein interactions in mycobacteria and lay the foundation for elucidating the process of Fe-S cluster assembly in mycobacteria.

PLASMA CYTOKINE BIOMARKERS TO PREDICT TUBERCULOSIS TREATMENT RESPONSE

¹I. Boshielo, ¹J. Peters, ¹B. Kana

¹DST/NRF Centre of Excellence for Biomedical TB Research, University of the Witwatersrand and National Health Laboratory Service, Johannesburg, South Africa

BACKGROUND

Tuberculosis (TB) is an infectious disease caused primarily by infection with *Mycobacterium tuberculosis* (*Mtb*). TB has existed for millennia, killing approximately ten million people each year. Even though most people who have active TB can be cured provided that treatment is administered adequately, the disease remains the leading cause of death ranking above HIV-AIDS over the past five years. The protracted treatment required to cure drug-susceptible TB is hypothesised to be attributable to the presence of non-replicating, drug-tolerant bacteria, termed differentially culturable tubercle bacteria (DCTB). Consequently, measuring the rate of DCTB clearance is central to understanding how TB treatment regimens can be shortened and to assess risk for recurrent disease. We identified individuals from a longitudinal cohort of TB patients on standard chemotherapy, who were either able to clear DCTB within the first two weeks of treatment and those wherein DCTB numbers persisted during this period.

OBJECTIVES

To determine the, 1) *in vitro* cytokine response to DCTB created from different clinical strains used to infect mouse macrophages; 2) cytokine response during early treatment of TB patients and identify a biomarker signature to discriminate between slow and fast responders to treatment; 3) establish whether RIF/INH plasma levels at different treatment time points can be related to fast and slow response.

METHODS

DCTB generation using two-sequential stress model. *In vitro* infection of mouse macrophages with DCTB. Cytokine biomarkers will be measured using a bead array, while we will use high-performance liquid chromatography to measure RIF and INH plasma levels.

RESULTS

We anticipate that DCTB will induce a different cytokine response in fast and slow responders of TB treatment.

CONCLUSION

These findings could potentially be used to identify individuals who would benefit from shorter treatment periods.

ADIPOSE TISSUE ANTIOXIDANT EXPRESSION IN VISCERAL AND SUBCUTANEOUS ABDOMINAL DEPOTS AND THE ASSOCIATION WITH CARDIOMETABOLIC RISK FACTORS IN AN OBESE POPULATION

¹N. Ellman, ²J. Goedecke, ¹A. Mendham, ³I. Marr, ³G. Stapleton, ¹D. Keswell

¹Division of Exercise Science and Sports Medicine, University of Cape Town, South Africa; ²Non-Communicable Diseases Research Unit, South African Medical Research Council, Tygerberg;

³Chrysalis Clinic, Life Kingsbury Hospital, Cape Town

BACKGROUND

Abdominal fat, including visceral and subcutaneous adipose tissue (VAT and SAT), is associated with insulin resistance (IR), with VAT being more strongly associated with IR than SAT. Few studies have investigated human adipose tissue (AT) antioxidant levels, and only one has compared antioxidant expression between VAT and SAT. We hypothesize that adipose antioxidant levels are associated with cardiometabolic risk factors (CMRF) and that these associations differ by depot.

OBJECTIVES

To investigate depot-specific differences in AT antioxidant expression and its association with CMRF in an obese population.

METHODS

We measured body composition (dual X-ray absorptiometry, basic anthropometry), measures of glycaemia including fasting glucose, insulin, insulin resistance (HOMA-IR), glycated haemoglobin (HbA1c %), fructosamine along with lipid profiles, high-sensitivity C-reactive protein (hs-CRP) and leptin in obese South African participants (n=14; 71% female, mean age 41±10.0). Total protein lysates isolated from abdominal SAT and VAT samples were analysed for key antioxidants superoxide

dismutase (SOD) and catalase (CAT) using Western blot.

RESULTS

Although SOD and CAT expression did not differ between VAT and SAT (P=0.356 and 0.569, respectively), the associations between CMRF and SOD and CAT differed. SOD expression in SAT was positively associated with fat mass index (FMI) (r=0.65, P=0.031), whereas expression of CAT in VAT was negatively associated with FMI and whole-body fat percentage (r=-0.69, P=0.039 and r=-0.73, p=0.01). Expression of SOD in SAT was positively associated with hs-CRP (r=0.65, P=0.019), and expression in VAT correlated with glucose (r=0.63, P=0.037). In contrast, SAT expression of CAT was negatively associated with fructosamine (r=-0.77, P=0.005).

CONCLUSIONS

There were no depot differences in SOD and CAT expression. However, preliminary results suggest that SOD and CAT may be associated with systemic inflammation and glucose metabolism. We propose that SOD may be upregulated in response to obesity and systemic inflammation and CAT may be reduced with obesity and increased glycaemia.

EFFECT OF ROUX-EN-Y GASTRIC BYPASS SURGERY VERSUS A CONVENTIONAL WEIGHT-LOSS PROGRAMME ON CARDIOMETABOLIC RISK FACTORS AT ONE AND SIX MONTHS POST-INTERVENTION

¹N. Ellman, ²J. Goedecke, ¹A. Mendham, ³K. Adams, ⁴I. Marr, ⁴G. Stapleton, ¹D. Keswell

¹Division of Exercise Science and Sports Medicine, University of Cape Town, South Africa; ²Non-Communicable Diseases Research Unit, South African Medical Research Council, Tygerberg;

³Department of Plastic Surgery, University of Cape Town, ⁴Chrysalis Clinic, Life Kingsbury Hospital, Cape Town

BACKGROUND

Few studies have compared the effects of Roux-en-Y gastric bypass surgery (RYGBS) versus conventional weight-loss programmes (CWLP) on cardiometabolic risk factors (CMRF).

OBJECTIVE

We aimed to test the hypothesis that RYGBS improves CMRF to a greater extent than CWLP.

METHODS

Body composition (dual X-ray absorptiometry), insulin resistance (HOMA-IR), glycated haemoglobin (HbA1c %), high-sensitivity C-reactive protein (hs-CRP), leptin and lipid profiles were measured in South African participants undergoing RYGBS (n=12) and a CWLP (n=12) at baseline and at one and six months post-intervention.

RESULTS

Although RYGBS participants had a higher body mass index (BMI) (46.2 ± 7.0 vs. 36.6 ± 8.3 kg/m², $P=0.005$) than those following CWLP at baseline, CMRF did not differ. RYGBS resulted in a greater percentage decrease in participants' BMI compared to CWLP at one and six months post-intervention ($9.9 \pm 2.3\%$ vs. $4.1 \pm 3.0\%$ and $23.0 \pm 3.3\%$ vs. $9.5 \pm 8.3\%$, $P<0.001$ for both). Visceral adipose tissue

(VAT) decreased similarly between groups at 1-month post-intervention ($P<0.05$), but a greater percentage decrease was observed in RYGBS vs. CWLP participants at six months post-intervention ($40.9 \pm 8.8\%$ vs. $17.3 \pm 28.6\%$, $P=0.025$). In RYGBS participants only, LDL-cholesterol and total cholesterol decreased at both time points relative to baseline ($23.9 \pm 12.4\%$ and $27.2 \pm 21.2\%$; $19.0 \pm 10.7\%$ and $20.2 \pm 18.5\%$, $P<0.01$), whereas HOMA-IR ($49.4 \pm 31.3\%$, $P=0.044$) and leptin levels ($62.35 \pm 22.8\%$, $P<0.01$) only decreased at six months relative to baseline. Changes in cholesterol, HOMA-IR and leptin levels were dependent on changes in BMI ($P>0.05$). Although RYGBS, and not CWLP, reduced HbA1c percentage at one month (5.7 ± 4.4 , $P=0.017$), and hs-CRP (64.0 ± 19.8 , $P<0.001$) and triglycerides (20.7 ± 26.2 , $P=0.047$) at six months, the percentage change was not different between groups ($P>0.05$).

CONCLUSION

RYGBS results in greater reductions in CMRF, specifically VAT, insulin resistance and lipid profile, compared to CWLP. Our further analysis will focus on the molecular mechanisms involved in the improvement of insulin sensitivity, with emphasis on oxidative stress.

INFLUENCE OF *LESSERTIA FRUTESCENS* AND *ECHINACEA PURPUREA* ON THE BIOAVAILABILITY AND METABOLISM OF ETHINYLESTRADIOL BASED CONTRACEPTIVES

^{1,2}N. Hlengwa, ²A. Basson, ¹C. Awortwe, ¹S. Bowles, ¹C. Muller

¹ Biomedical Research and Innovation Platform, South African Medical Research Council, Cape Town, South Africa; ² Department of Biochemistry and Microbiology, University of Zululand, Kwa-Dlangezwa, South Africa

BACKGROUND

Lessertia frutescens and *Echinacea purpurea* extracts are commonly used herbal immune boosters by immune-compromised individuals, including HIV patients. Previous findings suggested that these extracts interact with cytochrome P450 enzymes and drug transporters. Therefore, the aim is to investigate whether the co-use of *Lessertia frutescens* or *Echinacea purpurea* influences the rate of metabolism and efficacy of 17 α -ethinylestradiol (EE)-based oral contraceptives.

OBJECTIVES

To assess the effect of herbal extracts on the intestinal uptake and efflux of EE, and its pharmacologically active metabolites (17 α -ethinylestradiol-3-O-sulfate (EES) and 17 α -ethinylestradiol-3-O-glucuronide (EEG)) using Caco-2 cell model. To evaluate the effect of herbal extracts on EE metabolism using human liver microsomes and human S9 liver fractions. To determine the effect of herbal extracts on mRNA expression of the relevant major CYP enzymes and drug transporters using C3A liver-cell model.

METHODS

Transport experiments across Caco-2 monolayers, using EE, EES and EEG were conducted in the presence and absence of the herbal extracts. We assessed the effect of herbal extracts on the clearance and metabolism of EE in human liver microsomes, S9 fractions and C3A cells.

RESULTS

The rate of transport of EES and EEG were increased by the addition of herbal extracts (4.78×10^{-7} cm/s², 1.23×10^{-6} cm/s²), respectively in Caco-2 cells. Human liver microsomes and S9 fractions revealed an increase in the clearance (0.42 ± 0.033 , 0.06 ± 0.02) of EE in the presence of both extracts, respectively. These results were further confirmed by induction experiments, which validated the effect of the herbal extracts increasing gene expression of a major efflux protein (ABCB1 (2.86 ± 0.95 , 2.38 ± 1.49)) and a drug transporter (SLCO1B39 (1.81 ± 1.80 , 0.454 ± 0.19)) in C3A cells.

CONCLUSION

Co-administration of the herbal extracts may lead to herb-drug interactions, reducing the efficacy of EE-based oral contraceptives eventually leading to contraceptive failure.

THE EFFECTS HERBAL TEAS (ROOIBOS AND HONEYBUSH) IN THE REGULATION OF INFLAMMATORY RESPONSES DURING SKIN CARCINOGENESIS

¹L. Keet, ²S. Abel, ²M. Lilly, ¹A. Louw

¹Department of Biochemistry, University of Stellenbosch; ²Institute of Biomedical and Microbial Biotechnology, Cape Peninsula University of Technology

BACKGROUND

Keratinocyte UV exposure may be associated with multiple physiological response events in the human skin demonstrating a complex and multifaceted biological process. The resultant inflammatory responses involve the production of various inflammatory cytokines, chemokines and the induction of cell death. Several studies have shown the anti-inflammatory and subsequent anti-tumour activities of rooibos and honeybush by the topical application to mouse skin. The mixture of polyphenolic compounds is known to act as antioxidants and likely to prevent oxidant-induced cell damage, playing a chemo-preventive role.

OBJECTIVE

Multiple inflammatory markers in keratinocytes will be monitored before and after exposure to UVB light.

METHODS

A keratinocyte/UVB exposure model was utilised to investigate these effects with herbal extracts of rooibos and three honeybush subspecies as inflammatory agents. Freeze-dried aqueous herbal tea extracts prepared to the desired dilutions were added 18 hours before UVB exposure (80 mJ/cm²) to HaCaT keratinocyte cells

that were seeded previously for 6 hours in Dulbecco's modified Eagle's medium. After irradiation, the cells were incubated for an additional 24 hours and inflammatory markers monitored utilising the Bio-plex Pro assay. Non-irradiated cells were also monitored after 18 hours of treatment and 48 hours after seeding.

RESULTS

Before UVB exposure, cell viability markers were not detrimentally affected. The herbal extracts stabilised the keratinocytes by reducing the production of the different cytokine biomarkers following the 18 hours' pre-exposure. The reduction of several of these biomarkers is retained after 24 hours in the absence of UVB exposure. Following UVB irradiation, a memory effect seems to exist with the reduction of cytokine biomarkers associated with the subsequent inflammatory response. This suggests a direct anti-inflammatory potential.

CONCLUSIONS

The rooibos and *C. subternata* extracts were the most effective in protecting against UVB-induced effects. Understanding the molecular mechanisms that underlie these processes is of importance in devising chemo-preventive interventions.

AN ANTI-STEATOTIC EFFECT OF ASPALATHIN-RICH GREEN ROOIBOS EXTRACT ON OLEIC ACID INDUCED STEATOSIS IN C3AS

^{1,2}N. Khuboni, ¹C. Muller, ²R. Mosa, ²A. Kappo, ¹K. Gabuza

¹Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg, South Africa; ²Department of Biochemistry and Microbiology, University of Zululand, Kwadlangezwa, South Africa

BACKGROUND

Non-alcoholic fatty liver disease (NAFLD) is a major cause of liver disease worldwide. The incidence of NAFLD is expected to escalate dramatically with the upsurge in metabolic diseases, including obesity and type 2 diabetes. Rooibos helps to improve metabolism and has demonstrated hepatoprotective effects against carbon tetrachloride (CCl₄) and tert-butyl hydroperoxide induced hepatotoxicity in rodents.

OBJECTIVE

To assess the modulatory or hepatoprotective effect of an aspalathin-rich Rooibos (Afriplex-GRT) extract in *in-vitro* and *in-vivo* models of NAFLD.

METHODS

Oleic acid was used to induce steatosis C3A liver cells. C3A cells were treated with pioglitazone or GRT for 24 hours, either during or after (post-treatment) the induction of steatosis by 1 mM oleic acid for 24 hours. Oil red O staining and MTT assay were performed to determine lipid accumulation and cell viability, respectively.

In vivo C57BL6/J (db/db) or (db/+) diabetic/NAFLD mice were treated with GRT over a 10- or 16-week period. Food and water intake, body and liver weight, and fasting glucose were monitored. A week before the end of the treatment period, oral glucose tolerance tests were performed. After each treatment period, the animals were terminated, and liver samples collected for histological, gene and protein analysis.

RESULTS

Microscopic images showed decreased lipid content by <80% in steatotic C3A cells (indicated by low intensity of ORO staining) following treatment with 10 and 100 µg/ml GRT. The reduction was comparable to pioglitazone (control drug). Furthermore, in db/db mice, GRT improved glucose tolerance and reduced the liver weight to body weight ratio.

CONCLUSION

GRT-modulated lipid accumulation induced by oleic acid in C3A cells and the reduction of relative liver weights in diabetic NAFLD db/db mice suggest that GRT could help ameliorate NAFLD.

UNDERSTANDING THE ROLE INTER-INDIVIDUAL GENETIC VARIATION PLAYS IN THE DEVELOPMENT OF UNCONTROLLED HYPERTENSION IN PATIENTS WITH CONCOMITANT TYPE 2 DIABETES MELLITUS AT TYGERBERG ACADEMIC HOSPITAL, WESTERN CAPE SOUTH AFRICA

^{1,2}S. Mabhida, ³M. Conradie, ²L. Mabasa, ^{1,2}M. Benjeddou, ²S. Bowles, ^{2,4}R. Johnson

¹Department of Biotechnology, University of the Western Cape, Bellville, South Africa;

²Biomedical Research, Innovation Platform, South African Medical Research Council, Tygerberg;

³Division of Endocrinology, Stellenbosch University, Tygerberg; ⁴Division of Medical Physiology, Stellenbosch University, Tygerberg, South Africa

BACKGROUND

Hypertension (HTZ) affects 1 billion individuals globally of which 50% have controlled blood pressure. HTZ is a major and modifiable risk factor for cardiovascular disease that frequently coexists with type 2 diabetes mellitus (T2DM). In recent years, the mechanism that underpins uncontrolled hypertension and its effect on treatment outcome has been the subject of intensive investigation. A growing body of evidence suggests that inter-individual variability to a drug's response affects efficacy and toxicity that result in HTZ remaining uncontrolled. This variability and associated clinical problems complicate the standard treatment protocols. Therefore, in this study, we aim to identify inter-individual variation in DNA sequence and relate it to a drug's pharmacokinetics and pharmacodynamics for tailoring treatment to a patient's specific genotype.

OBJECTIVES

To assess genotypic analysis of single nucleotide polymorphism (SNP) variants in several genes associated with uncontrolled HTZ; evaluate and group genetic variants to establish a common haplotype; and

determine the effect of genetic variants on the pharmacokinetic profile of specific hypertensive drugs for each haplotype.

METHODS

Buccal swabs will be collected from uncontrolled hypertensive patients living with and without T2DM, who are on a multidrug combination therapy. DNA from patients, with and without controlled hypertension, will be isolated and genotypic analysis of SNP variants from several genes will be determined using the TaqMan allelic discrimination assay. Genetic variants will then be evaluated and grouped to establish a common haplotype associated with uncontrolled HTZ. Thereafter, serum will be collected to determine the pharmacokinetic profile of specific hypertensive drugs for each haplotype using tandem liquid chromatography-mass spectrometry. This profile will then be compared to haplotypes of selected genes to establish a genetic profile that could possibly be used by clinicians to predict to which antihypertensive drug the individual is most likely to respond.

RESULTS & CONCLUSION:

Not applicable.

BACKGROUND QUALIFICATIONS, SELF-PERCEIVED COMPETENCIES AND LEADERSHIP DEVELOPMENT PRACTICES AMONG PUBLIC-SECTOR HOSPITAL MANAGERS IN KWAZULU-NATAL

¹N. Mabuza

¹Department of Public Health and Nursing, School of Health Sciences, University of KwaZulu-Natal

BACKGROUND

Leadership development, a concept rooted in different theoretical frameworks, ranges from behavioural science to business and other disciplines. The extensively researched concept has been practised in the international business sector gaining research interest within the global healthcare industry around 2003. Currently, it is poorly explored within the South African healthcare sector. Leadership development practices are tools used to develop the required interpersonal skills, which can be developed in conjunction with academic qualifications. In South Africa, these practices have not been explored in public hospitals. The Department of Health is attending to the management needs through implementing changes and introducing the National Health Insurance.

OBJECTIVES

To describe, 1) Professional profiles of senior hospital managers in the public sector; 2) Their preparedness for the job role; and 3) The leadership development and succession planning practices of public sector healthcare managers.

METHODS

Using a sequential explanatory mixed-methods cross-sectional research design,

we will employ a total population sampling technique among senior hospital managers at public hospitals in KwaZulu-Natal. A self-administered questionnaire comprising closed and open-ended questions will be used for descriptive statistics and correlation analysis with a significance level of $p=0.05$. Because of the poor response rate, a scoping review developed by the Joanna Briggs Institute will be conducted parallel to the main study. A scoping review entails an exploratory literature search providing evidence on a topic irrespective of study quality, which is useful to examine emerging areas, clarify key concepts and identify gaps.

RESULTS

Data collection in progress.

CONCLUSIONS

Current methods applied to develop leadership and managerial competencies among hospital managers working within the public healthcare sector will be reported. Current leadership development practices applied within the African continent including the processes followed to apply the practices will be discussed. The goal of this paper is to add knowledge by publishing research findings obtained from the study.

THE ASSOCIATION BETWEEN POLYMORPHISMS IN THE VITAMIN D RECEPTOR AND METABOLIZING ENZYME GENES AND TYPE 1 DIABETES MELLITUS IN THE SOUTH AFRICAN INDIAN POPULATION

¹N. Malaza, ¹E. Cave, ^{1,2}C. Padoa

¹Chemical Pathology, University of Witwatersrand, Johannesburg; ²National Health Laboratory Service, Johannesburg

BACKGROUND

Vitamin D plays an immunoregulatory role in type 1 diabetes (T1D) through the vitamin D receptor (VDR) present in the pancreatic and immune cells. Increased levels of vitamin D mediate the shift from the Th1 pathway, which is responsible for the destruction of pancreatic β cells to the Th2 pathway. Polymorphisms in the VDR and CYP2R1 genes have been shown to be associated with T1D. Little is known about the effect of these polymorphisms on the development of T1D in the South African Indian population. Thus, we aimed to determine the frequency of these polymorphisms and their association with the development of T1D in the South African Indian population.

OBJECTIVES

To determine the frequency of the polymorphisms in the South African Indian population and to determine if they are associated with the development of T1D.

METHODS

T1D patients (n=52) were recruited from Charlotte Maxeke Johannesburg Academic and Inkosi Albert Luthuli Central Hospitals. Healthy non-diabetic South African Indian

participants (n=64) were recruited from SANBS blood drives. All participants were genotyped by PCR-RFLP for three VDR polymorphisms (rs1544410, rs7975232 and rs713236) and rs10741657 in the CYP2R1 gene.

RESULTS

There was a significant difference in the allele frequency for VDR rs7975232 between patients and controls (A allele: 0.74 vs. 0.48, respectively; $p=0.000$). Similarly, the A allele of CYP2R1 rs10741657 was significantly higher in patients compared to controls (0.44 vs. 0.27, respectively; $p=0.007$). No differences in allelic frequencies between patients and controls were seen for rs1544410 and rs731236 ($p=0.054$ and 0.28, respectively).

CONCLUSIONS

The rs7975232 and rs10741657 polymorphisms are associated with the development of T1D in the South African Indian population. The belief is that these polymorphisms result in defective vitamin D production and signalling leading to a shift from the Th2 (anti-inflammatory) to the Th1 (pro-inflammatory) pathway resulting in β -cell death.

INVESTIGATION OF THE INFLUENCE OF GENETIC VARIATION ON THE EXPRESSION EFFICIENCY OF THE PROMOTER REGION OF SLC47A2/ MATE-2K GENE

¹C. Masilela, ²R. Johnson, ¹M. Benjeddou

¹Precision Medicine Unit, Department of Biotechnology, Faculty of Natural Sciences, University of the Western Cape; ²Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg

BACKGROUND

Solute carrier family 47, member 2 (SLC47A2) also known as multidrug and toxin extrusion 2 (MATE2-K), plays an important role in the excretion of the anti-diabetic drug metformin. Previous studies have established that genetic polymorphisms in the promoter region of the MATE-2K gene are likely to directly influence the pharmacokinetics and inter-individual variability in metformin response. Therefore, accounting for the variability in this gene is important in understanding the impact of genetic variation in drug transport as well as response.

OBJECTIVE

To evaluate the expression efficiency of the promoter region of the MATE-2K gene in haplotypes associated with the promoter within the indigenous Zulu population of South Africa.

METHODS

Buccal swab samples were collected from a Zulu population. DNA was extracted

using a salt lysis method and quantified using a Nanodrop Spectrophotometer. The promoter region was sequenced to identify the different single nucleotide polymorphisms (SNPs) and haplotypes present in the Zulu population. DNA fragments representative of the haplotypes identified were cloned into a promoter-less vector (pGluc basic 2 vector) and expressed in immortalised human kidney cells (HEK293). The expression efficiency was monitored by measuring fluorescence using flow cytometry.

RESULTS

The promoter region of MATE-2K was sequenced in 96 samples. Six SNPs and 15 promoter haplotypes were identified. The level of expression and relative expression efficiency was determined by flow cytometry and statistical analyses.

CONCLUSION

This project will generate novel pharmacogenomics data that are relevant in the context of precision medicine.

WHOLE-GENOME TRANSPOSON MUTAGENESIS TO ELUCIDATE THE GENETIC REQUIREMENTS FOR VITAMIN B₁₂ BIOSYNTHESIS AND ASSIMILATION IN MYCOBACTERIA

^{1,2}R.D. Mbau, ^{1,2}G.T. Mashabela, ^{1,2}V. Mizrahi, ^{1,3}R. Mukherjee, ^{1,2}D.F. Warner

¹SAMRC/NHLS/UCT Molecular Mycobacteriology Research Unit, DST/NRF Centre of Excellence for Biomedical TB Research, Department of Pathology, Faculty of Health Sciences, University of Cape Town, South Africa; ²Institute of Infectious Disease and Molecular Medicine, University of Cape Town, South Africa; ³Division of Biology, Indian Institute of Science Education and Research, Tirupati, India

BACKGROUND

Recent comparative genomics analyses have suggested that an altered capacity for vitamin B₁₂ biosynthesis might represent a critical step in the evolution of the pathogenic *Mycobacterium tuberculosis* complex strains from a non-pathogenic ancestor. However, resolving the full gene complement involved in the complex, multi-step pathways for vitamin B₁₂ biosynthesis, assimilation, and salvage in different mycobacterial species is enormously challenging. To address this problem, we have adopted a genome-scale approach to yield a detailed genetic map of *de novo* vitamin B₁₂ biosynthesis and salvage in mycobacteria, as well as to elucidate previously unknown genes or regulatory elements involved in mycobacterial B₁₂ metabolism.

OBJECTIVE

To elucidate the genetic requirements for vitamin B₁₂ biosynthesis and assimilation in the non-pathogenic mycobacterial model organism, *M. smegmatis*.

METHODS

We applied a combination of whole-genome Tn mutagenesis and next generation sequencing (Tn-seq) in *M. smegmatis* $\Delta metE$, a gene-deletion mutant in which the function of the alternative, B₁₂-

dependent methionine synthase, MetH, is essential for viability. Following growth of the *metE* mutant in rich laboratory medium, genomic DNA was extracted, amplified by PCR, and subjected to high-throughput sequencing to quantify all Tn junctions. Thereafter, the library was cultivated in defined minimal medium to enable identification of conditionally essential genes.

RESULTS

A $\Delta metE$ library of 400,000 Tn insertion mutants (cfu/ml) was generated. Analysis of the resulting sequencing data revealed that, Of the 6,716 genes in the *M. smegmatis* genome, 213 genes were identified as essential for growth on LB agar while 312, 314, and 309 genes were identified as essential in unsupplemented, B₁₂-supplemented or cobalt-supplemented Sauton's minimal medium, respectively.

CONCLUSIONS

The *metE* library represents a valuable repository of Tn insertion mutants for genome-wide conditional essentiality analyses in defined minimal media. These studies are underway and will enable the first validated elucidation of the full vitamin B₁₂ gene repertoire in mycobacteria.

DEVELOPMENT AND VALIDATION OF ANTIRETROVIRAL DRUG LEVELS FOR THERAPEUTIC DRUG MONITORING USING DRIED BLOOD SPOTS

¹S. Modiba, ^{1,2}T. Snyman

¹Chemical Pathology, University of the Witwatersrand; ²National Health Laboratory Service, Johannesburg

BACKGROUND

Despite global efforts to halt the human immunodeficiency virus (HIV) epidemic, the number of individuals living with HIV continues to rise. Plasma concentrations of antiretroviral (ARV) drugs are frequently used for therapeutic drug monitoring. Dried blood spot (DBS) sampling offers a patient-friendly and easy alternative to plasma sampling.

OBJECTIVES

To develop and validate a method for the measurement of ARVs in DBS using ultra-pressure liquid chromatography in tandem with mass spectrometry (UPLC-MS/MS).

METHODS

Samples were spotted onto the collection cards and left to dry overnight. Each DBS was punched out and treated with a mixture of 0.1% formic acid in methanol and 0.2 M zinc sulphate heptahydrate in water (50:50 v/v) containing the deuterated internal standards. Ten microliters of the extract were injected onto Shimadzu 8060 UPLC-MS/MS for analysis. Linearity, accuracy, precision, limit of detection and

limit of quantification, specificity, sensitivity, recovery and stability for each of the drugs used.

RESULTS

The following transitions were used for analysis. The parent drug: with its multiple-reaction monitoring transitions: Efavirenz (EFV): 315.99 > 243.94; lamivudine (3TC): 230.03 > 112.00; lopinavir (LPV): 629.50 > 447.10; and ritonavir (RTV): 721.20 > 170.91. The assay was linear over the concentration ranges tested 119-833, 323-2360, 104-6640 and 370-5685 ng/ml for 3TC, EFV, RTV and LPV, respectively. Accuracy, inter- and intra-day precision gave a coefficient of variation of 20%, 7%, 6% and 6% for 3TC, EFV, RTV and LPV, respectively. The limit of detection and limit of quantification for each of the compounds were 10, 86 and 36.2 ng/ml for 3TC; 17.58 and 58.6 ng/ml for EFV; 54.51 and 181.7 ng/ml for LPV; and 4.62 and 15.4 ng/ml for RTV.

CONCLUSION

Method validation is near completion and patient recruitment has commenced.

DEVELOPMENT AND VALIDATION OF ANTIRETROVIRAL DRUG LEVELS FOR THERAPEUTIC DRUG MONITORING USING DRIED BLOOD SPOTS

¹S. Modiba, ^{1,2}T. Snyman

¹Chemical Pathology, University of the Witwatersrand; ²National Health Laboratory Service, Johannesburg

BACKGROUND

Despite global efforts to halt the human immunodeficiency virus (HIV) epidemic, the number of individuals living with HIV continues to rise. Plasma concentrations of antiretroviral (ARV) drugs are frequently used for therapeutic drug monitoring. Dried blood spot (DBS) sampling offers a patient-friendly and easy alternative to plasma sampling.

OBJECTIVES

To develop and validate a method for the measurement of ARVs in DBS using ultra-pressure liquid chromatography in tandem with mass spectrometry (UPLC-MS/MS).

METHODS

Samples were spotted onto the collection cards and left to dry overnight. Each DBS was punched out and treated with a mixture of 0.1% formic acid in methanol and 0.2 M zinc sulphate heptahydrate in water (50:50 v/v) containing the deuterated internal standards. Ten microliters of the extract were injected onto Shimadzu 8060 UPLC-MS/MS for analysis. Linearity, accuracy, precision, limit of detection and

limit of quantification, specificity, sensitivity, recovery and stability for each of the drugs used.

RESULTS

The following transitions were used for analysis. The parent drug: with its multiple-reaction monitoring transitions: Efavirenz (EFV): 315.99 > 243.94; lamivudine (3TC): 230.03 > 112.00; lopinavir (LPV): 629.50 > 447.10; and ritonavir (RTV): 721.20 > 170.91. The assay was linear over the concentration ranges tested 119-833, 323-2360, 104-6640 and 370-5685 ng/ml for 3TC, EFV, RTV and LPV, respectively. Accuracy, inter- and intra-day precision gave a coefficient of variation of 20%, 7%, 6% and 6% for 3TC, EFV, RTV and LPV, respectively. The limit of detection and limit of quantification for each of the compounds were 10, 86 and 36.2 ng/ml for 3TC; 17.58 and 58.6 ng/ml for EFV; 54.51 and 181.7 ng/ml for LPV; and 4.62 and 15.4 ng/ml for RTV.

CONCLUSION

Method validation is near completion and patient recruitment has commenced.

METABOLIC PROFILE OF RAT INSULINOMA BETA-CELL SPHEROIDS (INS-1)

^{1,2}Y. Ntamo, ^{1,3}C.J.F. Muller, ²A.M.P. Kappo, ^{1,2}J. Louw, ^{1,3}N. Chellan

¹Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg, South Africa; ²Department of Biochemistry and Microbiology, University of Zululand, Kwa-Dlangezwa, South Africa; ³Division of Medical Physiology, Faculty of Medicine and Health Sciences, Stellenbosch University, Tygerberg, South Africa

BACKGROUND

Cell culture is commonly used to study cellular pathophysiology of conditions such as type 2 diabetes (T2D). However, standard cell culture is grown on flat, polystyrene plastic surfaces that do not represent the three-dimensional architecture of tissue *in vivo*. These cultures lack some important environmental cues from the cellular microenvironment, such as cell-to-cell interaction and long-term, uninterrupted growth. To increase the physiological relevance of cell culture, microgravitational three-dimensional culture systems have been developed that produce tissue-like spheroids.

OBJECTIVE

To develop a method to produce pancreatic (INS-1) beta-cell spheroids.

METHODS

The CelVivoBAM, microgravitational culture system was used to culture INS-1 cells into beta-cell spheroids. Briefly, INS-1 cell clusters were produced in AggreWell plated (STEMCELL technologies), transferred into a rotating bioreactor of the CelVivoBAM system and then grown for extended periods for further experimentation. These spheroids were cultured in normal RPMI

medium, supplemented with low (11 mM) and high glucose (16.7 mM). Additionally, relevant survival and functional parameters such as viability and insulin secretion were investigated.

RESULTS

Culture conditions were optimised for INS-1 beta-cell spheroids growth up to ± 2 months. Their viability increased proportionally with time in culture from day one to 44 (5852 ± 137.6 RLU to 53568 ± 937.9 RLU, $p < 0.0001$), respectively. Additionally, at a functional level, spheroids were responsive to glucose-stimulated insulin secretion assays with 16.7 mM glucose (week 4 (15.11 ± 1.55 vs 2.65 ± 0.15 ng/mL, $p < 0.001$), week 5 (14.15 ± 1.05 vs 1.95 ± 1.05 ng/mL $p < 0.001$), week 6 (17.95 ± 2.25 vs 2.85 ± 0.05 ng/mL, $p < 0.001$), week 7 (12.70 ± 1.00 vs 2.15 ± 1.05 ng/mL, $p < 0.001$) and week 8 (11.35 ± 1.35 vs 2.65 ± 1.05 ng/mL, $p < 0.001$), respectively.

CONCLUSION

We have successfully established an *in vitro*, 3D-culture model of beta-cell spheroids which promises to be more physiologically relevant and could be very useful in understanding the pathophysiology of beta-cell metabolic conditions such as T2D.

SUSTAINED AUTOPHAGIC FLUX WITH CELL DEATH ONSET IN AN IN VITRO MODEL OF ALZHEIMER'S DISEASE

¹C. Ntsapi, ¹B. Loos

¹ Non-Communicable Diseases Unit, SAMRC/Division of Medical Physiology, Department of Physiological Sciences, Faculty of Science, University of Stellenbosch, Stellenbosch

BACKGROUND

Alzheimer's disease (AD) is the most common, incurable form of dementia, affecting more than 35 million people worldwide. The amyloid cascade hypothesis suggests that the widespread neurodegeneration found in AD patients is caused by the accumulation of amyloid-beta peptide (A β), which is derived from the amyloid precursor protein (APP). Although extracellular aggregates of A β serve as one of the primary hallmark pathologies required for a diagnosis of AD, deficits in the autophagy-lysosomal pathway are thought to precede the accumulation of A β . Deficits in this pathway manifest as defective autophagy, the major cellular quality control system that degrades damaged organelles and potentially toxic protein aggregates by delivering them to the lysosomes for degradation. In the AD brain, A β -laden autophagic vesicles (AVs) accumulate in the dystrophic neurites, thus linking impaired autophagy to A β metabolism. However, it is unclear whether accumulated AVs reflect an increase in autophagic flux, or that the end stage of AVs clearance is impaired. Autophagic flux is a measure of autophagic degradation activity, and the precise measurement of this process is crucial to understanding the

control and regulation of the autophagic machinery in AD.

OBJECTIVES

To determine the effects of APP overexpression on (i) autophagic flux, (ii) APP and A β protein clearance, and (iii) cell death onset.

METHODS

Using N2aSwe cells stably overexpressing APP as our in vitro model of AD, we (i) quantified protein expression in the absence and presence of Bafilomycin A1 (BafA1) treatment using western blot analysis, and (ii) characterised the cellular ultrastructure in the absence and presence of BafA1 using transmission electron microscopy analysis.

RESULTS

Autophagic flux is increased with APP overexpression and remains enhanced even with cell death onset.

CONCLUSION

Autophagic flux remains functional even with late APP overexpression and increased A β neurotoxicity suggesting that autophagy activity can be modulated throughout the duration of AD progression for the first time.

INVESTIGATING VACCINE HESITANCY AND VALIDATING A MEASURING TOOL IN THE WESTERN CAPE PROVINCE

¹E.O. Oduwole, ^{1,2}H. Mahomed, ^{3,4}C.S. Wiysonge

¹Division of Health Systems and Public Health, Department of Global Health, Stellenbosch University; ²Cape Metro Health Services, Western Cape Government; ³Division of Epidemiology and Biostatistics, Department of Global Health, Stellenbosch University; ⁴Cochrane South Africa, South African Medical Research Council, Tygerberg

BACKGROUND

Vaccine hesitancy, defined as the delay in acceptance or refusal of vaccination despite the availability of vaccination services, is an emerging global problem. Contributing to low and sub-optimal vaccine coverage, it can lead to intermittent outbreaks of vaccine-preventable diseases. The paucity of research and the lack of validated measurement tools in South Africa is of concern.

OBJECTIVES

To adapt and validate a survey tool to investigate vaccine hesitancy, we will conduct 1) an overview of reviews on vaccine hesitancy, and 2) a comprehensive review of current tools to measure vaccine hesitancy. 3) We will modify and validate the Vaccine Hesitancy Scale in South Africa.

METHODS

This quantitative study will consist of two phases, a synthesis of existing research and a primary study. Phase one (evidence synthesis phase) will involve (a) an overview of existing systematic reviews on vaccine hesitancy; and (b) a scoping review of

existing vaccine hesitancy measurement tools, irrespective of where they have been developed or validated. In the second phase, we will utilise iterative testing methodology to adapt and validate the Vaccine Hesitancy Scale among parents of children age one year and younger. They will be drawn from the three strata of geographical dwelling areas in the Western Cape Province, South Africa as described by Statistics South Africa. The estimated total sample size for the study will be greater than 500 participants.

RESULTS

The research is currently at the protocol approval stage, hence there are no data available.

CONCLUSIONS

We anticipate that the two reviews and the validation study will contribute immensely to the existing body of knowledge on vaccine hesitancy on the local and global scale. The validated tool will be valuable in reducing the knowledge deficit in addressing vaccine hesitancy in South Africa and similar settings.

GENOME-WIDE ASSOCIATIONS BETWEEN HOST GENOTYPES AND *M. TUBERCULOSIS*

¹S. Pitts ^{1,2}S. Pitts, ¹M. Möller, ¹H. Schurz, ¹E. Streicher, ¹R. Warren, ³T. Thye, ^{4,5}S. Niemann, ¹E. Hoal, ^{1,2}G. van der Spuy, ^{1,2}G.C. Tromp, ¹C. Kinnear

¹DST-NRF Centre of Excellence for Biomedical Tuberculosis Research; ²South African Tuberculosis Bioinformatics Initiative; South African Medical Research Council Centre for Tuberculosis Research; Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, Tygerberg, South Africa; ³Infectious Disease Epidemiology, Bernhard Nocht Institute for Tropical Medicine, Hamburg Germany; ⁴Molecular and Experimental Mycobacteriology, Forschungszentrum Borstel, 23845 Borstel, Germany; ⁵German Center for Infection Research, Borstel Site, 23845 Borstel, Germany

BACKGROUND

Tuberculosis (TB) is a complex disease caused by infection with *Mycobacterium tuberculosis* (*M. tb*). While most infected, immune-competent individuals remain asymptomatic, approximately 10% will develop active disease. Numerous studies have investigated the association of candidate genes with TB, and with different *M. tb* clades, with one recent study investigating genome-wide associations in a Thai cohort.

OBJECTIVE

In this study, the aim was to investigate genome-wide association(s) between the host genotype and the genome of the infecting *M.tb* pathogen.

METHODS

Sputum and blood samples were collected from TB patients residing in a suburb of Cape Town. Genotyping was performed using the Affymetrix 500k SNP array, and *M. tb* clades were identified using spoligotyping and IS6110 RFLP. Genotypes passing strict quality control filters were phased followed by imputation. Multinomial logistic regression (MLR) was performed using SNP test and the standard genome-wide significance cut-off of $\alpha = 5 \times 10^{-8}$ was used.

RESULTS

The cohort was dominated by LAM, followed by the Haarlem/LCC, Beijing/CAS1, Other, and Quebec superclades. MLR was performed using ~7 million SNPs for 445 samples, and the five *M. tb* superclades. The strongest association was with SNP rs9389610 (g.139039029G>A) on chromosome 6, at a p-value of 1.6×10^{-7} . Individuals with the A allele of this SNP were twice as likely to be infected with a member of the Beijing/CAS1 superclade, as compared to the Haarlem/LCC (OR: 0.49) or LAM (OR: 0.46) superclades.

CONCLUSIONS

Although the association did not reach genome-wide significance, the results suggest replication of this approach in a larger cohort of this population may provide significant associations with the infecting *M. tb* clade, thereby improving our understanding of TB pathobiology. This is the first study to analyse associations between gene variants and *M. tb* superclades at a genome level, and this working method will now be used to investigate a Ghanaian cohort.

PREVENTION OF DOXORUBICIN-INDUCED CARDIOTOXICITY: A MECHANISTIC STUDY

^{1,2}N.F. Sangweni, ¹L. Mabasa, ^{1,2}B. Huisamen, ²D. van Vuuren, ^{1,2}R. Johnson

¹Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg, South Africa; ²Division of Medical Physiology, Faculty of Health Sciences, Stellenbosch University, Tygerberg, South Africa

BACKGROUND

Anthracyclines (ATCs) are a class of highly potent chemotherapeutic agents used to treat various types of malignancies such as breast cancer. Although effective, the therapeutic index of these drugs is drastically reduced because of their cardiotoxic side effects. Following ATC treatment, the myocardial insult resulting in months for acute-toxicity or years for chronic-toxicity, have been demonstrated in studies. Therefore, early preclinical detection of patients at risk of anthracycline-induced cardiomyopathy (aCMP) and preventative treatment strategies can be employed to attenuate the resulting cardiotoxicity. To this end, compounds from *Galega africana*, which possess cardioprotective and anti-cancer properties, could aid in alleviating aCMP. Therefore, in this study we will investigate the cardioprotective effect of these compounds and elaborate on the proposed mechanism in preventing aCMP.

OBJECTIVES

To screen the serum of breast cancer patients for early predictive parameters related to aCMP. To understand the underlying pharmacokinetic interactions

between *G. africana* and ATC (herb-drug interaction). To determine the efficacy of compounds specific to *G. africana* in the prevention of aCMP in an *in vivo* neoplastic or non-neoplastic Wistar rat model.

METHODS

Blood from breast cancer patients in remission will be collected at predetermined time periods to test for known cardiac biomarkers using the cardiac Troponins and NT-proBNP serum ELISA kits. The inhibitory or inducing effect of compounds specific to *G. africana* will be measured using Vivid recombinant cytochrome P450 enzymatic assays. Then, to investigate the efficacy of these compounds in preventing aCMP, 7-week-old female, neoplastic (chemically induced with MBA for two weeks) and non-neoplastic, Wistar rats will be co-treated with compounds specific to *G. africana* and doxorubicin for six weeks. Three months after cessation of treatment, animals will be terminated, and blood and tissue collected for subsequent histological, biochemical and protein and gene expression analysis.

RESULTS & CONCLUSION

Not applicable.

A PEPTIDOGLYCAN RECYCLING AND AMIDATION ENZYME IN MYCOBACTERIUM TUBERCULOSIS AS A NEW DRUG TARGET FOR TUBERCULOSIS

¹M. Shaku, ¹B. Kana

¹DST/NRF Centre of Excellence for Biomedical TB Research, Wits University, Johannesburg

BACKGROUND

Mycobacterium tuberculosis (*Mtb*), assembles a complex cell wall with cross-linked peptidoglycan (PG) being essential for cellular integrity. PG is composed of glycan and peptide components, the latter containing amidated D-glutamate, which is essential for PG cross-linking. PG recycling and amidation in gram-positive bacteria is facilitated by murein peptide ligase (MurT), and in this study, we focused on characterisation of the mycobacterial homologue for this enzyme.

OBJECTIVE

To validate the PG recycling and amidation enzyme, MurT, as a novel drug target for TB treatment.

METHODS

Bioinformatics techniques were used to identify *Mtb* genes required for PG recycling. The enzyme MurT (Rv3712) was selected for further study. Allele exchange mutagenesis was used to generate MurT mutant in *M. smegmatis* and CRISPR-cas9 gene silencing was used to create MurT mutants in *Mtb*. Confocal microscopy coupled with PG labelling fluorescent substrates were used to study the growth

of MurT depleted cells and for cellular localisation of MurT-GFP. The mycobacterial protein fragment complementation assay was used to determine MurT interacting partners.

RESULTS

MurT is essential for mycobacterial growth. MurT was found to be required for PG amidation. Depletion of MurT causes cell death. Spatial localisation of MurT-GFP reveals that MurT localises at the cell poles and cell division septum. Bioinformatic and biochemical analyses of MurT interacting partners reveal GatD (Rv3713) as a protein partner of MurT for the formation of the MurT-GatD complex required for PG biosynthesis. GatD-mRFP was found to co-localise with MurT. Cells depleted of MurT were found to be highly sensitive to cell wall targeting antibiotics.

CONCLUSION

Our observations suggest that PG amidation plays a decisive role in the polymerisation of PG in mycobacteria and highlight the MurT-GatD complex as a novel drug target.



NATIONAL HEALTH SCHOLARSHIP PROGRAMME (NHSP)

MS PUMLA ZONKE – PROGRAMME ADMINISTRATOR

SUPERVISION SYSTEM OF WBOT IN NORTH WEST PROVINCE DISTRICTS

¹T. Assegai, ¹H. Schneider

¹School of Public Health, University of the Western Cape, Bellville

BACKGROUND

The ward-based outreach teams (WBOT) programme constitutes South Africa's national community health worker (CHW) programme. Many challenges that CHWs face, point to the need for supervision systems that not only monitor performance but also provide moral and other forms of support.

OBJECTIVES

To develop a supportive supervision framework that will contribute to effective strategies which improve the implementation of supportive supervision processes of national CHW programmes. For this phase of the study, we describe the extent to which policy and training documents relating to WBOT provide guidance on supervision processes and explore interactions among team members and the primary health care (PHC) staff.

METHODS

This qualitative study included a document review and in-depth interviews. We reviewed policy and training documents of the National Department of Health focusing on text relating to the supervision system of the WBOT programme. In the Ngaka Modiri Molema District, we used a semi-structured interview guide with open-ended questions in one-on-one

interviews and focus group discussions. We elicited perceptions on supervision of WBOT and mapped social and professional networks between WBOT members and PHC staff. Key informants included WBOT, operational managers and middle-level managers.

RESULTS

Policy and training documents outline a line of authority between WBOT members and facility staff. However, details and specifics of supervision are limited. Preliminary analysis shows that team leaders are critical role players and provide lots of support to WBOT members, and their role seems to correlate with the document review results. Data show that WBOT members communicate and support each other. However, facility staff do not appear to have regular or close interactions with WBOT members.

CONCLUSIONS

Weaknesses in the current supervision system of WBOT exist. Adequate provision of support and supervision guided by formal instructions, dedicated human resources and training are key to the performance and sustainability of scaled-up CHW programmes.

DIVERSITY AND ECOLOGY OF ASTROVIRUSES IN SOUTH AFRICAN BATS

¹K. Barnard, ¹N. Ithete, ¹W. Preiser, ²S. Schultz-Cherry

¹Faculty of Medicine and Health Sciences, Department pathology, Division Medical Virology, Stellenbosch University; ²Department of Infectious Disease, St. Jude Children's Research Hospital, Memphis, United States of America

BACKGROUND

In the search for wildlife hosts of potential zoonotic diseases, bats (Chiroptera) were found to play an important role as reservoirs. Astroviruses (AstVs) are among a wide variety hosted by bats. AstVs are transmitted via faecal-oral route and cause acute gastroenteritis and in rare cases encephalitis and hepatitis. Little is known about AstVs occurring in southern African (SAn) bats.

OBJECTIVES

To investigate the diversity and ecology of SAn bat AstVs using molecular-, phylogenetic- and statistical modelling techniques.

METHODS

Bat faecal samples (n=600) were screened for the presence of AstVs using a screening assay that targets the RNA-dependent RNA polymerase (RdRp) gene. Based on the RdRp sequences a real-time PCR (qPCR) assay was developed and used to monitor the amplification of AstVs in a bat colony over time. The qPCR assay and the conventional screening assay were compared to each other regarding detection. Phylogenetic analyses were carried out using MEGA v7 and Geneious R12.

RESULTS

Phylogenetic analyses of the SAn bat astrovirus RdRp sequences (n=44) suggest that clustering is not always according to species or geographical location. The ML tree of the ORF2 sequences indicates that the SAn bat AstV sequence shares a common ancestor with human astrovirus isolates from China. This could be because there are not many ORF2 bat sequences available for analysis. The generation of additional sequences should improve confidence in phylogenetic inference of bat AstVs. qPCR results indicated that amplification of AstVs in a bat colony peaked after the recolonization of the roost. The qPCR assay detected 20% more positive samples than the conventional screening PCR, indicating its value as a screening tool for bat AstVs. Statistical analyses indicated that species identity, sex and biome influenced astrovirus positivity.

CONCLUSION

AstVs in SAn bats are highly diverse and could potentially be zoonotic based on the phylogenetic analyses of the capsid protein gene.

MATERNAL EXPOSURE TO TRAUMA AND CHILD ADVERSE GROWTH OUTCOMES IN A SOUTH AFRICAN BIRTH COHORT

¹W. Barnett, ²S. Halligan, ¹H.J. Zar, ³K.A. Donald, ^{4,5}D.J. Stein

¹Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital, and Medical Research Council Unit on Child & Adolescent Health, University of Cape Town (UCT), South Africa; ²Department of Psychology, Bath University, United Kingdom; ³Division of Developmental Paediatrics, Department of Paediatrics & Child Health, Red Cross War Memorial Children's Hospital, UCT, South Africa; ⁴Department of Psychiatry and Mental Health, UCT, South Africa; ⁵South African Medical Research Council Unit on Risk and Resilience in Mental Disorders, Cape Town, South Africa

BACKGROUND

Mothers and children in low- and middle-income settings such as South Africa are at risk of exposure to high, sustained levels of violence and trauma, with potentially negative health consequences for exposed children. However, there is limited data on the impact of maternal trauma on child growth that derives from high-risk communities.

OBJECTIVE

We aimed to investigate the impact of pre-existing maternal childhood trauma, and maternal exposure to intimate partner violence (IPV) in the perinatal and early post-partum period and adverse growth in children through age two years.

METHODS

This study was nested in the Drakenstein Child Health Study, a longitudinal birth cohort. Maternal IPV (emotional, physical and sexual) was measured at six time points from pregnancy to two years postpartum and maternal childhood trauma at enrolment. Associations between maternal maltreatment in childhood and IPV and child

growth (weight, height, stunting, wasting) were investigated using multinomial and logistic regression. Maternal mental health outcomes were examined as possible mediating variables.

RESULTS

At age 12 months, the prevalence of stunting and wasting in 863 children was 18% and 4%, respectively. High levels of maternal childhood trauma (35%) and IPV (28%) were also present in the cohort. Results indicate an association between IPV exposure and pre-existing maternal childhood trauma, and child stunting through age two years. Maternal depression mediated this relationship.

CONCLUSION

In high-risk communities such as South Africa, it is critical to gain an improved understanding of pathways by which maternal trauma affects child growth. Maternal mental health problems may represent an important pathway by which child growth is compromised.

BIOMECHANICAL ANALYSIS OF SPECIFIC MOTOR IMPAIRMENTS CONTRIBUTING TO EARLY FUNCTIONAL DECLINE IN ADULTS LIVING WITH HIV/AIDS: SUB-STUDY TO THE CAPE WINELANDS HAART TO HEART/ENDOAFRICA STUDY

¹K. Berner, ¹L. Morris, ¹Q. Louw

¹Division of Physiotherapy, Department of Health & Rehabilitation Sciences, Faculty of Medicine and Health Sciences, Stellenbosch University, Tygerberg, South Africa

BACKGROUND

The prevalence of locomotor impairments remains concerning among people living with HIV/AIDS (PLWHIV), despite advanced antiretroviral therapies. A poor understanding exists of how gait and balance are quantitatively affected in PLWHIV.

OBJECTIVES

To provide quantitative biomechanical information about locomotor impairments of PLWHIV, and to correlate clinical test performance to 3D-motion analysis, self-reported function, and falls.

METHODS

Phase I included a systematic review describing objective locomotor impairments in PLWHIV. This was followed by two primary agreement, correlation and repeated-measures studies, aimed at ascertaining concurrent validity (versus optical motion capture) and repeatability of gait-measurements using a portable inertial motion capture system (PIMCS) in healthy volunteers, community controls and PLWHIV. Phase II comprised a cross-sectional study with an analytical component. The PIMCS was implemented in a clinical setting to measure 3D gait and balance biomechanics of 50 PLWHIV and 50 seronegative participants. Timed clinical functional test performance was also

recorded, and self-reported function and fall-history. These data will be correlated to investigate associations.

RESULTS

The systematic review revealed that objective locomotor impairments exist in PLWHIV, resembling fall-associated parameters in the elderly. Findings from Study One of psychometric testing using healthy volunteers indicated that the PIMCS's output was not directly comparable to the reference standard, but good repeatability and high correlation to CGM-based models implied that PIMCS gait data are comparable when using the same system. Following completion of data analysis, findings from Study Two will extend these results using a community sample of PLWHIV and controls; aiding interpretation of PIMCS data in a clinical population. Findings from Phase II will answer the overall project aim. Data analysis is ongoing.

CONCLUSIONS

The project is the first to describe 3D-locomotor biomechanics in PLWHIV. The comprehensive dataset will allow identification of appropriate clinical test(s) for early community-level screening of functional decline in PLWHIV.

PATTERNS AND PREDICTORS OF HIV-STATUS DISCLOSURE AMONG PREGNANT WOMEN IN SOUTH AFRICA: DIMENSIONS OF DISCLOSURE AND INFLUENCE OF SOCIAL AND ECONOMIC CIRCUMSTANCES

¹K. Brittain, ²C.A. Mellins, ²R.H. Remien, ¹T. Phillips, ³A. Zerbe, ^{3,4}E.J. Abrams, ¹L. Myer

¹Division of Epidemiology & Biostatistics and Centre for Infectious Disease Epidemiology & Research, School of Public Health & Family Medicine, University of Cape Town, South Africa;

²HIV Center for Clinical & Behavioral Studies, New York State Psychiatric Institute, Columbia University, USA; ³ICAP, Columbia University, Mailman School of Public Health, USA; ⁴College of Physicians & Surgeons, Columbia University, USA

BACKGROUND

HIV-status disclosure may improve psychosocial health and adherence to antiretroviral therapy (ART), but existing insights suffer from methodological limitations.

OBJECTIVE

We explored disclosure over time during pregnancy and postpartum among 1347 HIV-positive women in Cape Town.

METHODS

HIV-positive women who were entering antenatal care were recruited into the MCH-ART study. Women who were initiating ART were followed until their first postpartum clinic visit, with follow-up through 12 months postpartum among women who chose to breastfeed. We used different analytic methods across three analytic populations to explore disclosure over time: (i) a cross-sectional analysis of disclosure reported at entry into antenatal care among all women who were known HIV-positive before the pregnancy; (ii) a descriptive analysis of longitudinal data through 12 months postpartum among women who were known HIV-positive and who were initiating ART; and (iii) an analysis of longitudinal data through 12 months postpartum among women who were diagnosed HIV-positive during the

pregnancy and who were initiating ART.

RESULTS

Among 995 women diagnosed HIV-positive before the pregnancy and entering antenatal care, 95% had disclosed to ≥ 1 individual. In Mokken scale analysis, we observed two separate dimensions of disclosure: disclosure to a male partner, and disclosure to family/community members. Among 352 women diagnosed during the pregnancy and initiating ART, 61% disclosed to a male partner and 71% to a family/community member by 12 months after diagnosis. Among both previously- and newly-diagnosed women, married/cohabiting relationship status was associated with increased disclosure to a male partner, but less to family/community members. Among newly-diagnosed women, relationship status modified the impact of pregnancy intentions and poverty on disclosure to a male partner.

CONCLUSION

These unique data provide important insights into dimensions of disclosure during pregnancy and postpartum, and suggest that women's social and economic circumstances are central determinants of disclosure.

UNDERSTANDING TREATMENT INDIVIDUALISATION AND ITS IMPACT ON STUDY DESIGN AND ANALYSIS

¹B.S. Carpenter

¹Traditional Medicine Laboratory, University of KwaZulu-Natal; South African Medical Research Council, South Africa

BACKGROUND

Evidence exists that certain medications and treatments are substantially more efficient for specific subgroups of the population. As such, there is an increasing trend within the medical world toward personalised and adaptive treatments for a variety of diseases and disorders. However, innovations in this area are scattered across disciplines and need to be adopted more widely.

OBJECTIVES

To explore how different disciplines undertaking intervention research understand and define individualisation, and to determine what approaches are used to account for individualisation within intervention research.

METHODS

We conducted a systematic review of the literature focusing on the designs and analyses used to account for individualisation. A variety of synonyms relating to individualisation were used to identify eligible studies, and only intervention research was included. The search was conducted between January 2017 and June 2018 using the

databases, Academic Search Complete, AHFS Consumer Medication Information, CINAHL, Health Source - Consumer Edition, Health Source: Nursing/Academic Edition, MasterFILE Premier, MEDLINE, PsycARTICLES, and PsycINFO.

RESULTS

We retrieved and reviewed 4702 papers using EBSCOhost. During the review process, 81% of the studies were deemed to be ineligible and a further 6% were inaccessible. A wide variety of different designs were used in those articles we accepted, with the randomised controlled trial and case-control being the most popular designs for use with individualised treatment. The most common approach to individualisation was the use of panomics.

CONCLUSIONS

In this review, we identify the different designs and analyses that are currently being used to facilitate intervention research which makes use of individualisation. The innovations seen across the wide variety of studies covered by this review will help prospective researchers to design future research more proficiently.

"CODEINE IS MY HELPER": MISUSE OF AND DEPENDENCE ON CODEINE-CONTAINING MEDICINES IN SOUTH AFRICA

¹S. Dada, ²M. van Hout, ¹E. Rich, ²M. Bergin

¹Alcohol Tobacco and Other Drug Research Unit, South African Medical Research Council;

²School of Health Sciences, Waterford Institute of Technology

BACKGROUND

Misuse of codeine-containing medicines is an emerging global public health concern. Most research has been conducted in developed countries (i.e. European Members States, Australia, the United States).

OBJECTIVES

To gain an understanding of unique individual and collective experiences of trajectories of codeine misuse and dependence in South Africa.

METHODS

In-depth interviews were conducted with a purposive sample of adult codeine misusers and dependents (n=25). Narratives were analysed using the empirical phenomenological psychological five-step method. Nine themes with 63 categories

emerged, with two additional high levels of abstraction.

RESULTS

Findings are illustrated: participant profile and product preferences, motives for use, transitioning to misuse and dependence, pharmacy purchasing and alternative sourcing routes, effects and withdrawal experiences, help-seeking and treatment experiences, and strategies for prevention.

CONCLUSION

In this study, the need for continued support for enhanced patient awareness of the risk of habit-forming use and related health consequences and professional pharmacovigilance is underscored.

INTRODUCING AN ARTERIOVENOUS FISTULA PRE-CANNULATION ASSESSMENT CARE-BUNDLE TO REDUCE COMPLICATIONS IN PATIENTS WITH AN ARTERIOVENOUS FISTULA ON HAEMODIALYSIS

¹A. Damons, ¹A.S. van der Merwe, ¹M.R. Moosa

¹Department of Nursing and Midwifery, Faculty of Medicine & Health Sciences, Stellenbosch University, Tygerberg

BACKGROUND

The prevalence of diabetes in sub-Saharan countries is a specific concern, with 9.4 million people living with diabetes in Africa, which is expected to increase to 12.7 million by 2025. Thus, an estimated 6–16% of the sub-Saharan population will be diagnosed with diabetic nephropathy resulting in end-stage kidney disease (ESKD) and requiring renal replacement therapy. In South Africa, for a patient to gain access to treatment on a renal replacement programme, a selection committee reviews each case. Patients diagnosed with ESKD receiving dialysis therapy are at an increased risk of infection because of open vascular access, which is regarded as their lifeline during dialysis therapy. The early detection of arteriovenous fistulae (AVF) complications can benefit the patient because of early diagnosis and treatment. Therefore, it is critically important for staff working in dialysis units to detect AVF complications before initiation of haemodialysis to prevent infection which may lead to death or prolonged stay in hospitals.

OBJECTIVES

To design, develop and pilot-test a prototype AVF pre-cannulation assessment

care-bundle (intervention) within a haemodialysis Unit in the Western Cape.

METHODS

This study fits the intervention research model and follows the first four of the six phases of intervention as described by Rothman and Thomas in 1994. Descriptive and inferential statistical analysis will be performed.

RESULTS

The study has been approved by the ethics committee of Stellenbosch University (project reference number #0552; ethics ref.no. #S17/07/112). Data collection is currently in progress and will hopefully be completed in January 2019.

CONCLUSION

By detecting infection from the AVF very early or determining the incidence of complications relating to AVF failure and infection, we anticipate reducing these complications in patients on haemodialysis in the long-term.

SUSTAINABLE FINANCING OPTIONS FOR MENTAL HEALTH CARE IN SOUTH AFRICA: FINDINGS FROM A SITUATION ANALYSIS AND KEY INFORMANT INTERVIEWS

¹S. Docrat, ²C. Lund, ³D. Chisholm

¹ Alan J. Flisher Centre for Public Mental Health, Department of Psychiatry and Mental Health, University of Cape Town, South Africa; ² Centre for Global Mental Health, Institute of Psychiatry, Psychology and Neuroscience, King's College London, United Kingdom; ³ Department of Mental Health and Substance Abuse, World Health Organization, Switzerland

BACKGROUND

With the implicit neglect for the integration of mental health services into general health service development in South Africa, there is an urgent need for an understanding of the ways in which existing reforms may be leveraged to incorporate the objectives of the National Mental Health Policy Framework and Strategic Plan (MHPF) and the mechanisms by which these reforms can be structured and financed in the context of fiscal constraint.

OBJECTIVE

To provide recommendations for how scaled-up mental health services can best be paid for within the fiscal constraints and structures of the country.

METHODS

We conducted a situational analysis guided by a newly developed analytical framework for sustainable mental health financing. The review was followed by qualitative, in-depth interviews with a range of expert national stakeholders.

RESULTS

Although the MHPF is said to be consistent with ongoing efforts toward implementing

the National Health Insurance (NHI), there is clear evidence of discordance between the MHPF and the NHI. The most promising strategies for sustainable mental health financing include increased decentralisation of resources to primary and community mental health services, active integration of mental health into ongoing NHI implementation including expanding the mandate of District hospitals and drawing on the private sector, submission of costed budget bids to support a mental health conditional grant, and ensuring that explicit outcomes and deliverables are in place to monitor Provincial implementation. In the longer-term, the NHI benefit package must be expanded to include comprehensive mental health services at all levels.

CONCLUSIONS

In this paper, several ways in which existing reforms may be leveraged to incorporate the objectives of the MHPF and achieve better mental health outcomes for South Africans are suggested. Critical opportunities for financing mental health service scale-up are revealed to be embedded into South Africa's future health delivery strategy.

MULTISYSTEM IMPAIRMENT IN PERINATALLY HIV-INFECTED SOUTH AFRICAN ADOLESCENTS ON ART

^{1,2}L. Frigati, ³K. Brown, ¹S. Mahtab, ¹L. Zuhlke, ¹D. Gray, ¹L. Githinji, ⁴J. Hoare, ²M. Cotton, ^{3,5}L. Myer, ^{1,6}H. Zar

¹Department of Paediatrics and Child Health, Faculty of Health Sciences, University of Cape Town (UCT), Cape Town; ²Department of Paediatrics and Child Health, Faculty of Health Sciences, Stellenbosch University, Stellenbosch; ³Division of Epidemiology and Biostatistics, School of Public Health & Family Medicine, UCT, Cape Town; ⁴Department of Psychiatry, UCT, Cape Town; ⁵Centre for Infectious Disease Epidemiology and Research, School of Public Health & Family Medicine, UCT, Cape Town; ⁶Medical Research Council Unit on Child & Adolescent Health, UCT, Cape Town

BACKGROUND

Perinatally HIV-infected (PHIV+) adolescents are at risk of chronic disease. There are little data on multisystem involvement in this group, especially in Africa.

OBJECTIVE

To investigate the overlapping burden of neurocognitive, cardiovascular, respiratory or renal impairment in the Cape Town Antiretroviral Cohort (CTAAC).

METHODS

PHIV+ aged 9–14 years on ART for six months were recruited from seven sites across Cape Town, with age-matched HIV-negative adolescents. Impairment was assessed at enrolment included: Neurocognitive defined as an International HIV Dementia Scale score <10; cardiac based on echocardiogram; respiratory based on spirometry and renal defined as abnormal glomerular filtration rate. Single-, dual- or multi-system impairment was defined as having impairment of one, two or three or more of the four systems measured, respectively. Baseline variables were compared between groups using t-tests, Wilcoxon, and Chi-square tests.

RESULTS

Of the adolescents included, 406 were HIV+ and 95 HIV- (mean age, 12 years; 49% female). The median age of ART initiation was 4.2 years (IQR: 1.7–7.8), the median CD4 count was 710 (IQR: 564–951) with 63% of HIV+ being virologically suppressed at enrolment. Almost half (45%) the HIV+ cohort had a single-system impairment, while 134 (33%) had > two systems involved. Of these 30 (7%) PHIV+ had three or four systems involved. Single-system impairment was as follows, cardiac 40%, renal 0.1%, neurocognitive 35% and respiratory 25%. Of those with dual-system morbidity, (n=104), the most common pattern was cardiac and neurological (n=43, 52%). There was no difference in viral suppression at enrolment or duration of ART regimen in those with dual- or multi-system impairment versus either single- or no system impairment (p=0.22 and p=0.43, respectively).

CONCLUSION

Despite relatively early ART initiation some adolescents will still have significant systemic morbidity that will require increasing clinical attention through adulthood.

IN VIVO AND IN VITRO STUDIES TO INVESTIGATE THE ROLE OF AUTOPHAGY IN HUMAN TUBERCULOSIS

¹P. Gina, ¹M. Davids, ¹A. Pooran, ¹K. Dheda

¹ Lung Infection and Immunity Unit, Division of Pulmonology and UCT Lung Institute, Department of Medicine, University of Cape Town, Cape Town, South Africa

BACKGROUND

Mycobacterium tuberculosis (*M.tb*) is one of the world's most successful human pathogens that has infected ~2 billion people worldwide. The success of *M.tb* rests upon its ability to manipulate intracellular membrane trafficking events in host macrophages and blocking maturation of the phagosome. New therapeutic interventions for tuberculosis (TB) are urgently required. Whether the induction of autophagy by metformin (MET) and nitazoxanide can promote *M.tb* stasis remains unclear.

OBJECTIVE

To determine whether the induction of autophagy will facilitate *M.tb* stasis/killing in human alveolar and monocyte-derived macrophages from persons with varying degrees of susceptibility to TB.

METHODS

Blood and or broncho-alveolar lavage (BAL) fluid were obtained from participants with varying degrees of *M.tb* susceptibility, presumed latent TB infection, presumed sterilising immunity, previous TB, and

recurrent TB. Expression of LC3II protein, the marker of autophagy from peripheral blood monocyte cells, monocyte-derived macrophages and BAL cells were quantified by western blot and confocal microscopy. Cell cultures were treated *in vitro* with MET, nitazoxanide and starvation media in the presence or absence of bafilomycin. Some of the participants received bronchoscopic-instilled BCG with follow-up bronchoscopy at day three; autophagic proteins (LC3II) were measured pre- and post-treatment in the presence and absence of bafilomycin.

RESULTS

MET was a potent inducer of autophagy in BAL cells ($p=0.004$ compared to no MET $n=16$). *In vivo*, BCG was an inducer of autophagy ($p=0.018$ compared to saline control $n=6$).

CONCLUSIONS

These preliminary results demonstrate that MET and BCG induced autophagy in alveolar cells. These findings have implications for new host-directed therapies. The next step is to determine if the relevant pathways influence mycobacterial survival *in vitro*.

SIMULATION AND MODELLING OF LONGITUDINAL HIV VIRAL LOAD MEASURES DURING PREGNANCY AND BREASTFEEDING

¹T. Glass, ¹L. Myer, ²J. Raboud ¹M. Lesosky

¹Division of Epidemiology and Biostatistics, University of Cape Town, Cape Town; ²Toronto General Hospital Research Institute, University Health Network, Toronto, Canada

BACKGROUND

Despite the achievements made in the prevention-of-mother-to-child-transmission, it remains a public health concern, especially in sub-Saharan Africa where most of the transmissions occur. The number of children infected with HIV globally has decreased from 290 000 in 2010 to an estimated 150 000 in 2015. While the rapid increase in access to lifelong antiretroviral therapy (ART) for pregnant and breastfeeding women has led to major improvements, there remain gaps in understanding the challenges related to ART adherence, access in care and how viral load (VL) monitoring can impact mother-to-child-transmission (MTCT).

OBJECTIVE

To determine the optimal VL monitoring strategy among pregnant and breastfeeding women.

METHODS

A Monte Carlo simulation model of VL trajectories and MTCT risk during the antenatal and postpartum periods is in the process of being developed. A wide variety of VL monitoring strategies will be

compared, to determine the optimal timing and frequency of VL monitoring.

RESULTS

Preliminary results, averaged across runs, showed that the percentage of women with VL <1000 copies/mL at the time of delivery was 89% (SD, 0.3%), and median (IQR) time on ART at delivery was 18 weeks (12, 23). Furthermore, when monitoring based on time since ART initiation, the optimal timing for a single VL appeared to be VL measured at 20 weeks after ART initiation (SE: 42%, SP: 99%). However, only 50% of women would be eligible for this measure (the remainder having delivered by this time point). In addition, when monitoring based on gestational age, the optimal time point appeared to be testing at 36 weeks' gestation with approximately 90% of women eligible to be tested and relatively high sensitivity (72%) and specificity (95%).

CONCLUSIONS

Statistical simulation is a useful method for evaluation of routine monitoring of longitudinal biomarker data. However, further work is needed.

WELL-BEING AMONG YOUTH LIVING WITH AND WITHOUT HIV IN SOUTH AFRICA: A HEALTH ECONOMIC PERSPECTIVE

¹D. Govindasamy, ¹C. Mathews

¹ Health Systems Research Unit, South African Medical Research Council, Tygerberg

BACKGROUND

Recently, well-being has been strongly recommended as an outcome measure for public policy evaluations as it is considered to capture wider societal benefits. However, little is known on which well-being measures would be applicable for public health policy evaluation in sub-Saharan African, particularly policies targeting youth such as HIV/AIDS treatment policies.

OBJECTIVE

To contribute to the understanding of well-being measurement for HIV-policy evaluation among youth (15–24 years) in South Africa.

METHODS

The overarching PhD study design is mixed-methods (sequential exploratory) and comprises three papers. 1) A mixed-methods review to understand the predictors and experiences of well-being among youth living with HIV in sub-Saharan Africa; 2) A qualitative study in which we seek to understand the perceptions and experiences of well-being via focus-group discussion and in-depth interviews with youth in Umlazi, KwaZulu-Natal, South Africa; and 3) A quasi-experimental analysis

to examine the effects of antiretroviral therapy expansion policies on the well-being of youth in South Africa.

RESULTS

Currently, I have completed data collection for my review and qualitative study. Preliminary data analysis suggests that well-being among youth in this setting is defined in terms of context, and is shaped by cultural values, including societal and gender norms. Moreover, key drivers of well-being include educational attainment, employment, social support, hope, access to basic services.

CONCLUSIONS

Over the next year and a half, analyses and write-up papers will proceed and be submitted to appropriate journals and presented at conferences. Moreover, a community engagement session, which will entail sharing findings with healthcare workers and youth at the study clinics will be conducted. The findings from my papers and community engagement session I will share via a policy brief to the Department of Health, which will outline key areas for programme intervention to improve well-being among youth in South Africa.

KNOWLEDGE, ATTITUDES AND PRACTICES ON SCHISTOSOMIASIS IN SUB-SAHARAN AFRICA: A SYSTEMATIC REVIEW

¹H. Gwebu Sacolo, ¹M. Chimbari, ¹C. Kalinda

¹School of Nursing and Public Health, College of Health Sciences, Howard College Campus, University of KwaZulu-Natal, Durban, South Africa

BACKGROUND

The World Health Organization emphasises the use of integrative approaches in controlling and eliminating schistosomiasis. A detailed understanding of socio-cultural factors that may influence the uptake of the intended health activities and services is vital.

OBJECTIVES

In our study, we sought to understand the knowledge, attitudes, perceptions, beliefs and practices about schistosomiasis in various sub-Saharan Africa communities.

METHODS

A systematic search of literature dating from 2006–2016 was done using Medline, PubMed, CINAHL, Psych info and Google Scholar databases. The keywords entered were, “Schistosomiasis, *S. mansoni*, *S. haematobium*, knowledge, attitudes, perceptions, beliefs and practices in sub-Saharan Africa” in combination with Boolean operators (OR, AND). In this context, we reviewed studies conducted among school children, community members, and caregivers of preschool children.

RESULTS

Studies that we reviewed reflected inadequate knowledge, attitudes and practices in relation to schistosomiasis. Age, gender, occupation, and level of education showed to have an extensive impact on schistosomiasis knowledge and practices. About 60% of these studies revealed widespread misconceptions on the transmission and prevention of schistosomiasis. The disease was mostly believed to be caused by HIV, consuming unclean water and contaminated food. Risky water-related practices, such as swimming, bathing and washing clothes in open water bodies were identified as key factors promoting transmission of the disease.

CONCLUSION

A comprehensive health education programme using contextual and standardised training tools may improve peoples’ knowledge, attitudes and practices in relation to schistosomiasis prevention and control.

FACTORS INFLUENCING HIGH SCHOOL RE-ENTRY AND SCHOOL PARTICIPATION FOLLOWING THE ONSET OF A TRAUMATIC BRAIN INJURY

¹L. Jacobs-Nzuzi Khuabi

¹Division of Health and Rehabilitation Sciences, Faculty of Medicine and Health Sciences, Stellenbosch University

BACKGROUND

For an adolescent, school participation is one of the primary occupations that may be disrupted by post-traumatic brain injury (TBI). Post TBI, the adolescent has to deal with the expected associated adjustments of their development stage, along with adjusting to a range of impairments and increased dependence resulting from the TBI. This combined with contextual factors may have implications for their preparedness to re-enter and participate in school post TBI.

OBJECTIVE

To gain an increased understanding of the enablers and barriers to high school re-entry and school participation post TBI.

METHODS

This qualitative study used a multi-case study design, which included documentation review, semi-structured observations and semi-structured interviews with eight adolescent learners and each of their primary caregivers, teachers and principals.

RESULTS

Enablers to school re-entry and school participation included the engagement in the valued occupation of school, the use of strategies, personal attributes and external supports which increased the adolescents' capacity to adapt. The main barriers included changes in abilities, skills and role fulfilment post TBI, a lack of open communication between team members, human and financial constraints, a lack of preparation of the adolescent and their contexts, inaccessibility (structural, attitudinal and lack of safety) as well as a lack of psychological support to adolescents and their families.

CONCLUSIONS

In conclusion, we found that school re-entry requires preparation of adolescents and their contexts. Planning should encompass the adolescent's full school experience, i.e. preparing to go back to school, being back at school, grade-grade transition and moving on from high school. The learning support should be flexible and requires ongoing monitoring to ensure that support remains relevant and responsive to the learner's changing needs. Adolescent learners and their primary caregivers need to be active partners in identifying and planning for the learner's support needs.

DENDRITIC CELLS AND OTHER ANTIGEN PRESENTING CELLS INDUCE PROTECTIVE TH1 IMMUNITY IN MICE INFECTED WITH CENTRAL NERVOUS SYSTEM TUBERCULOSIS

¹K. Kgoadi, ¹R. Keeton, ¹N. Hsu, ¹A. Walters, ¹⁻³M. Jacobs

¹Division of Immunology, Institute of Infectious Disease and Molecular Medicine, Pathology Department, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa;

²National Health Laboratory Services, Johannesburg, South Africa, ³South African Medical Research Council, Cape Town, South Africa

BACKGROUND

Tuberculosis (TB) is primarily a pulmonary infection caused by *Mycobacterium tuberculosis* (*Mtb*) affecting one-quarter of the global population. Approximately 1% of extra-pulmonary TB cases are attributed to central nervous system tuberculosis (CNS-TB), a severe form of TB associated with high morbidity and mortality mainly occurring in children and immunocompromised adults. CNS-TB faces diagnosis and treatment challenges. Pathogenesis of CNS-TB is initiated as a secondary infection during the haematogenous dissemination of pulmonary infection to the brain. Mechanisms and specific cell types targeted by *Mtb* to evade the BBB remain primarily undefined. Dendritic cells are professional antigen presenting cells (APCs) which have been neglected in CNS-TB research.

OBJECTIVE

To characterise APCs and T cells that infiltrate the brain post-*Mtb* infection.

METHODS

C57BL/6 mice were intracerebrally infected with H37Rv (*Mtb*) and saline mock-infected. Mice were sacrificed on day one, week two, four and six and brains harvested for experimental analysis. Histopathological analysis was performed on brain sections,

and single cell suspensions were also generated for determining immune cell recruitment kinetics, phenotype and functional profile using flow cytometric analysis.

RESULTS

Acid-fast bacilli were detected in the brain ventricles, and inflammatory responses occurred post infection. There was a significant decrease in the bacterial burdens four weeks after infection. Activated APCs (microglia, dendritic cells and infiltrating macrophages) produced high amounts of IL-1beta, a pro-inflammatory cytokine associated with protection against *Mtb*. The T cells that infiltrated the brain displayed a Th1 Phenotype evident by the high expression of transcription factor T-bet and high levels of secreted IFN-gamma. T cells infiltrating the brain consisted of high amounts of activated CD4+ T cells and less CD8+ T cells.

CONCLUSION

Functional phenotype of *Mtb* infected DCs favours Th1 immunity and together with microglia/macrophages are promising drivers of protective immunity against CNS-TB making them target cells for strategic therapeutic intervention.

BECOMING AN INTERVENTIONIST-RESEARCHER DURING THE RESEARCH PROCESS

¹H. Koch, ²M. Pillay

¹ Occupational Therapy, University of KwaZulu-Natal (UKZN), Durban; ² Audiology, UKZN, Durban

BACKGROUND

During research with humans, it is important that they remain protected throughout the process. The ethics application is even more rigorous when dealing with vulnerable populations. However, whether some kind of intervention occurs during or after the research study, depends on various factors, i.e. the methodology chosen. This presents a conundrum for the researcher, when the participants are food insecure, in danger, or have an illness and the initial methodology chosen does not reflect intervention.

OBJECTIVE

To evaluate the data collection process in which the research methodology for a food insecurity study expanded from life history research to including interventionist research methodology.

METHODS

In this qualitative study the reflective journals of the researcher and research assistant were analysed from the data collection process of the main study. These typed notes were inputted into Nvivo 11, following which thematic analysis occurred.

RESULTS

The four themes identified include “I’m confused”, “Dependency”, “I feel like I’m alive again” and “You didn’t do anything, don’t come back”. The complexity that arises in various situations, and how sometimes there is a catapulting effect, and ‘no turning back’ is demonstrated.

CONCLUSIONS

These potential, seemingly conflicting interventions regarding the problems that participants experience present an irreconcilable difference for the researcher. There is no clear-cut answer to what the correct and best steps would be to take, since each one could significantly alter the story of the participant including the relationship between the researcher and the participant. Since life history research involves co-construction of stories, it seems understandable that any kind of presence within the participants’ lives, can cause an altering of their life course and vice versa. Each encounter is unique and thus it is not possible to predict ahead of time which would be the best course of action.

3D SCAFFOLD FOR NEURAL TISSUE ENGINEERING

¹G. Mahumane, ¹P. Kumar, ¹Y. Choonara, ¹V. Pillay

¹Wits Advanced Drug Delivery Platform Research Unit, Department of Pharmacy and Pharmacology, School of Therapeutic Science, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

BACKGROUND

Mounting literature has shown the potential of scaffolds for neural repair. However, many of these scaffolds are in the experimental phase and have yet to yield functional repair at a clinical level.

OBJECTIVE

To obtain an injectable hybrid scaffold presenting multiple cues to augment tissue regeneration through interconnected pores, fibres for the guidance of cell growth and a hydrogel filling for the encapsulation of cells in a hydrated environment.

METHODS

The scaffold is designed to be compressible, enable adherence, provide multiple mechanical cues to stimulate cell growth, while preserving cell viability and neural integrity during transplantation via the minimally invasive injection route or otherwise.

RESULTS

The chemical modification via crosslinking was confirmed by Fourier transform infrared spectra. Thermogravimetric analysis showed an 81% and 69% weight loss in the un-crosslinked and crosslinked cryogel, respectively. The curve of the crosslinked

cryogel showed a slower decomposition rate compared to the uncrosslinked cryogel, an indicator that crosslinking increased the thermal stability of the cryogel. Cryogels were sponge-like and exhibited fast swelling (within 1-2 seconds). The scaffold exhibited an increase in volume following hydration while maintaining its shape, as evidenced by stereomicroscopy. Scanning electron microscopy (SEM) revealed that the microstructure of the cryogel comprises interconnected pores, ranging from 22-192 μm , separated by a thick pore wall. The electrospun fibres ranged from 500-980 μm , as observed by SEM.

CONCLUSIONS

PC-12 adherent cell line is used as a model for neuronal differentiation, function and death. Cells grown in serum-containing medium exhibit a rounded morphology. The morphology of the cells progresses to spindle-shaped with dendritic processes once adhered to the culture flask. Thus far, cells have been cultured growth medium (Dulbecco's modified Eagle's medium, horse serum, foetal bovine serum and antibiotic penicillin/streptomycin) in preparation for seeding into the 3D scaffold.

PULMONARY REHABILITATION FOR PEOPLE WITH TUBERCULOSIS IN A HIGH HIV-POSITIVE SETTING: A RANDOMISED CONTROL TRIAL

¹S. Manie, ¹S.L. Amosun, ²G. Meintjes, ³B. Allwood

¹Department of Health and Rehabilitation Sciences, University of Cape Town (UCT), Cape Town;

²Department of Medicine, UCT, Cape Town; ³Department of Medicine, Stellenbosch University, Tygerberg

BACKGROUND

Only in the last decade research has shown that tuberculosis (TB) patients present with chronic obstructive pulmonary disease post successful completion of drug therapy. Even though pulmonary impairment is evident post-TB cure, uptake of these findings into clinical practice has been slow. Pulmonary rehabilitation or any other additional care to address poor lung function or impaired functional ability arising from decreased lung function post TB is meagre in the South African context.

OBJECTIVES

To assess the effectiveness of the pulmonary rehabilitation programme (PRP) on outcomes related to lung function, functional capacity, and quality of life for people receiving TB therapy.

METHODS

A pilot randomised, single-blinded, pre-test-post-test design will be used. The trial

is designed to assess the superiority of the experimental intervention over standard of care in a randomised controlled trial. Enrolled participants will be randomly allocated to either the intervention or control group. The intervention group will participate in two-weekly pulmonary rehabilitation sessions which are exercised-based for 12 weeks. Data pertaining to lung function (FEV₁, FVC and FEV₁/FVC), functional capacity (three-minute step test) and quality of life questionnaires (EQ-5D and SGRQ) will be collected at enrolment, halfway through the intervention and on completion of the 12 weeks.

RESULTS

Data collection still in progress.

CONCLUSION

Not applicable.

PHARMACOGENETICS OF TENOFOVIR

¹K. Montjane, ¹D. Mhandire, ²E. Kampira, ¹C. Dandara

¹Division of Human Genetics, Faculty of Health Sciences University of Cape Town, Cape Town, South Africa; ²Department of Pathology, University of Malawi College of Medicine, Blantyre, Malawi

BACKGROUND

HIV/AIDS is a pandemic disease, with Africa carrying the highest burden. Antiretroviral therapy (ART) used as a combination of at least three antiretrovirals (ARV) has improved the HIV/AIDS prognosis into a more manageable chronic condition. Tenofovir (TDF) is used as part of combination ART and in the prevention of HIV. Even using this therapy, viral replication and resistance are still observed, and it is thought a host of pharmacogenetic factors play a role. TDF is not metabolised but transported by proteins coded for by polymorphic genes. Interpatient variability in TDF-drug disposition has been observed, and genetic factors have been proven to have a role in ARV disposition. Single nucleotide polymorphisms (SNPs) have been reported in transporter genes among Caucasian and Asian populations. However, their distribution in African populations is poorly understood. Therefore, we aim to investigate the role of genetic variation in genes coding for transporters on TDF regimen.

OBJECTIVE

To genotype genes that are associated with a disposition for variation that may affect

responses observed for TDF among African patients.

METHODS

Malawian, Zimbabwean and South African HIV/AIDS patients (n=450) on TDF will be analysed. We will evaluate all SNPs with functional significance in ABC and SLC genes associated with TDF transport using TaqMan Assays, PCR-RFLP, SNaPshot, Sanger sequencing and where possible exome sequence a few samples. The frequencies of these SNPs will be analysed with different statistical tools to determine their role in TDF response among patients and their association with adverse drug effects.

RESULTS

Data analysis in progress.

CONCLUSIONS

We hope to understand the effect of genetic variation of transporter genes in TDF patients in sub-Saharan Africa. Ultimately, we will reveal if pharmacogenetics can be used to identify which patients are likely to present with adverse drug effects before treatment by recommending relevant pharmacogenetic tests.

DEVELOPING AN EDUCATION PROGRAMME DESIGNED TO IMPROVE QUALITY OF LIFE OF PEOPLE LIVING WITH HIV ON ANTIRETROVIRAL THERAPY IN THE JOHANNESBURG METROPOLE

^{1,2}M. Mutemwa, ²D. Phetlhu

¹ Non-Communicable Diseases Research Unit, South African Medical Research Council, Tygerberg, South Africa; ² Department of Medical Biosciences, University of the Western Cape, Bellville, South Africa

BACKGROUND

The widespread accessibility of antiretroviral therapy (ART) has significantly improved the lives of people living with HIV (PLWHIV). However, it has become apparent that we not only focus only on the individuals' survival but on their overall quality of life (QoL).

OBJECTIVE

To develop an education programme that seeks to support and improve the QoL for these individuals.

METHOD

A cross-sectional survey was conducted among 434 adults receiving care for HIV infection at three academic hospitals in the Johannesburg Metropole. A quantitative research approach with a descriptive survey design was used. Data were collected through interviewer-reported questionnaires and QoL improvement linked to PLWHIV on ART was assessed. We used a Likert scale questionnaire, and the data were analysed using SPSS Version 24.

RESULTS

Of the 434 participants, 70.5% were women, and 29.5% were men. The overall mean age of the participants was 43 years old (men 45 years vs. women 42-years-old) $P < 0.001$. The overall QoL for PLWHIV was 77% among the participants, with 70% of them showing good psychological health; good physical health was observed to be 74%, healthy social relationships 71%, and environmental health 65%.

CONCLUSIONS

According to the findings in this study, most of the PLWHIV show good QoL in the different domains investigated. We propose that interventions aimed at this population to improve QoL should take into account the physical, psychological, social, environmental, and other aspects of PLWHIV during treatment, care, and support. More importantly, there is a need for health interventions such as education programmes, which can further prove to be useful.

AN ANALYSIS OF OVERWEIGHT AND OBESITY IN SOUTH AFRICA: THE CASE OF WOMEN OF CHILDBEARING AGE

¹M. Nglazi

¹School of Public Health and Family Medicine, Faculty of Health Sciences,
University of Cape Town

BACKGROUND

Evidence is lacking concerning the socio-economic inequalities in and determinants of overweight and obesity among South African women of childbearing age. In this research project, the aim is to analyse and interpret national data on the prevalence, determinants and socio-economic inequality in overweight and or obesity in South African non-pregnant women aged 15–49 years old.

OBJECTIVES

To assess 1) the pattern and trends in the prevalence of overweight and obesity from 1998–2015 in South African women of childbearing age; 2) the changing pattern in socio-economic inequality in food consumption patterns over the period 2005–2011 in these women's households; 3) the determinants of obesity in these women, with a focus on the specific households' food consumption patterns; 4) the changing pattern in socio-economic inequality in overweight and obesity over the period 1998–2015 in these women; and 5) the socio-economic inequality in inter-generational overweight and obesity in South Africa.

METHODS

Data will be obtained from publicly available data sources. Logistic regression will be performed to estimate the temporal trend in the prevalence of overweight and obesity. A growth model will be used to estimate the average rate of change in body mass index (BMI) over time and examine the factors associated with the different BMI trajectories. The concentration index will be used to measure the socio-economic inequality in the health variable (i.e. household food spending and consumption, overweight and obesity, and inter-generational overweight and obesity in this case).

RESULTS

Unfortunately, the study findings are not yet available.

CONCLUSION

These findings will be able to contribute to new knowledge on the ongoing national efforts towards understanding the socio-economic inequalities in overweight and obesity along with their determinants.

GENOME-WIDE DIFFERENTIALLY METHYLATED GENES ASSOCIATED WITH PTSD IN FEMALE RAPE SURVIVORS

¹J. Nothling, ¹S. Seedat, ²N. Abrahams, ¹S. Hemmings

¹Department of Psychiatry, Stellenbosch University, Stellenbosch; ²Gender and Health Research Unit, South African Medical Research Council, Tygerberg

BACKGROUND

Alterations to the epigenome in response to psychological trauma have been reported as a mechanism mediating gene and environmental interaction. Differentially methylated genes involved in the biological pathways associated with the adverse phenotypic behavioural presentations in posttraumatic stress disorder (PTSD) has previously been identified. However, studies have focussed on differential methylation of single candidate genes in participants exposed to heterogeneous index traumas.

OBJECTIVE

Identify genome-wide differences in methylation profiles of a group of women exposed to rape, with and without PTSD.

METHODS

Female isiZulu participants (n=48) between 18 and 40 years old, who reported an incident of rape within the previous twenty days, were recruited from three Thuthuzela Care Centres and a Crisis clinic in Durban, Kwa-Zulu Natal. Rape-exposed participants with and without PTSD were matched on HIV status, age, childhood maltreatment and other lifetime trauma exposure, body mass index and smoking status. DNA

was extracted from peripheral blood and analysed using the Illumina Epic BeadChip microarray. Logistic regression models, adjusting for multiple comparisons, were used to identify differentially methylated genes in participants with and without PTSD at three months post-rape.

RESULTS

PTSD status was associated with 423 differentially methylated genomic regions. Paired box 8 (PAX8), encompassing eight CpG sites, $p=9.14E-20$ and Zinc Finger Protein 57 (ZFP57), encompassing 19 CpG sites, $p=4.84E-18$ were among the top twenty genomic regions significantly associated with PTSD in this dataset and previously found to be associated with PTSD in other traumatised cohorts.

CONCLUSIONS

PAX8 may be involved in PTSD symptoms related to sleeping difficulties, and ZFP57 is believed to be involved in susceptibility to stress governed by differential methylation in hippocampal cells. To our knowledge, this is the first study to investigate the genome-wide profiles of women exposed to rape in Africa. Confirmation of these findings will require replication in larger cohorts.

THE QUALITY OF LIFE OF PRIMARY HEALTH CARE PATIENTS DIAGNOSED WITH HYPERTENSION AND/OR DIABETES IN THE EASTERN CAPE, SOUTH AFRICA

¹Z. Ogle, ^{1,2}L. Koen, ^{1,2}D.J.H. Niehaus

¹Medicine and Health Sciences, Stellenbosch University; ²Stikland Hospital

BACKGROUND

Hypertension and diabetes have emerged as a major medical and public burden and have been associated with a short life expectancy and poor quality of life (QOL). As such, QOL is an important indicator to evaluate hypertension and diabetes treatment outcomes.

OBJECTIVE

To describe the QOL of primary health care patients diagnosed with hypertension and/or diabetes.

METHODS

This was a cross-sectional study with 79 participants from five primary health care centres in the Eastern Cape, South Africa. Demographic data were summarised as frequencies, percentages, means with standard deviation (SD). The Mann-Whitney U Test compared mean scores between people with and without other medical conditions.

RESULTS

Sixty-nine (87%) females and 10 (13%) males with mean age of 49 (SD=8.6844) participated in the study. More than half (54%) reported medical conditions other than hypertension and diabetes. There were low mean scores on the physical health (12.42), psychological health (14.17), and environment (12.71) domains. The social relationships domain had the highest mean score (14.97). There was a statistically significant difference in the scores of people with hypertension coexisting with other medical conditions compared to people without other medical conditions (physical domain, 0.01) and (environment domain, 0.03).

CONCLUSIONS

In this study, we confirmed that living with hypertension and/or diabetes was associated with a poor QOL. People with hypertension comorbid with other medical conditions had significantly poorer physical and environment QOL compared to those without other medical conditions. This highlights the need for interventions in primary health care to improve the QOL of people living with hypertension and/or diabetes.

FINDING FORMER TUBERCULOSIS PATIENTS - A HIGH-RISK GROUP FOR TUBERCULOSIS-ASSOCIATED MORBIDITY AND MORTALITY IN CAPE TOWN, SOUTH AFRICA: A PILOT STUDY

^{1,2}M. Osman, ¹R. Brown, ¹R. Dunbar, ¹G. Hoddinott, ²A. Welte, ¹A.C. Hesselting, ¹F.M. Marx

¹Desmond Tutu TB Centre, Department of Paediatrics and Child Health, Faculty of Medicine and Health Sciences, Stellenbosch University, Tygerberg; ²South African Centre for Epidemiological Modelling and Analysis, Stellenbosch University, Stellenbosch

BACKGROUND

A high risk of tuberculosis (TB), chronic lung disease and mortality have been reported among people with a history of previous TB treatment, but data from high-incidence settings remain limited.

OBJECTIVES

To locate adults who had successfully completed TB treatment in the past five years, and to characterise general morbidity and mortality.

METHODS

In this cross-sectional study, we used routine electronic TB treatment register data to randomly select adults (≥ 18 years) who successfully completed pulmonary TB treatment between 2013 and 2017. Household visits were conducted in a high-incidence community in suburban Cape Town to locate and survey former TB patients. Individuals who could produce sputum were bacteriologically investigated for TB. Household interviews and vital registration data were used to estimate mortality among patients who could not be traced.

RESULTS

We sampled 259 former TB patients of whom 51 (20%) were successfully

contacted and interviewed. Of the latter, the median age was 41 years (IQR 33–49 years); 63% (32/51) were male and 51% (26/51) were HIV-infected. Of 51, 28 (55%) reported shortness of breath when walking fast or uphill, 26 (51%) having to walk slower because of breathlessness, 24 (47%) wheezing, and 15 (29%) severe chest infections in the past year. Of 28 participants who provided a sputum sample, one (3.6%) had culture-positive TB. Another two reported currently being re-treated for TB, providing 3/51 prevalent cases of TB. Among 208 individuals unable to be contacted, 15 (7.2%) were confirmed to have died.

CONCLUSIONS

In this setting, only 20% of individuals treated in the past five years could be located and interviewed. Our results are consistent with a high prevalence of respiratory disease including active TB among former TB patients, and higher mortality compared to TB treatment-naïve individuals of similar age.

A NOVEL METALLO-ENDOPEPTIDASE REQUIRED FOR PEPTIDOGLYCAN REMODELLING DURING OSMOLARITY CHANGES IN *M. TUBERCULOSIS*

¹A. Papadopoulos, ¹B. Kana

¹DST/NRF Centre of Excellence for Biomedical TB Research, Wits University, Johannesburg, South Africa

BACKGROUND

The persistence of tuberculosis (TB) disease and rising incidence of drug-resistant strains necessitates the discovery of novel therapeutics. An intuitive approach is to target bacterial cell division. The LytM family of metallo-endopeptidases regulate cell division in model organisms such as *Escherichia coli* and the non-pathogenic relative of *Mycobacterium tuberculosis*, *Mycobacterium smegmatis* by activating amidases which degrade the peptidoglycan cell wall permitting cell separation. Deletion of lytM genes is expected to lead to cell separation defects.

OBJECTIVES

To characterise the lytM genes of *M. tuberculosis* and validate them as novel drug targets for TB treatment.

METHODS

Two highly conserved lytM genes, *mepA* and *nlpAL*, were characterised using various strains of *M. tuberculosis* including knock-out mutants as well as overexpression and genetically complemented strains, bearing various domains of *mepA*.

RESULTS

Unexpectedly, deletion of the *M. tuberculosis* lytM genes did not cause a cell separation defect as seen in *E. coli* and *M. smegmatis* lytM deletion strains. Instead, strains of *M. smegmatis* heterologously expressing *M. tuberculosis mepA* exhibited sensitivity to high concentrations of salt relative to the *mepA* domain expressed. A recent study revealed that *M. tuberculosis* responds to an increase in salt by remodelling peptidoglycan coinciding with increased *mepA* expression. Therefore, *mepA* is likely required for degrading *M. tuberculosis* peptidoglycan during osmolarity changes. This is being investigated further in the *M. tuberculosis mepA*-knockout.

CONCLUSION

Collectively, our data highlight a role for *mepA* in adapting to stress conditions suggesting that this enzyme may be a useful new drug target for TB.

HARM-REDUCTION IN THE MANAGEMENT OF ADOLESCENT SELF-HARM: ETHICAL AND PRACTICAL CONSIDERATIONS IN A SOUTH AFRICAN CONTEXT

¹S. Pasche, ¹J. Bantjes

¹Department of Psychology, Faculty of Arts and Social Sciences, Stellenbosch University

BACKGROUND

Self-harm, defined as non-suicidal self-injury, is globally estimated to occur in 10% of adolescents. The British NICE guidelines acknowledge that cessation of self-harm may be unrealistic for some individuals, and that harm-reduction may be appropriate. Examples include psychoeducation on how to cut without risk of serious injury, and how to prevent infection. While some international health systems have employed harm-reduction for self-harm, it has not been considered in South Africa.

OBJECTIVE

To consider the potential value, pitfalls and ethical dilemmas of using harm-reduction approaches in the psychological treatment of South African adolescents who self-harm.

METHODS

We conducted in-depth, semi-structured interviews with ten healthcare professionals engaged in the treatment of adolescents who self-harm, to explore their experiences and ideas for suicide prevention. Interviews were recorded, transcribed and thematically analysed in Atlas.ti. We focus on the theme of harm-reduction and associated sub-themes, “the myth of prevention”, “anxiety and shame around implementing harm-

reduction”, “self-harm serves a function” and “meeting the patient where she is”.

RESULTS

Clinicians regarded self-harm as a coping mechanism for patients and questioned the expectation of being able to prevent it. Anxiety and shame exist around the implementation of harm-reduction, because of a fear of colleagues’ reactions. The importance of respecting the patient’s experience and the difficulty in distinguishing self-harm with and without intent to die became apparent in the narrative.

CONCLUSIONS

While harm-reduction may be an appropriate strategy in the treatment of self-harm, this practice is not without ethical and practical challenges when used with adolescents. The appropriateness of harm-reduction should be considered on a case-by-case basis. Possible challenges include determining intent, the risk of contagion, and professionals’ anxiety. Adolescents’ right to autonomy should be balanced against the individual’s capacity for decision-making. Clinical guidelines and combined decision-making by the treating team may reduce anxiety among health professionals.

HIV-ASSOCIATED COGNITIVE DISORDERS IN CHILDREN AND ADOLESCENTS: METHODOLOGICAL INVESTIGATIONS AND VALIDATING A QUICK SCREENING TOOL

¹N.J. Phillips

¹Department of Psychiatry and Mental Health, Faculty of Health Science,
University of Cape Town

BACKGROUND

Perinatal HIV-infection has profound consequences for cognitive and functional ability of children and adolescents. Context-specific assessment tools and methods of cognitive and functional impairment is lacking.

OBJECTIVES

To determine 1) a consensus (if any) in the literature regarding cognitive effects of the HIV virus in children and adolescents, 2) a statistically sound method for assessing cognitive impairment, 3) the associations with cognitive impairment and functional impairment and the relative risk of having functional impairment in the presence of cognitive impairment, and 4) to validate a quick screening tool for risk of cognitive impairment.

METHODS

Nested within a larger longitudinal study, the Cape Town Adolescent Antiretroviral Cohort (CTAAC), this quantitative cross-sectional study required specific methodological considerations. For the first, electronic systematic searches were conducted to find relevant literature. These were assessed by two independent reviewers, the data extracted and meta-analysed. For objectives 2–4, data were collected from research participants enrolled in CTAAC. Data scoring, capturing

and inferential statistics were conducted using SPSS 25.

RESULTS

There were inconsistencies in the literature about which cognitive domains are most affected by HIV. Findings from the meta-analysis revealed that the cognitive domains of executive function and processing speed are the most affected. Statistical analysis showed that composite cognitive domains scores (as opposed to global scores) were more accurate in detecting HIV-related cognitive differences in adolescents. Traditional measures of functional impairment were significantly associated with cognitive impairment, and adolescents had an increased risk of having functional impairment if they also had cognitive impairment. The statistical validity of the youth International HIV Dementia Scale to screen for risk of cognitive impairment in HIV-infected adolescents was demonstrated.

CONCLUSIONS

Traditional assessments/methods may not be contextually appropriate in low-income settings. The methodological approach and screening tool validated is a start in addressing these kinds of issues locally and globally.

MOUSE MACROPHAGES UPREGULATE MX1 AND MX2 UPON INFECTION WITH MYCOBACTERIA

¹R-D. Pietersen, ¹G. Leisching, ²C. van Heerden, ¹B. Baker

¹NRF/DST Centre of Excellence for Biomedical Tuberculosis Research, South African Medical Research Council Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, Tygerberg; ²Central Analytical Facility (CAF), DNA Sequencing Unit, Stellenbosch University, Stellenbosch

BACKGROUND

The disease-causing agent, *Mycobacterium tuberculosis*, survives inside human macrophages. However, non-pathogenic mycobacteria do not survive inside healthy host cells. Comparing the host response between infection with pathogenic and non-pathogenic mycobacteria might reveal important determinants (molecules) that are involved in the intracellular survival strategy of *Mycobacterium tuberculosis*. Through RNA-Seq data, we previously observed that mouse macrophages express RNA molecules at different levels when comparing infection between pathogenic (*Mycobacterium tuberculosis* H37Rv and clinical isolate R179) and non-pathogenic mycobacteria (*Mycobacterium smegmatis* and *bovis* BCG).

OBJECTIVE

To validate the expression levels of Mx1 (MX Dynamin Like GTPase 1) and Mx2 through quantitative PCR (qPCR).

METHODS

Mouse macrophages were infected with the same strains as used for the RNA-Seq analysis, followed by extraction of macrophage RNA, conversion to cDNA and determining the relative expression levels through qPCR.

RESULTS

The RNA-Seq data showed that very high fold changes occur for the gene expression of Mx1 and Mx2 upon infection with mycobacteria and the qPCR results confirm this. The pathogenic strains elicit a much stronger response to these interferon (IFN)-induced genes as compared to the non-pathogenic strains. Mx1 and Mx2 play roles in cytokine signalling and antiviral responses. Interestingly, the same IFN-induced response that fights viruses can inhibit the clearance of mycobacteria. If Mx1 and Mx2 promote the intracellular growth of mycobacteria, then interfering with the role of these genes using small interfering RNA (siRNA) could possibly influence the intracellular survival of mycobacteria.

CONCLUSIONS

The qPCR results confirm the validity of the RNA-Seq data. Among the many molecules that mycobacteria manipulate for its intracellular survival, Mx1 and Mx2 could be on the list of molecules that are important for intracellular survival. Testing for this can be done by knocking down these genes and assessing the intracellular health of the mycobacteria.

DECIPHERING THE PHYSIOLOGICAL STATE OF DRUG RESISTANT *MYCOBACTERIUM TUBERCULOSIS* STRAINS

¹C.M. Pule, ²G.E. Louw, ¹R.M. Warren, ¹J.M. Mouton, ¹P.D. van Helden, ¹S.L. Sampson

¹DST/NRF Centre of Excellence for Biomedical Tuberculosis Research, SAMRC Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, University of Stellenbosch, South Africa; ²Institute of Infectious Disease and Molecular Medicine, Division of Medical Microbiology, Department of Pathology, Faculty of Health Sciences, University of Cape Town, South Africa

BACKGROUND

The rising incidence of drug resistant *Mycobacterium tuberculosis* (*M. tb*) strains negatively influences *tuberculosis* control. Limited data exist on the physiological changes of *M. tb* during treatment.

OBJECTIVE

To assess the physiological changes of *M. tb* at the transcriptional level during antibiotic treatment.

METHODS

Pan-susceptible Beijing clinical isolate (K636), K636 rifampicin resistant *in vitro* mutant and laboratory strain H37Rv were cultured in 7H9 enriched media and on 7H11 agar plates, for daily OD600 readings and CFU/ml assessment. Followed by assessing the optimal concentration of INH by titration kill-curve. Moreover, total RNA was extracted and purified (after 24 hours INH exposure), for gene expression analysis by quantitative real-time polymerase chain reaction for selected genes (*kasA*, *accD6*) and RNA sequencing (RNA-seq) analysis.

RESULTS

The 0.05 µg/ml INH concentration was selected for antibiotic treatment for *M. tb*

strains. Low-level gene expression changes in *kasA* and *accD6* ($K636^{WT} = 2.0; 2.4$ and $2.0; 2.4$) and $K636^{RF} (2.6; 2.3$ and $2.4; 2.2)$ was observed, when normalised to 16s rRNA and *sigA*, respectively, in the studied *M. tb* strains. RNA-seq analysis identified a few differentially expressed genes of tested *M. tb* strains.

CONCLUSIONS

The 0.05 µg/ml INH concentration was validated and chosen sub-lethal INH treatment of all tested *M. tb* strains, which was subsequently used for gene expression analysis experiments. In the presence of 0.05 µg/ml INH, *M. tb* growth was inhibited by ≥ 10%. Low-level gene expression changes observed, is in accordance with the literature. Thus, verifying that our optimal sub-lethal INH treatment concentration induced gene-expression changes in selected *M. tb* strains. RNA-seq identified differentially expressed genes. Our findings suggest that the physiological changes of the studied *M. tb* strains were reflected in the total transcriptome.

HIGH EARLY MORTALITY IN PATIENTS HOSPITALISED WITH HIV-ASSOCIATED TUBERCULOSIS: CHARACTERISING THE IMMUNE RESPONSE ASSOCIATED WITH DEATH

¹C. Schutz, ²D. Barr, ¹A. Ward, ³S. Janssen, ⁴R. Burton, ⁵R.J. Wilkinson, ⁵K.A. Wilkinson, ¹M. Shey, ¹G. Meintjes

¹Wellcome Centre for Infectious Diseases Research in Africa (CIDRI-Africa), Institute of Infectious Disease and Molecular Medicine (IDM), University of Cape Town (UCT), and Department of Medicine, UCT, South Africa; ²Wellcome Trust Liverpool Glasgow Centre for Global Health Research, University of Liverpool, United Kingdom; ³Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands; ⁴Khayelitsha Hospital, Department of Medicine, UCT, South Africa; ⁵Department of Medicine, Imperial College and The Francis Crick Institute, London, United Kingdom

BACKGROUND

TB remains the leading cause of death (40%), hospitalisation (18%) and in-hospital death (25%) in HIV-infected people worldwide. Despite availability of effective anti-TB and HIV treatment there is high early mortality, especially in hospitalised patients. The pathophysiology underlying death in hospitalised HIV-infected patients newly diagnosed with TB is poorly understood.

OBJECTIVE

To characterise the immune correlates of mortality in patients hospitalised at the time of HIV-TB diagnosis.

METHODS

We conducted a prospective cohort study at Khayelitsha Hospital, Cape Town, South Africa. HIV-infected patients with CD4 <350 cells/ μ l and suspected TB were enrolled and those with a diagnosis of TB (n=571) are included in this analysis. Samples were obtained upon presentation, before TB treatment. Twelve-week mortality was ascertained. Twenty-eight soluble markers of inflammation were measured in a randomly selected subset of 496 patients (108 deaths and 388 survivors). Statistical analyses were performed in R (Version3.4.4).

RESULTS

Of the 682 patients who were enrolled, 571 were diagnosed with TB. TB was microbiologically confirmed in 482/571 (84.4%), 123/571 (21%) died within 12 weeks despite 560/571 (98%) starting on TB treatment. We identified a principal component (PC1) which accounted for 25% of data variability and was dominated by innate immune signalling and chemotaxis (IL-8, IL-6, IL-1Ra, MIP-1, MCP-1). PC2 explained 24% of the variance and was dominated by T-lymphocyte-related mediators (IL-13, IL-7, IL-12, TNF-, IL-2). In Cox proportional hazards, analysis PC1 was associated with mortality (aHR=2.3, (95%CI=1.9-2.7)) and PC2 with survival (aHR=0.67, (95%CI=0.5-0.9)) after adjustment for age, sex and HIV viral load. IL-1Ra concentration was six-fold higher in patients who died within seven days.

CONCLUSIONS

HIV-infected patients hospitalised at the time of TB diagnosis have high 12-week mortality. Mortality was associated with an immune profile of innate immune and chemotactic signalling, and an immune profile dominated by T-lymphocyte mediators was protective.

TUBERCULOSIS AND THEIR RELATIONSHIP TO INFLAMMATION AT THE SITE OF DISEASE

^{1,2}N.V. Sibiya, ^{1,2}A.K. Coussens, ^{1,3,5}R.J. Wilkinson

¹Clinical Infectious Diseases Research Initiative, University of Cape Town (UCT), Cape Town, South Africa; ²Department of Clinical Laboratory Sciences, UCT, South Africa; ³Department of Medicine, UCT, South Africa; ⁴The Francis Crick Institute, Mill Hill Laboratory, United Kingdom; ⁵Imperial College, Department of Medicine, United Kingdom

BACKGROUND

Tuberculosis (TB) remains one of the leading causes of death globally, and with the steep rise in drug resistance (DR), is becoming increasingly difficult to manage. Contacts of DR-TB are at high risk of infection thus, the WHO recommends that this cohort be screened and treated to minimise the chance of developing active TB disease. Currently, no methods are available for diagnosing subclinical TB, where the risk of progression to active disease is high, but before people become contagious. Hence, there is a need for quick and accurate subclinical TB diagnostic methods, of which whole-blood biosignatures is one promising candidate. Determination of a subclinical TB biosignature can potentially be achieved by a combination of methods, such as positron emission tomography-computed tomography (PET/CT), to detect sites of potential lung infection and the characterisation of cellular and molecular components of whole-blood and bronchoalveolar lavage (BAL).

OBJECTIVES

To identify blood biomarkers associated with the presence of subclinical *Mycobacterium tuberculosis* infection as defined by PET/

CT and to determine whether BAL cells from lung lobes contralateral to the site of subclinical infection have distinct profiles which may reflect a signature of recent infection in the lung.

METHODS

Samples from participants with active TB, subclinical TB and no TB will undergo whole-blood and BAL cellular mRNA transcriptome analysis. Serum and BAL fluid will be characterised and have a panel of inflammatory cytokines, chemokines, and growth factors measured. Circulation and BAL cell populations will be immunophenotyped. Systems biology approaches in whole-blood and BALF at baseline and 6-12 months will be used to identify a biosignature of subclinical TB in whole blood.

CONCLUSION

The primary outcome is expected to be a validated biosignature for recent infection or re-infection that will be developed into a multiplex assay which could be used as an experimental endpoint in vaccine studies.



SAMRC RESEARCH CAPACITY DEVELOPMENT INITIATIVE (RCDI)

MS PHILISTIA JOSHUA – PROGRAMME ADMINISTRATOR

DETERMINANTS OF TYPE-2 DIABETES MELLITUS AMONG HIV/AIDS PATIENTS ON ANTIRETROVIRAL DRUGS IN THE OR TAMBO DISTRICT, SOUTH AFRICA

¹N.E. Bam, ¹T. Apalata, ¹M. Ntsaba

¹ Faculty of Health Sciences, Walter Sisulu University, Mtatha

BACKGROUND

Among patients on antiretroviral therapy (ART), the World Health Organization (WHO) suggests that chronic diseases, mainly cardiovascular diseases and type-2 diabetes mellitus (DM) should be monitored.

OBJECTIVES

To describe determinants of type-2 DM among HIV/AIDS patients on ART in the OR Tambo District and develop intervention strategies able to mitigate the long-term effects of type-2 DM.

METHODS

A case-control study was conducted on a retrospective cohort of HIV-infected patients. Cases were defined as HIV-positive patients with type-2 DM, while controls were HIV-positive without type-2 DM. We used a self-administered questionnaire adapted from the WHO STEPwise surveillance tool.

RESULTS

Of patients (n=531) enrolled (87.19% females and 12.81% males), 177 were cases and 354 controls. Secondary level of education ($p=0.036$), unstable marital

relationship ($p=0.017$), physical inactivity ($p=0.013$), inadequate diet ($p=0.031$), uncontrolled high blood pressure ($p=0.024$), absence of salt reduction ($p=0.023$), and the use of any ART ($p < 0.0001$) were independently associated with the presence of type-2 DM among HIV-infected patients. The mean duration on ART was 5.96 (± 3.01) years for cases as compared to 4.61 (± 2.73) years for controls ($p < 0.0001$). As compared to HIV-infected patients who received ART for \leq five years, the risk of developing type-2 DM was two and three times higher for patients who received ART between 6–10 years ($p < 0.0001$) and ≥ 11 years ($p=0.035$), respectively. As compared to patients who received fixed-dose combination ART, the risk was 22 to 43 times higher for developing type-2 DM if any protease inhibitor was part of the regimen, while this risk ranged from two and a half to nine times higher if any non-nucleoside reverse transcriptase inhibitor was part of the regimen ($p < 0.0001$).

CONCLUSION

Traditional risk factors compounded by ART-associated adverse events are the principal drivers of type-2 DM among HIV-infected patients.

FACTORS ASSOCIATED WITH RECENT UNSUPPRESSED VIRAL LOAD IN HIV-1-INFECTED PATIENTS RECEIVING FIRST-LINE ANTIRETROVIRAL THERAPY IN AN NHI PILOT DISTRICT IN EASTERN CAPE, SOUTH AFRICA

¹T. Apalata, ¹N. Pakade, ¹M. Ntsaba

¹ Faculty of Health Sciences, Walter Sisulu University, Mtatha

BACKGROUND

In 2016, approximately 834,253 people were living with HIV and 360,206 people receiving antiretroviral therapy (ART) in the Eastern Cape (EC). Unsuppressed viral load (VL) in patients on ART occurs when treatment fails to suppress a person's VL on first-line ART for \geq six months.

OBJECTIVES

To evaluate factors associated with unsuppressed VL (VL > 400 copies/ml) to inform interventions to improve VL suppression among patients currently in care.

METHODS

Routinely collected data from patients' medical records and electronic TIER. Net record system were used in a cross-sectional analysis of a cohort of HIV patients in care. Seven primary health-care facilities in OR Tambo, a selected NHI pilot district in the EC, were targeted. A total of 360 patients on first-line ART for \geq six months were included. A multivariate logistic regression analysis was used to identify factors independently associated

with unsuppressed VL at the most recent visit among patients in care.

RESULTS

The median age of the 55.6% females and 44.4% males who started on ART, was 46 years and their median duration of ART was nine years. After adjusting for confounding variables, factors associated with unsuppressed VL included: less than ten years' duration on ART (OR=1.83; CI: 1.2–2.98; $p=0.016$), WHO disease stage 2 ($p < 0.0001$) and stage 3 ($p=0.004$), and initial VL $\geq 10,000$ copies/mL ($p=0.047$). Approximately 62.8% of the ART cohort who were in care had achieved viral suppression, far below the UNAIDS 90% target. T-test for paired samples showed a significant difference between initial CD4+ T cells (108.51 ± 55.68 cells/mm³) and most recent CD4+ T cells (781.72 ± 219.95 cells/mm³) ($p < 0.0001$).

CONCLUSION

There is a need to develop and evaluate targeted interventions for ART patients in care who are at high risk of unsuppressed VL.

TASK-SHIFTING FOR ANTIRETROVIRAL TREATMENT DELIVERY AND QUALITY OF HIV/AIDS CARE INITIATED BY NURSES AT PRIMARY HEALTH-CARE LEVEL IN EASTERN CAPE, SOUTH AFRICA

¹T. Apalata, ¹N. Pakade, ¹M. Ntsaba

¹ Faculty of Health Sciences, Walter Sisulu University, Mtatha

BACKGROUND

Since 2011, task-shifting has been advocated as a strategy for addressing the health-care worker shortages impeding scaling up of ART programmes in South Africa. Limited evidence on the success of this programme in Eastern Cape province exists.

OBJECTIVES

To assess the acceptability of HIV management by nurses and evaluate effects of perceived quality care delivery and satisfaction on patients' outcomes.

METHODS

A cross-sectional study was conducted in seven randomly selected primary health-care facilities in OR Tambo district. Data were collected from seven doctors, 30 nurses, seven managers and 360 patients using structured interviews. Responses from open-ended questions were coded to generate quantifiable responses and analysed using SPSS v24.

RESULTS

Managers, doctors and nurses believed task-shifting would improve access to and quality of HIV services. Some doctors

did not readily accept task-shifting and objected to delegate their tasks; they perceived that patients would probably change facilities to avoid nurses. There was an increased loss to follow-up rate of HIV patients in some clinics. Patients (67.2%) were more likely to report dissatisfaction with services received from nurses, which was not significantly associated with the presence of unsuppressed viral load. Absence of regular transport by 40% of patients and long waiting time in clinics were more likely to be associated with lower CD4 counts after \geq six months of ART ($p < 0.0001$). Only 20% of nurses perceived their own knowledge and skills about HIV management as adequate and satisfactory, while 43.3% and 16.7% reported not being trusted by patients and doctors, respectively. Challenges included lack of policies, absence of standardised training, various degrees of supervision, mentorship and nurses' performance evaluation.

CONCLUSION

Patients' dissatisfaction with task-shifting might explain the high rate of loss to follow up in some clinics. Addressing the identified challenges is urgently warranted for improving quality care.

THE PROPOSED ADAPTATION AND IMPLEMENTATION OF ACUTE CARE CLINICAL GUIDELINES IN THE MANAGEMENT OF TRAUMATIC SPINAL CORD INJURIES FOR THE SOUTH AFRICAN CONTEXT: A DELPHI CONSENSUS STUDY PROTOCOL

¹B. Boggenpoel, ¹N. Mlenzana, ¹A. Rhoda, ^{1,2}C. Jospheh

¹The University of the Western Cape, Department of Physiotherapy, Bellville, Cape Town, South Africa; ²Karolinska Institutet, Department of Neurobiology, Care Sciences and Society, Physiotherapy Division, Stockholm, Sweden

BACKGROUND

The use of acute care clinical guidelines for traumatic spinal cord injury (tSCI) management proves to be invaluable in improving the processes of care being delivered within the hospital setting. However, areas in need of change and strengthening, as well as barriers to the implementation of these guidelines within the South African context, still need to be answered.

OBJECTIVE

To develop recommendations for improving the use of acute care guidelines in tSCI management by taking into account the health structure, function, resources and constraints specific to our setting.

METHODS

A three-round Delphi method will be used to explore and reach consensus as to which areas of the international guidelines should be changed, as well as highlight their possible barriers to implementation. For the purposes of this study, the agreement level for consensus will be set at 70%. Qualitative data, as collected through open-ended questions, will be analysed

using thematic analysis, while the mean will be used to document the level of consensus in round two and three. All participants will be given an information sheet detailing the purpose of the study and requested to give written informed consent online. To facilitate the dissemination of findings, a presentation will be given to relevant end-users/stakeholders. Ethics will be sought from the University of the Western Cape Research Ethics Committee, specifically the Humanities and Social Sciences Research Ethics Committee.

RESULTS

The results will be dependent upon the outcomes of the Delphi study.

CONCLUSIONS

Identifying the areas within which acute care guidelines can be changed to suit our local context would be key in facilitating its uptake, and successful implementation. The findings of this study, will further provide us with a starting point as to the areas that may need adaptation or contextualisation to improve patient outcomes and current processes of care.

INTEGRATIVE ANALYSIS OF EPIGENETIC MODIFICATIONS IN A BREAST CANCER CELL LINE TREATED WITH A BIOACTIVE EXTRACT OF *BIDENS PILOSA*

¹P.K.P. Chokoe, ²C. Pheiffer, ¹L.J. Mampuru

¹Department of Biochemistry, Microbiology and Biotechnology, Faculty of Science and Agriculture, University of Limpopo, Sovenga, South Africa; ²Biomedical Research and Innovation Platform, South African Medical Research Council, Cape Town, South Africa

BACKGROUND

The global incidence of breast cancer has continued to increase over the years. Conventional therapies, such as radiation and surgery, for the malignancy, are often undesirable. Moreover, therapy involving drugs often results in side effects affecting the health of the patient. Phytochemicals have proven to offer effective alternatives to conventional medication for treatment of many ailments and clarification of their mode of action is essential for their development as potential treatments for cancer.

OBJECTIVE

To investigate the potential of *Bidens pilosa* to mitigate cancer progression by modulating epigenetic mechanisms in the MCF-7 breast cancer cell line.

METHODS

The crude methanolic extract of *B. pilosa* was separated into six fractions of varying polarity which were then assayed for their cytotoxicity using the MTT assay. The solvents used in the fractionation were

hexane, chloroform, ethyl acetate, butanol, methanol and water. The chloroform fraction showed the most sought-after activity, lowering the viability of MCF-7 breast cancer cells by more than 40% at concentrations above and including 200 µg/ml after 24 hours. The effect of the *B. pilosa* chloroform fraction on alterations in the epigenetic mechanisms underpinning breast cancer will be investigated in this study. This will be achieved primarily by assessing telomerase activity, global DNA methylation and the methylation status of breast cancer-associated genes using bisulfite pyrosequencing as well as a histone modification assay in treated MCF-7 cells. Furthermore, expression of genes shown to be differentially methylated in breast cancer cells will be quantified using quantitative RT-PCR and Western blot analysis in MCF-7 cells treated with the crude *B. pilosa* extract and its chloroform fraction.

RESULTS AND CONCLUSION

Not yet available.

DEVELOPING A MODEL FOR PROMOTING PHYSICAL FITNESS AND HEALTHY LIFESTYLE OF PRIMARY SCHOOL LEARNERS IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

¹H. Gomwe, ¹E. Seekoe, ¹P. Lyoka

¹Faculty of Health Sciences, University of Fort Hare, East London

BACKGROUND

The challenge of low-level participation in physical activity (PA) and, consequently, limited physical fitness has been acknowledged as being a national public health concern in South African schools. The first thing was to determine their physical fitness level and body composition and then develop a behavioural model based on the findings. In the Eastern Cape, there is no such model for promoting physical fitness among the children. The model by policy makers, institutions, and the community will stem the tide of low physical fitness and the rising trend of overweight and obesity among these children.

OBJECTIVE

To develop a behavioural model for promoting physical fitness and healthy lifestyle of primary school learners in the Eastern Cape Province in South Africa.

METHODS

The researcher employed a cross-sectional, mixed-method, descriptive and theory generating research design to develop the model for promoting physical fitness and healthy lifestyle of the primary school children. The study involved a random

sample of 876 learners aged 9–14 years. Data collection includes demographic, lifestyle behavioural variables, anthropometric, physical fitness measurements and six focus group discussions.

RESULTS

Out of 876 participants, 61.76%, 3.77%, and 2.16% were underweight, overweight and obese, respectively. Boys reported higher PA levels than girls ($p < .0001$). PA levels decreased with age from 9–14 years and there were also significant differences in PA levels between gender and residences ($p < .000$). Body composition measures were reported higher in girls than boys, and higher in urban areas compared to rural areas.

CONCLUSIONS

In this study, we demonstrated the prevalence of overweight, obesity, underweight, and low level of physical fitness among the school learners. These findings form the basis for developing a model for promoting physical fitness and healthy lifestyle in the South African context.

TRAINING NEEDS FOR THE IMPLEMENTATION OF THE 2012 INTEGRATED SCHOOL HEALTH POLICY IN THE EASTERN CAPE PROVINCE

¹D.T. Goon, ¹U. Obi, ¹E. Seekoe

¹Faculty of Health Sciences, University of Fort Hare, East London Campus, Eastern Cape

BACKGROUND

International evidence shows that the implementation of successful school health programmes depends on strong partnerships between education and health sectors, teachers and health workers, schools and community groups, and learners and persons responsible for school health programmes.

OBJECTIVE

To assess the training needs of various stakeholders responsible for implementing the Integrated School Health Policy (ISHP) in the Eastern Cape.

METHODS

Individual face-to-face interviews were conducted with primary and secondary school principals, Life Orientation (LO) teachers, and the Directors of Education, Health and Social Development to assess their training needs for effective implementation of the ISHP.

RESULTS

The participants indicated that training for the implementation of the ISHP was not satisfactory. However, there is training on capacity building regarding the implementation of ISHP and supported by the coordinator of HIV. The teachers

attended workshops to integrate and understand the HIV policy; first aid; school nutritional policies; financial issues; and fire extinguishers. Most school principals were not trained in ISHP. The LO teachers and Director of Social Development did not receive any form of training in ISHP. The LO teachers expressed the desire to be trained in counselling; health and physical education; HIV/AIDS; and drug abuse. The school principals indicated the need to provide a mentorship programme where some principals shall be mentored by other principals. They also emphasised training on aspects of HIV/AIDS and nutrition education. Because of the shortage of staff, staff nurses are not able to attend in-service training. They had training in school health; Human Papillomavirus but could not be trained on Ward Based Outreach.

CONCLUSIONS

The principals, teachers, and Directors signified their ambition to be trained in the implementation of ISHP. Their training needs were identified, and recommendations made to ensure the ISHP implementation is more effective in schools for the optimal development of all school children.

DESIGN, SYNTHESIS AND *IN VITRO* BIO-ANALYTICAL TESTS OF NEW CHEMICAL ENTITIES AS CYP17A1 INHIBITORS: TARGETING PROSTATE CANCER

¹N. Gumedé

¹Department of Chemistry, Mangosuthu University of Technology, Umlazi, Durban

BACKGROUND

Metastatic castration-resistant prostate cancer (mCRPC) is a major problem mostly in older males. Since current medications are rendered ineffective by mutations and splice variants of the androgen receptor, survival rates are very low.

OBJECTIVES

To design CYP17A1 inhibitors targeting the lyase route of the enzyme, instead of the hydroxylase route that is susceptible to mineralocorticoid excess syndrome. Hence, abiraterone acetate is co-administered with prednisone.

METHODS

We performed a 3D-QSAR pharmacophore model on a diverse set of steroidal and non-steroidal CYP17A1 inhibitors obtained in the literature. Using the highly active, medium and inactive compounds in the dataset, we selected a six-point pharmacophore hypothesis with the unique geometrical arrangement of two hydrogen bond acceptors (A), one hydrogen bond donor (D), one hydrophobic group (H), and two aromatic rings (R). Database screening and molecular docking of the hits followed, which were subsequently synthesised in the laboratory before bio-analytical

testing using ultra-high-performance liquid chromatography (UHPLC-MS/MS).

RESULTS

The compounds in the dataset that remained (after outlier-elimination) provided adequate model predictive statistics ($R^2=0.9228$ and $Q^2=0.9400$, for training and test sets, respectively). Density functional theory optimisation further provided the electronic properties explaining their structure activity relationships (SAR). Finally, docking revealed the binding modes of new chemical entities (NCEs) at molecular level explaining their experimental binding affinities to CYP17A1 enzyme.

CONCLUSIONS

The 13 hits designed computationally were synthesised in the laboratory as different scaffolds. The UHPLC-MS/MS *in vitro* experiments revealed three NCEs with IC_{50} values against the lyase route at sub-micromolar level, on the synthesised molecules. Conversely, the hydroxylase route gave IC_{50} values $>50 \mu\text{M}$. The three most promising inhibitors identified could be further optimised to improve their potency against CYP17A1, the target enzyme.

STAT-1 IS REQUIRED FOR THE INDUCTION OF INTERFERON INDEPENDENT CHOLESTEROL 25-HYDROXYLASE

¹T. Magoro, ¹P.O. Bessong, ²A.P. Dandekar, ²Y.S. Hahn, ²L.T. Jennelle, ²R. Rabab

¹Department of Microbiology, University of Venda, Thohoyandou, South Africa; ²Department of Microbiology, Beirne B. Carter Center for Immunology Research, University of Virginia, Charlottesville, VA, USA

BACKGROUND

Although cholesterol 25-hydroxylase (CH25H) and its metabolite, 25-hydroxycholesterol (25HC) have been shown to exert broad antiviral properties, suppressing viral pathogen. However, in humans, its transcriptional regulatory events are critical to understanding to further design therapeutic agents to control viral infection.

OBJECTIVE

To understand the regulation of CH25H to further design therapeutic agents to control viral infection.

METHODS

Wildtype THP-1 monocytic cell-line or THP-1 MyD88 knockout cell-line were treated with PMA for 72 hours for differentiation into macrophages. For resident macrophages, human microglial cells were utilised. Macrophages were then stimulated with either TLR-agonists, pro-inflammatory cytokines, ZIKV or interferons, and several interferons stimulated genes including CH25H, mRNAs expression levels were measured by qPCR.

RESULTS

In this study, we showed that CH25H is induced by ZIKV infection, TLR stimulation, and 25HC efficiently inhibited ZIKV infection at a post-entry stage. Interestingly, CH25H was induced by pro-inflammatory cytokines including IL-6, 1L-1 β , and TNF- α and this induction was dependent on STAT-1 transcription factor. Additionally, we have observed that ATF3 weakly binds to CH25H promoter suggesting co-operative operation with STAT-1. However, ZIKV induced CH25H was independent of this pro-inflammatory cytokines or interferons, which further complicates CH25H transcriptional regulatory events in humans.

CONCLUSIONS

Our results have demonstrated for the first time the ability of pro-inflammatory cytokines to induce CH25H. These findings will guide us to understand the regulation of CH25H in human cells better. Our data also contribute to a rapidly growing body of evidence that identifies 25HC as a potent antiviral agent.

INVESTIGATION OF THE PROBABLE ANTI-CANCER EFFECTS OF THE CRUDE METHANOL EXTRACT OF *DICEROCARYUM SENECIOIDES*, (KLOTZCH) J. ABELS, LEAVES ON CERVICAL HELA CANCER CELLS

¹K. Malemela, ²S. Riedel-van Heerden, ¹V. Mbazima

¹ Department of Biochemistry, Microbiology and Biotechnology, University of Limpopo, Sovenga, South Africa; ² Biomedical Research and Innovation Platform, South African Medical Research Council, Cape Town, Tygerberg, South Africa

BACKGROUND

Cervical cancer accounts for 7.6% of all cancer deaths worldwide. In South Africa, it is among the five most prevalent cancers in women. Although substantial progress has been made in current treatments, they have shown limited survival benefits for most advanced-stage cancers. *Dicerocaryum senecioides* is a plant widely used as a nutritional source and treatment of measles and wounds in many parts of southern Africa.

OBJECTIVE

To investigate the anti-cancer effects of the crude methanol leaf extract of *D. senecioides* on HeLa cells.

METHODOLOGY

Cytotoxicity was assessed using the MTT assay and the mode of cell death by the Hoechst 33258 nuclear staining assay and inverted light microscopy. Flow cytometry was used to confirm the mode of cell death using the annexin-V/PI and multicaspase assays. Western blotting analysis and the human apoptosis antibody array kit were used to elucidate pro-apoptotic

mechanisms of the extract.

RESULTS

The extract showed significantly increased inhibition of HeLa cell viability at concentrations above 400 µg/ml after 48 hours. Extract concentrations below 600 µg/ml showed no effect on the viability of normal human fibroblast KMST-6 cells. Apoptosis was proposed as the mode of cell death in extract-treated HeLa cells. There was modulation of some anti- and pro-apoptotic proteins as well as the release of mitochondrial proteins required for the initiation of apoptosis in the cytoplasm.

CONCLUSION

Dicerocaryum senecioides crude methanol leaf extract induced some degree of apoptosis in cervical HeLa cancer cells via the intrinsic apoptosis pathway.

GENETIC VARIATION WITHIN THE CODING REGION OF CCR5 IN CHRONICALLY HIV-1 INFECTED SOUTH AFRICAN INDIVIDUALS

¹N.D. Matume, ²D.M. Tebit, ²L.R Gray, ²D. Rekosh, ²M-L. Hammarskjöld, ¹P.O. Bessong

¹HIV/AIDS & Global Health Research Programme, Department of Microbiology, University of Venda, Thohoyandou, South Africa; ²Myles H. Thaler Center for AIDS and Human Retrovirus Research, Department of Microbiology, Immunology and Cancer Biology, University of Virginia, Charlottesville, USA

BACKGROUND

The human co-receptor CCR5 is an important target for viral and cellular antiretroviral interventions. Until now, several mutations and single-nucleotide polymorphisms (SNPs) in this gene have been discovered and found to be important genetic factors capable of influencing susceptibility to HIV-1 infection or affecting the rate of disease progression.

OBJECTIVE

To characterise polymorphism in the coding region of CCR5 in an HIV-1 infected South African population of which most were drug-experienced.

METHODS

Genomic DNA was isolated from peripheral blood mononuclear cells of 192 HIV-infected patients and CCR5 was sequenced on an Illumina MiniSeq platform. Sequences were analysed using Geneious® software version 8.1.5. SNPs and Indels were detected using Bayesian Haplotype-based polymorphism discovery and genotyping tools within Geneious software. The SNPs were confirmed and compared to SNPs in other populations

reported in the 1000 Genome Phase III and HapMap. Hardy-Weinberg Equilibrium was calculated, Haplotypes and Linkage disequilibrium were inferred using LDlink 3.0 web tool.

RESULTS

We detected the following SNPs P35P, S75S, Y89Y, A335V and Y339F and their varying frequencies in this study. The A335V and Y339F variants were detected at the highest frequency of 17.4% (29/167) and 1.2% (2/167), respectively than previously reported in South Africa. The G265S variant is reported for the first time at 0.6% (1/167) frequency. The SNPs detected were in strong LD ($D'=1$, $R^2=0.0$) with a minor deviation from the Hardy-Weinberg Equilibrium.

CONCLUSIONS

We have shown that significant SNP variation and frequency distribution exist among diverse populations in South Africa and that the variants detected in the study cohort are not located in the binding motif of Maraviroc. Therefore, those infected with CCR5 utilising viruses may benefit from the use of this in HIV treatment.

PREVALENCE OF OBESITY, HYPERTENSION AND ERECTILE DYSFUNCTION AMONG HIV –VE AND NEWLY DIAGNOSED HIV +VE ART NAÏVE PATIENTS

¹V. Mbombela, ¹C. Sewani-Rusike, ¹H. Musarurwa, ²B. Nkeh-Chungag

¹Department of Human Biology (Physiology), Walter Sisulu University, Mthatha; ²Department of Zoology, Walter Sisulu University, Mthatha

BACKGROUND

Classic risk factors for cardiovascular diseases (CVD) such as age, obesity and hypertension, have been increasingly reported among patients on antiretroviral therapy, yet data on the prevalence of these parameters among newly diagnosed male patients compared to HIV-negative population is scarce. Erectile dysfunction is considered an early indicator of CVD although underreported.

OBJECTIVE

To investigate the prevalence of hypertension, obesity and erectile dysfunction among newly diagnosed ART naïve HIV-infected men (HIV +ve) compared to HIV-negative (HIV –ve) participants.

METHODS

One hundred and three HIV –ve and 66 HIV +ve participants were recruited from a primary health-care testing centre in Mthatha. After giving informed consent, anthropometric measurements for the calculation of waist:hip ratio (W:H, abdominal obesity) and body mass index (BMI) were taken. Blood pressure (BP) was measured in triplicate, and the means of

systolic and diastolic BPs were recorded. A validated structured questionnaire (IIEF15) was used to assess erectile dysfunction. Data are reported as mean \pm SEM and frequency %.

RESULTS

The mean age of the HIV +ve group was higher ($P < 0.001$) compared to the HIV –ve group (34.0 ± 0.9 years vs 29.63 ± 0.8 years). Despite the younger age, HIV –ve group had a higher ($P < 0.05$) prevalence of abdominal obesity (W:H ≥ 0.9 ; 27% vs 15%) and overweight + obesity (BMI ≥ 25 ; 26% vs 16.6%) compared to HIV +ve but similar prevalence of hypertension (BP $\geq 140/90$; 31% in HIV –ve vs vs 26% in HIV +ve). The overall prevalence rate for erectile dysfunction was 50% for HIV –ve and 58% for HIV +ve ($P > 0.05$).

CONCLUSIONS

These preliminary data show a high prevalence of hypertension and erectile dysfunction in a young population of HIV –ve and HIV +ve men. Anthropometric risk factors for CVD are more prevalent in HIV –ve than HIV +ve men.

IN VITRO ASSESSMENT OF CYTOCHROME P450 AND DRUG TRANSPORTERS MODULATION BY POLYPHENOLIC CONSTITUENTS OF CYCLOPIA GENISTOIDES

^{1,2}N. Mchunu, ²S. Bowles, ²C. Muller, ¹P. Kappo, ³C. Malherbe, ²C. Awortwe

¹Department of Biochemistry and Microbiology, University of Zululand, Kwadlangezwa, South Africa (SA); ²Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg, SA; ³Post-Harvest and Wine Technology Division, Agricultural Research Council, Infruitec-Nietvoorbij, Stellenbosch, SA

BACKGROUND

Herb-drug interactions (HDI) are acknowledged as a growing public health problem that can lead to life-threatening adverse drug reactions (ADR). The potential for ADR requires assessment before herbal products are made available on the market. In this study, we assessed the effect of a *Cyclopia genistoides* extract for its interaction with cytochrome P450 (CYP) enzymes and drug transporters.

OBJECTIVE

To investigate whether the use of *C. genistoides* extract or its bioactive phenolic constituents has the potential for herb-drug interactions.

METHODS

The potential for hepatotoxicity of a methanol *C. genistoides* extract, xanthone and benzophenone enriched fractionations and associated pure compounds (mangiferin, isomangiferin, 3-β-D-glucopyranosyl-4-β-D-glucopyranosyloxyliriflophenone (IDG) and 3-β-D-glucopyranosyliriflophenone (IMG)) was assessed using C3A liver cells. The inhibitory effects of these compounds on major CYP isoforms were also assessed using Vivid® blue screening kits.

RESULTS

C. genistoides was deemed non-toxic to C3A hepatocytes, and showed inhibitory activities on all CYP isoforms tested (53%, 54.74%, 68.83% and 76.56% inhibition of CYP3A4, CYP2D6, CYP2C19 and CYP2C9, respectively). Mangiferin inhibited CYP 3A4 (60.83 % inhibition), CYP2D6 (52.12% inhibition) and CYP2C9 (82.08% inhibition). The xanthone-rich fraction inhibited CYP3A4 (52.5% inhibition) and CYP2D6 (50% inhibition) while the benzophenone-rich fraction only showed inhibition of CYP3A4. RT-PCR analysis suggested that the extract, xanthone-rich fraction and mangiferin as a pure compound, affect the expression of major drug transporters.

CONCLUSIONS

Xanthone-enriched extracts, especially those with a high mangiferin content, show potential towards herb-drug interactions and warrant further investigation into the potential of ADR. qRT-PCR analysis to show how these extracts affect the expression of major drug transporters needs to be performed.

AN INTERSECTORAL COLLABORATION MODEL FOR THE IMPLEMENTATION OF THE INTEGRATED SCHOOL HEALTH POLICY IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

¹S. Mnwana, ¹E. Seekoe, ¹D. Goon

¹Department of Nursing, Faculty of Health Sciences, University of Fort Hare, East London, Eastern Cape

BACKGROUND

The need for intersectoral collaboration in the provision of school health services is well recognised internationally as a cost-effective strategy and thus reaching groups with great need and limited resources. The collaboration model provides a conceptual framework on which to base action and a standard against which to measure success and simplifies the complex process of providing school health programmes.

OBJECTIVES

The research objectives for this study are to, 1.) examine the nature of collaboration that exists between the stakeholders implementing the integrated school health policy (ISHP); 2.) describe the barriers and facilitators of collaboration; 3.) describe the collaborative needs of the stakeholders in implementing the ISHP; 4.) describe a conceptual framework that can be used to develop the intersectoral collaboration model; and 5.) develop a model to facilitate collaboration between the stakeholders.

METHODS

This study will adopt a qualitative, explorative, and descriptive and theory generation research design. A purposive sampling technique will be used to select the participants. Face-to-face semi-structured interviews will be utilised for data collection. Data will be analysed guided by grounded theory.

CONCLUSIONS

The findings and recommendations of this study might help to strengthen the intersectoral collaboration among the key stakeholders involved in the implementation of the ISHP in the Eastern Cape, and by extension, South Africa. Recommendations from this study may be useful to policy makers at national and provincial levels in designing and implementing school health-related policies and interventions in South Africa, taking into perspective the need for intersectoral collaborative paradigms.

PHYTOCHEMICAL ANALYSIS OF ETHYL ACETATE AND METHANOL EXTRACTS OF *SENNA ITALICA*

¹M. Moloantoa, ¹M. Mokgotho, ¹K. Poopedi, ¹L. Mampuru

¹ Department of Biochemistry, Microbiology and Biotechnology, University of Limpopo, Sovenga

BACKGROUND

The bioactive phytochemicals present in plants are preferred for anti-cancer therapy because of their potential to differentiate between cancerous and normal cells. The plant species, *Senna italica*, is indigenous in Southeast Asia and Sub-Saharan Africa. As a herbal/traditional medicine, the stems are used to treat diabetes, malaria, constipation, jaundice and fever.

OBJECTIVE

To determine the antioxidant and phytochemical properties of *Senna italica* leaf extract using the ethyl acetate and methanol solvent systems.

METHODOLOGY

Senna italica leaves were extracted with ethyl acetate and methanol. Phytochemical analysis was determined using thin layer chromatography. Various phytoconstituents were evaluated using standard chemical tests. Antioxidant activity was determined

using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity assay.

RESULTS

Phytochemicals such as the phenols, tannins, flavonoids, terpenoids and steroids were abundant in the ethyl acetate extract compared to the methanol extract. Additionally, the ethyl acetate extract exhibited more antioxidants and indicated more radical scavenging activity in comparison to the methanol extract.

CONCLUSIONS

The phytochemical and antioxidant properties of *S. italica* were dependent on the solvent system that was used in the extraction process. In this study, the ethyl acetate solvent system was more prominent in extracting phytoconstituents which contributed to the antioxidative property of the extract.

MOMORDICA BALSAMINA INDUCES P53-MEDIATED APOPTOSIS ASSOCIATED WITH G0/G1 CELL DIVISION CYCLE ARREST IN LUNG A549 CANCER CELLS

¹M. Mudalahothe, ¹K. Lebogo, ¹K. Malemela, ¹V. Bagla, ¹M. Mokgotho, ¹L. Mampuru, ¹V. Mbazima

¹Department of Biochemistry, Microbiology and Biotechnology, University of Limpopo, Sovenga, Limpopo Province, South Africa

BACKGROUND

Apoptosis is a process of programmed cell death with unique morphological and biochemical changes, such as cell shrinkage, nuclear fragmentation, chromatin condensation and externalisation of phosphatidylserine. The process of eliminating the damaged cells susceptible to develop cancer further aids apoptosis as a defence mechanism for cancer development. Hence, screening of medicinal plants for anti-cancer activity, *in vitro*, could help identify plant extracts with the potential to induce apoptosis without affecting normal cells.

OBJECTIVE

To investigate the ability of *Momordica balsamina's* crude leaf acetone extract to induce apoptosis in lung A549 cancer cells.

METHODS

The effect of the extract on cell viability and proliferation was determined using Muse viability and Ki67 proliferation assay kits, respectively. The presence of features

associated with apoptosis was analysed by AO/EB and annexin V-7-ADD staining. Furthermore, the effect of the extract on the cell cycle arrest and associated genes and apoptosis regulatory genes was measured using the Muse cell cycle assay kit and RT-PCR technique, respectively.

RESULTS

The extract inhibited the viability and proliferation of A549 cells in a time- and concentration-dependent manner following 24 and 48 hours of treatment. Chromatin condensation, nuclear fragmentation and externalisation of phosphatidylserine were observed, suggesting the induction of apoptosis. The extract was also seen to induce G0/G1 and G2/M phase arrest and modulate cell cycle and apoptosis regulatory genes.

CONCLUSION

Momordica balsamina has an anti-proliferative effect and induces apoptosis cell death associated with cell cycle arrest at G0/G1 and G2/M phase.

GENETIC DIVERSITY OF SLCO1B1 WITHIN INDIGENOUS SOUTH AFRICANS AND IMPACT ON ENALAPRIL THERAPY

¹R. Musoliwa, ²R. Johnson, ¹M. Benjeddou

¹Precision Medicine Unit, Faculty of Natural Sciences, University of the Western Cape;

²Biomedical Research and Innovation Platform, South African Medical Research Council, Tygerberg

BACKGROUND

Hypertension is one of the most common conditions and was recorded as the number one killer worldwide. More than 60% of hypertensive patients do not respond to antihypertensive drugs. Moreover, some have been reported to experience adverse drug reactions. Enalapril is an angiotensin-converting enzyme inhibitor, known to exert many beneficial effects that reduce mortality and morbidity in patients with hypertension. Enalapril is important since it stabilises blood pressure. However, if it accumulates in the body, patients may experience inflammation, body pain, fever and cough. Previous studies have linked the genetic variants in the SLCO1B1 gene to affect the pharmacokinetics of this drug leading to adverse reactions.

OBJECTIVE

To investigate the genetic variation of SLCO1B1 in a South African indigenous population and its role in enalapril response.

METHODS

DNA was extracted from hypertensive patients who were undergoing enalapril

therapy. The study sample comprised patients who were grouped into (i) those who were controlled, and (ii) those who were uncontrolled. SLCO1B1 promoter and four common exon single nucleotide polymorphisms (SNPs; rs4149056, rs2306283 rs11045819 and rs34671512) were amplified, sequenced, and their impact predicted using various bioinformatics tools.

RESULTS

One promoter SNP was identified, and three haplotypes generated in the study cohort. In-silico analysis showed that each haplotype might affect the binding of transcriptional factors.

CONCLUSIONS

The identified haplotypes for the promoter of SLCO1B1 may influence the rate of protein expression. Further investigation into the effect(s) that promoter haplotypes may have on the response of enalapril needs to be investigated.

CHALLENGES FACED BY SCHOOL HEALTH NURSES IN THE IMPLEMENTATION OF THE 2012 INTEGRATED SCHOOL HEALTH POLICY IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

¹E. Seekoe, ¹D.T. Goon, ¹B. Mayeye, ¹U.N. Obi

¹Faculty of Health Sciences, University of Fort Hare, East London Campus, Eastern Cape

BACKGROUND

Children's need should be made a priority in the country. However, meeting this obligation has been a challenge due to the following reasons: poverty related illnesses namely: childhood infectious diseases and malnutrition, which in turn become barriers to optimal health and development. The anecdotal evidence portrays the ineffective implementation of the Integrated School Health Policy (ISHP) in the Eastern Cape Province.

OBJECTIVE

To improve learners' health by linking school visits with the inter-sectoral collaboration required for promoting the health of learners.

METHODS

Face-to-face interviews involving five school health nurses and two coordinators of the Mother, Child and Women's' Health programme in three Eastern Cape Province districts were conducted regarding challenges in implementing the (ISHP) programmes. Transcripts were coded thematically.

RESULTS

The findings indicated a shortage of school health nurses, unavailability of equipment, shortage of transport and long travelling distances, ineffective Ward-Based Outreach Team initiatives, and a lack of stationery for recording and writing referrals. Others include inadequate training of enrolled nurses in school health-promotion activities; inadequate implementation and management of the school health programme; lack of formalised collaboration and coordination with the Department of Education and Social Development.

CONCLUSIONS

The sub-optimal provision of school health services in this setting is linked to the shortage of school health nurses, lack of equipment, transport and long travelling distances. For nurses to efficiently perform their function in the ISHP, human and material/physical resources are needed.

EVALUATING THE SCHOOL FOOD AND NUTRITION ENVIRONMENT IN THE EASTERN CAPE SOUTH AFRICA: IMPLICATION FOR HEALTHY EATING OF SECONDARY SCHOOL LEARNERS

¹A.P. Okeyo, ¹E. Seekoe, ²A. de Villiers, ²M. Faber

¹Faculty of Health Sciences, University of Fort Hare; ²Non-Communicable Diseases Research Unit, South African Medical Research Council, Tygerberg

BACKGROUND

Learners in Eastern Cape secondary schools tend to be obese, which is speculative according to the literature. To promote healthy eating practices in learners, the secondary school food and nutrition environment needs to be improved.

OBJECTIVE

To assess school food and nutrition environment, eating practices and nutrition knowledge of secondary school learners in the Eastern Cape, South Africa.

METHODS

This cross-sectional study involved 18 randomly selected secondary schools in three districts of the Province. The study sample comprised 1357 randomly selected secondary school learners and a purposive sample of school principals, Life Orientation (LO) teachers and school health nurses, who completed questionnaires on nutrition-related questions.

RESULTS

Five main food items provided by the National School Nutrition Programme at schools included beans, pap, sour-milk, rice, and samp. Tuckshops sold chips, sandwich, pap, biscuits, and cake, while vendors sold chips, sandwich, pap, cake,

and pop-corn. Learners' lunch-boxes contained samp, noodles, fat-cake, chips, and Russian/Viennas. Few schools had vegetable gardens. Most learners (72.7%) ate breakfast, while more male (24.4%) than female (29.1%) learners skipped breakfast. Most (62.2%) learners had poor nutritional knowledge; with more male (35%) than female (27%) learners having poor nutritional knowledge. Only 28.6% of LO teachers had received nutrition training, mostly at the Department of Education workshops. Despite the poor level of training in nutrition, almost all LO teachers (92.9%) who were interviewed expressed interest in nutrition. The Integrated School Health Policy had no on-site services for nutritional assessment.

CONCLUSIONS

The school food and nutrition environment is saturated with food items containing mostly carbohydrate, and vegetable and fruits were not served regularly. Most learners ate breakfast before coming to school. Nutrition knowledge scores in this population were slightly higher among urban learners compared to their rural counterparts. However, it was not reflected in their nutritional consumption of healthier foods.

THE ANALYSIS OF THE PHYTOCHEMICAL PROFILE AND ANTIOXIDANT ACTIVITY OF CRUDE METHANOLIC AND SUB-FRACTIONS OF *BIDENS PILOSA* L

¹M. Raboshakga, ¹K. Poopedi, ¹V. Bagla, ¹M. Mokgotho, ¹L. Mampuru

¹Department of Biochemistry, Microbiology & Biotechnology, University of Limpopo, Sovenga

BACKGROUND

Plants are an essential remedial source for prevention, management and treatment of various ailments in the traditional systems and western medicine. A large percentage of drugs are derived from natural sources. The plant *Bidens pilosa* L (*B. pilosa*) has been used by the indigenous traditional practitioners for treatment of various ailments, such as infections, wounds and burns, inflammation, allergies and malaria. The plant has a broad phytochemical composition, is easily accessible and assumed safe to use making it a reliable potential remedial source.

OBJECTIVE

To analyse the phytochemical fingerprint and antioxidant properties of crude methanolic extract and sub-fractions of *B. pilosa* L.

METHODOLOGY

A crude extract of *B. pilosa* L was obtained by extracting it with methanol. Hexane, n-butanol, ethyl acetate, water, chloroform and 35% water in methanol sub-fractions were partitioned from the crude extract.

Phytochemical fingerprint profiles of the extracts were established using thin layer chromatography. Various phytochemical constituents and antioxidant activity were determined qualitatively and quantitatively using standard procedures.

RESULTS

The crude methanolic extract, 35% water in methanol and n-butanol extracts have shown the presence of phenols, tannins, terpenes, steroids, flavonoids and glycosides. The chloroform sub-fractions have the highest concentration of flavonoids while the n-butanol sub-fraction has the most quantity of phenols. The chloroform and 35% water in methanol extracts reflected the most prominent antioxidant properties qualitatively and quantitatively.

CONCLUSION

Our findings provided evidence that extracts of *B. pilosa* L contain important medicinally bioactive compounds justifying their use in traditional medicine for the treatment of various diseases.

THE CONCEPTUALIZATION OF THE 2012 INTEGRATED SCHOOL HEALTH POLICY: IN THE LENS OF PRINCIPALS, LIFE ORIENTATION TEACHERS, SCHOOL GOVERNING BODIES AND WARD COUNSELLORS IN THE EASTERN CAPE, SOUTH AFRICA

¹E. Seekoe, ¹D. Goon, ¹D. Murray, ¹N. Mange

¹Faculty of Health Sciences, University of Fort Hare, East London Campus, Eastern Cape

BACKGROUND

The Integrated School Health Policy (ISHP) was implemented at national level to contribute to the improvement of the general health of school-going children. The need for the evaluation of the 2012 ISHP remains an essential element for decision making in social and health policy development.

OBJECTIVE

The focus of this study was to assess the views of stakeholders regarding the conceptual implementation of the ISHP in the Eastern Cape, South Africa.

METHODS

Individual in-depth face-to-face interviews were conducted among the primary and secondary school principals, including Life Orientation teachers, school governing bodies and ward counsellors in the OR Tambo; Chris Hani, and Buffalo City Metropolitan districts in the Eastern Cape Province. Interviews were audiotaped and thematically analysed.

RESULTS

The emerging themes were coordinated health-care support in collaboration with relevant stakeholders; enhancing health of

learners through a range of programmes; and curriculum support. From the findings, it emerged that some of the key stakeholders had a clear understanding of what the integrated school health programme entails. They understood that ISHP is a promotive and preventive health-care programme for learners in collaboration with the Departments of Health, Education and Social Development as well as all relevant structures such as safety committees and school governing bodies. Participants indicated that the integrated school health programme provides different health-care programmes such as screening of all the learners, oral health, eyes, immunisations, mental health, TB, and deworming. The programme also caters for health-care needs and health problems of learners and the promotion of a learner's lifestyle.

CONCLUSION

Although the concept of ISHP is clearly understood by the stakeholders, its implementation is fraught with several policy and institutional problems for effective realisation of its goal of achieving optimal health of school children.

THE ANTIMETASTATIC EFFECTS OF *MOMORDICA BALSAMINA* ON HT-29 COLON CANCER CELLS

¹K. Serala, ¹L. Mampuru, ²S. Prince, ¹V. Mbazima

¹ University of Limpopo Department of Biochemistry, Microbiology and Biotechnology, Sovenga,

² University of Cape Town, Department of Cell Biology, Observatory

BACKGROUND

Cancer metastasis is a major factor in the morbidity and mortality among cancer patients, which accounts for 90% of all cancer-related deaths. This is because of the lack of effective therapeutic strategies to completely prevent the dissemination of cancer cells from a primary tumour to other parts of the body. However, there is a continued search for more effective antimetastatic drugs. This search has now shifted towards plants, particularly those used to treat various ailments traditionally. Recent studies have shown plants in various genera to have anticancer properties including plants in the *Momordica* genus. This genus consists of about 60 species, and only a few have been shown to possess biological activities.

OBJECTIVE

To investigate the *in vitro* antimetastatic effects of *Momordica balsamina* crude acetone leaf extract on human colon HT-29 cancer cells.

METHODS

The cytotoxic effect of the extract was assessed using the MTT assay. The effect of the extract on the attachment and migration of HT-29 cells was assessed using the cell adhesion and wound healing assay, respectively.

RESULTS

Our results showed that the extract inhibited cell viability in both concentration- and time-dependent manner. The extract also showed a concentration- and time-dependent inhibition of cell attachment and migration.

CONCLUSION

The extract inhibits migration and attachment of colon HT-29 cancer cells, *in vitro*. However, further studies will be conducted to assess the effect of the extract on HT-29 invasiveness and angiogenesis.

THE ANTIMETASTATIC EFFECTS OF *MOMORDICA BALSAMINA* ON HT-29 COLON CANCER CELLS

¹K. Serala, ¹L. Mampuru, ²S. Prince, ¹V. Mbazima

¹ University of Limpopo Department of Biochemistry, Microbiology and Biotechnology, Sovenga,

² University of Cape Town, Department of Cell Biology, Observatory

BACKGROUND

Cancer metastasis is a major factor in the morbidity and mortality among cancer patients, which accounts for 90% of all cancer-related deaths. This is because of the lack of effective therapeutic strategies to completely prevent the dissemination of cancer cells from a primary tumour to other parts of the body. However, there is a continued search for more effective antimetastatic drugs. This search has now shifted towards plants, particularly those used to treat various ailments traditionally. Recent studies have shown plants in various genera to have anticancer properties including plants in the *Momordica* genus. This genus consists of about 60 species, and only a few have been shown to possess biological activities.

OBJECTIVE

To investigate the *in vitro* antimetastatic effects of *Momordica balsamina* crude acetone leaf extract on human colon HT-29 cancer cells.

METHODS

The cytotoxic effect of the extract was assessed using the MTT assay. The effect of the extract on the attachment and migration of HT-29 cells was assessed using the cell adhesion and wound healing assay, respectively.

RESULTS

Our results showed that the extract inhibited cell viability in both concentration- and time-dependent manner. The extract also showed a concentration- and time-dependent inhibition of cell attachment and migration.

CONCLUSION

The extract inhibits migration and attachment of colon HT-29 cancer cells, *in vitro*. However, further studies will be conducted to assess the effect of the extract on HT-29 invasiveness and angiogenesis.

IN VITRO ANTIDIABETIC AND CYTOTOXICITY PROPERTIES OF COMMELINA BENGHALENSIS ACETONE EXTRACT AGAINST 3T3-L1 CELLS

¹T. Tshidino, ¹K.W. Poopedi, ¹L.J. Mampuru, ¹M.P. Mokgotho

¹Department of Biochemistry, Microbiology & Biotechnology, University of Limpopo, Sovenga

BACKGROUND

Conventional antidiabetic drugs have undesirable side effects, are not easily accessible, and are expensive. As such, there is a need to investigate alternative antidiabetic treatments. *Commelina benghalensis* (*C. benghalensis*) has been reported to possess antimicrobial, antidiarrheal and cytotoxic activities. The antidiabetic properties of *C. benghalensis* have also been reported. However, there is a paucity of information on this aspect of the plant.

OBJECTIVE

To investigate the antidiabetic and cytotoxicity properties of the acetone extract of *C. benghalensis* on 3T3-L1 cells.

METHODOLOGY

Commelina benghalensis will be extracted using acetone. The High-performance liquid

chromatography will be used to analyse the phytochemical constituents in the extract. The viability of 3T3-L1 cells was evaluated using the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide assay, and the cellular and nuclear morphological features associated with apoptosis will be assessed using acridine orange/ethidium bromide-dual staining. The acetone extract of the plant will be evaluated for its glucose uptake and utilisation of the ATP molecule ability using colometric assays.

CONCLUSIONS

In this study, we will analyse the effectiveness of the extract on the glucose and ATP uptake utilisation. Furthermore, the basic components determined in the extracts will infer the activity of the extract.



SAMRC MID-CAREER SCIENTIST PROGRAMME (MCSP)

MS PHILISTIA JOSHUA – PROGRAMME ADMINISTRATOR

PROTEOMIC ANALYSIS OF GEOMETRICALLY AND ETHNICALLY CLASSIFIED HUMAN HAIR IN A SOUTH AFRICAN COHORT

¹H. Adeola, ¹N. Mehlala, ¹N. Khumalo

¹Hair and Skin Research Laboratory, Division of Dermatology-Department of Medicine, Faculty of Health Sciences, University of Cape Town, South Africa

BACKGROUND

As well-established, hair is mostly composed of keratins and keratin-associated proteins. Hence, an in-depth understanding of the physiological proteome of hair is a potential treasure-trove for identification of non-invasive biomarkers for various diseases. However, there has been a few bottlenecks in the large-scale identification of the full complement of proteins in human hair samples. Not the least, differences in the physiological proteome of men of different ethnic origin are poorly researched.

OBJECTIVES

The objective of this study is to characterise the physiological hair proteome of various ethnicities within a South African cohort.

METHODS

We carried out label-free, shotgun proteomics analysis on various ethnically and geometrically classified hair samples collected from a heterogeneous population in the Western Cape of South Africa.

RESULTS

Using various proteomics bioinformatics pipelines, we have identified over 450 protein groups (FDR=0.01) in the South African hair proteome. Proteins identified included: keratins, keratin-associated proteins, desmosomes, and histone proteins, inter alia. Functional pathway analysis of high-ranking proteins showed enrichment for skin, epidermal and tissue development as well as intermediate filament organisation.

CONCLUSION

In this study, we validate the fact that medical research needs an urgent shift away from racial classification and embraces a more objective classification of human hair. Also, the established physiological hair proteome could potentially serve as a template for the identification of disease biomarkers.

THE ROLE OF STEM CELLS IN THE PATHOGENESIS OF SCARRING ALOPECIA

¹M. Alkelani, ¹H. Adeola, ¹N. Khumalo

¹Faculty of Health Science, Division of Dermatology, Department of Medicine, University of Cape Town

BACKGROUND

Scarring alopecia (also called cicatricial alopecia) is a type of alopecia which results in permanent hair loss, which can be caused by several factors, including systemic conditions such as scleroderma and discoid lupus. The hair follicles are destroyed completely, and the hair does not grow again. The disease affects males and females and is more common among adults than in children. There were significant clinical and fibroblastic inflammatory phenomena in the type of hair loss, and the term "nodal hair loss" has been suggested. Stem cells are regenerative cells, with the unique ability to develop into specialised cell types in the body. However, the pathogenetic mechanism of scarring alopecia remains unclear, as do what the roles of stem cells are in these lesions.

OBJECTIVES

To determine if the hair follicle bulge stem cells undergo structural and molecular changes during the progression of scarring

alopecia. Also, to find out if the bulge stem cell biology can be used to monitor the progression of or classify scarring alopecia.

METHODS

A biopsy will be obtained from scarring alopecia patients at the hair clinic of Groote Schuur Hospital, Cape Town. Proteomic analysis will be done by using scanning electron microscopy, MALDI imaging mass spectrometry and laser capture microdissection. Also, Flow Cytometry analysis will be used to isolate and identify the stem cells population.

RESULTS

We expect to get a better understanding of the role of stem cells during the stages of scarring alopecia and to identify molecular changes.

CONCLUSION

The success of this study will give a clearer understanding of the role of stem cells in scarring alopecia. Also, it would help identify diagnostic and prognostic stem-cell biomarkers of scarring alopecia.

IS THERE AN ASSOCIATION BETWEEN FRONTAL FIBROSING ALOPECIA AND SUNSCREEN ACTIVES?

¹K. Chabaesele, ¹H. Adeola, ¹M. Lebeko, ¹N. Khumalo

¹Health Sciences, Dermatology, Hair and Skin Research Laboratory, University of Cape Town

BACKGROUND

Frontal fibrosing alopecia (FFA) is a subtype of lymphocytic primary scarring alopecia associated with progressive, inflammation of hair follicles and permanent replacement by fibrous tissue. Clinically FFA is characterised by a band-like recession of the frontal hairline which may be associated with eyebrow loss and facial hyperpigmentation. Since the report in postmenopausal women, the number of published cases initially remained low. However, in the last decade, there has been an exponential increase in cases which include younger women and men (largest study 355 patients). The psychopathology from FFA is significant and the cause unknown.

OBJECTIVE

To evaluate cytotoxicity and bioenergetics of sunscreen actives in a keratinocyte cell line and site-specific fibroblasts from FFA patients.

METHODS

Two cell types, human keratinocytes and FFA-derived fibroblast, were exposed to five common sunscreen actives, titanium dioxide, zinc oxide, octinoxate, benzophenone-4 and Padimate O, over 24 hours. Thereafter, the cell counting kit-8

(CCK8) was used to measure the cytotoxicity effect of the actives on the cells. Metabolic phenotype switch of the treated cells was also analysed using Seahorse bioanalyzer.

RESULTS

The human keratinocyte cell line and FFA primary fibroblasts show varying susceptibility to sunscreen actives, with zinc oxide being most cytotoxic. Real-time extracellular flux analysis indicates that zinc oxide induces an aerobic phenotype switch only on keratinocytes. Titanium dioxide induces an energetic phenotype switch in both cell types, increasingly more dramatic in fibroblasts from FFA edge and scar samples. Chemical sunscreen actives show a negligible effect on the energy phenotype of both cell types.

CONCLUSIONS

Zinc oxide is the most cytotoxic and with titanium dioxide exhibit significant bioenergetic changes compared to chemical sunscreen actives on mono-layer cells. The effect of physical sunscreen actives (traditional and nano-particles) warrants further investigation on more complex (closer-to-real-life) *in vitro* and *ex vivo* 3D-organ culture models.

INTERDEPENDENCE BETWEEN GEOMETRIC, TENSILE AND CHEMICAL BOND BEHAVIOURS OF UNTREATED CURLY HAIR FIBRES

¹E. Cloete, ¹N. Khumalo, ²J. van Wyk, ¹M. Ngoepe

¹Hair & Skin Research Laboratory, Dermatology, University of Cape Town, Cape Town, South Africa; ²Textile Research Institute, Princeton, NJ 08540, USA

BACKGROUND

Until now, an accurate understanding of the dynamics between the fibre's inherent geometric, mechanical and biological characteristics is deficient, affecting the reliability and robustness of hair data. There is also insufficient scientific clarity on deviations of curly hair from characteristic fibre behaviour.

OBJECTIVE

To gain an accurate understanding of the interrelationships between diverse fibre attributes of curly fibres.

METHODS

Research tools included tensile, geometric, image, spectroscopic assessments, regression modelling and multivariate statistical analysis. Fibre attributes, assessed individually and comparatively, included length, diameter, cross-sectional area, curl index, curl peaks, tensile behaviour in toe- and elastic regions, and absorbance behaviour.

RESULTS

Through the findings of this research, it was shown that, that there is an additional material property (mechanical energy) associated with curly fibres, which is absent in non-curly fibres. Tensile patterns in low-to-

medium strain regions showed a sequence of distinct horizontal, exponential and linear patterns for curly fibres, but an absence of the horizontal and exponential sections for low-curl fibres. Based on these regions, a 3-component constitutive equation was developed, describing fibre tensile strength, which, until now, was assumed to be calculable from the linear region (via Young's modulus) only. The diverse nature of the components (i.e. chemical, viscous, elastic) demonstrated the dynamic complexity of curly fibres. Hydrogen bonds, previously thought as an insignificant distinctive fibre strength contributor, were shown to underwrite intrinsic curvature permanence and to be subject to mechanical fragility during fibre preparation for tensile measurements. Based on *de facto* tensile measurement methods, curly fibres are currently considered to have a lower tensile strength than low-curl fibres.

CONCLUSION

Although confirmation is required through larger studies, findings strongly suggest improved reliability and robustness of fibre data by considering the parameters explored in this study.

THE USE OF HAIR TO DETECT AND MONITOR HYPERGLYCAEMIA – A PILOT STUDY

¹S. da Silva, ¹N. Khumalo, ²J. van Wyk, ¹A. Spitaels, ¹S. Delport, ¹H. Nieuwoudt

¹Hair & Skin Research Laboratory, Dermatology, University of Cape Town, Cape Town, South Africa; ²Textile Research Institute, Princeton, NJ 08540

BACKGROUND

Hyperglycaemia results in debilitating complications. Therefore, it is vital for diabetics to monitor and control their blood-glucose levels between 7 and 9 mmol/L. Chronic estimates of glucose control are obtained using glycated haemoglobin (HbA1c) valid for 8–12 weeks. Since scalp hair grows at 1 cm per month and comprises 65–95% protein, which is subject to glycation, it could potentially be a useful non-invasive method of monitoring chronic glycaemic control.

OBJECTIVE

To determine whether hair may be an alternative substrate for monitoring chronic hyperglycaemia.

METHODS

Scalp hair and blood samples (for HbA1c) were collected from 46 diabetics with matched controls. Twenty-six adult cases (30–70 years) and 29 controls (26–65 years), were recruited from the outpatient clinic at Groote Schuur hospital. Children recruited from outpatient clinics at the Red Cross children's hospital included 20 cases (7–18 years) and 17 controls (7–17 years). History of chemical hair treatment was recorded for each participant. Hair samples were

analysed using Fourier transform infrared-attenuated total reflection (ATR-FTIR) spectroscopy. Spectra were analysed with SIMCA, Umetrics.

RESULTS

When ATR-FTIR spectra were analysed using multivariate data analysis, orthogonal projections to latent structures discriminant analysis models between spectra obtained from the hair of diabetic participants and those from controls, show good separation and predictive ability. Partial least squares revealed a good correlation between hair FTIR spectra and participant HbA1c levels. The correlation varied between 0.8067 and 0.9296 depending on whether participants' hair was natural or had undergone various chemical cosmetic treatments.

CONCLUSIONS

We demonstrated the potential ability to distinguish between the hair of diabetics and controls including to predict HbA1c levels from hair using ATR-FTIR. These promising prospects for non-invasive diabetes screening and long-term blood glucose monitoring suggest greater insights into the timing and development of diabetic complications.

THE IDENTIFICATION OF NOVEL MICROBIAL SIGNATURES AS BIOMARKERS IN TRACTION ALOPECIA

^{1,2}M. Gabier, ¹H. Adeola, ¹N. Mehlala, ¹N. Khumalo

¹Hair and Skin Research Laboratory, Division of Dermatology, University of Cape Town; ²Faculty of Applied Sciences, Cape Peninsula University of Technology

BACKGROUND

Traction alopecia (TA) is a biphasic type of hair loss that can be described as non-scarring in its early stage. In this scenario, the stem cells can still be stimulated for regeneration of hair growth. However, if it progresses to a later stage it becomes a scarring type in which the surrounding tissue is replaced with fibrous tissue and the hair follicle is lost leading to baldness. People of every race may be affected by TA, while two South African studies showed that 31.7% of women and 9.4% of children are affected by TA. A variety of hair traction and pulling forces that people do during hair grooming, weaving, braiding, clipping as well as binding hair in ponytails causes TA. This can be psychosocially traumatising, particularly in women, and may lead to emotional distress, lack of confidence and depression. When a pulling force is applied to the hair, the pores open providing entry to the natural microflora. With a change of environment, the natural microflora becomes pathogenic.

OBJECTIVES

Factors that govern the progression of TA from early to later stages is poorly understood and no studies have been done on this. Hence, it could be useful to look at the potential roles of microbes in TA, to better elucidate the mechanism of disease.

METHODS

High-end targeted metaproteomic tools will be used to identify potential microbial biomarkers for early detection and progress monitoring of TA.

RESULTS

With this research, the roles that microorganisms play in TA will be better understood. More importantly, novel protein sequences that are highly sensitive and specific to TA can be used as a diagnostic tool for early disease detection and will be identified.

CONCLUSION

The success of this research will create awareness of the dangers caused by chemicals and the application of force onto the hair.

THE STOP RHEUMATIC HEART DISEASE THROUGH AWARENESS RAISING, SURVEILLANCE, ADVOCACY, AND PREVENTION RESEARCH PROGRAMME: LONGITUDINAL STUDIES OF PRIMARY AND SECONDARY PREVENTION OF RHEUMATIC HEART DISEASE

¹O. Kgasha, ¹M. Nchabeleng, ¹X. Khosa, ²H. Mabuza, ³M. Moshe, RHD team-SMU/UCT

Departments of ¹Microbiology, ²Family Medicine, ³Paediatrics, Sefako Makgatho Health Sciences University & University of Cape Town

BACKGROUND

Group A streptococcus (GAS) is responsible for a wide range of invasive and non-invasive infections. Pharyngitis caused by GAS may trigger complications such as acute rheumatic fever leading to rheumatic heart disease (RHD) which continues to have high mortality and morbidity. Hence the need to find intervention strategies such as vaccines for control of GAS infection.

OBJECTIVES

To establish surveillance of GAS pharyngitis and validate a South African clinical decision rule for treatment at selected clinics in the northwest of Pretoria. Also, to determine the GAS antigen specificity of the human immune response following natural pharyngeal infection and to evaluate the homing receptor expression of intra-lesional valve T cells for skin versus oral mucosa.

METHODS

Throat swabs from patients presenting with pharyngitis to selected clinics were collected for GAS isolation. Blood serum was collected from patients with culture-confirmed GAS isolates for immunological response investigation. GAS isolates were

also collected from the NHLS service laboratory. Quantitative antimicrobial susceptibility tests were performed using E-test and Kirby-Bauer methods. Results were interpreted using CSLI guidelines and EUCAST. Emm typing was performed using PCR by amplifying and sequencing the 5' portion of the emm gene. GAS antigen specificity will follow.

RESULTS

Seventy-two throat swabs were collected from which 25% (18/72) GAS isolates were recovered. In addition, 48 GAS isolates were collected from the NHLS service laboratory. All isolates were susceptible to all antibiotics tested with no MICs creeping up. Thus far, 24 isolates have been typed, and ten emm types were found. Emm 92.0, which is a vaccine type, is the most found emm type.

CONCLUSIONS

All isolates were susceptible to the routinely used antibiotics for GAS treatment. Emm typing shows that 50% of the isolates circulating in this region are not covered in the 30-valent vaccine underdevelopment. The study is ongoing.

DIFFERENTIAL GENOMIC PROFILING FOR STAGING AND DIAGNOSIS OF TRACTION ALOPECIA: A PILOT STUDY

^{1,2}H.A. Adeola, ³P.S. Magangane, ^{1,2}N. Mehlala, ¹R.M. Ngwanya, ^{1,2}N.P. Khumalo

¹Division of Dermatology, Department of Medicine, Faculty of Health Sciences and Groote Schuur Hospital, University of Cape Town, Cape Town, South Africa; ²Proteomics Pathology and Molecular Imaging Group, Hair and Skin Research Laboratory, Groote Schuur Hospital, Cape Town, South Africa; ³Department of Anatomical Pathology, Faculty of Health Sciences, University of the Witwatersrand, Parktown, Johannesburg, South Africa

BACKGROUND

Traction alopecia (TA) is a type of abnormal hair loss caused by excessive amounts of tension being placed on hair shafts. TA has two phases, the early and late stage. Early stage TA is reversible and non-scarring, while late-stage TA is irreversible and leads to scarring and permanent hair loss. Recent studies have shown that treatment of TA is only successful if the cause of the condition is recognised early enough and the patient is willing to discontinue the styling practice causing the traction. General population data have been reported in South African female and child cohorts. In this population, mild to moderate TA was dominant in 31.7% of women and between 8.6% and 21.7% of children, ages 6–15 years.

OBJECTIVES

Our focus was to identify differentially expressed genes and to compare the genomic signatures of the two stages of TA.

METHODS

RNA was extracted from two early- and two late-stage scalp FFPE tissue samples

using a Qiagen RNA extraction kit. The extracted RNA of each sample was reverse-transcribed into cDNA using the Qiagen cDNA Synthesis RT2 First Strand kit. The cDNA was sequenced on the Quant Studio 6 Flex analyser RT-PCR and the resulting sequences loaded and analysed on Qiagen GeneGlobe Array Finder software. We did this to identify the gene panels that match the cDNA targets of the two groups being analysed.

RESULTS

The student t-test gave a p-value of 0.05, showing that the two groups were significantly different. The gene panel yielded a total of 89 genes which were differentially expressed between the two groups.

CONCLUSION

In this study, we successfully demonstrated a difference in the genomic signatures of early- and late-stage TA.

IMPACT OF NYAOPE ON PHYSICAL HEALTH AND ORGAN FUNCTIONS

¹A. Khine, ²K. Mokwena, ³V. Moodley

Departments of ¹Chemical Pathology; ²Public Health; ³Haematology, Sefako Makgatho Health Sciences University

BACKGROUND

Unique to the mostly lower socio-economic youth who live in South African townships, Nyaope is a very addictive novel or cocktail psychoactive substance of abuse. In a previous study, we identified caffeine, other drugs of abuse which included stimulants, sedatives, antibiotics, and antiretroviral drugs, as components of the substance. Typical complaints of Nyaope users include severe abdominal cramps, tremendous drowsiness, vomiting and sometimes diarrhoea. However, with the use of Nyaope progressive weight loss, which is associated with decreased appetite, emanates.

OBJECTIVES

To explore the impact of Nyaope on physical health and organ function.

METHODS

The sample size consisted of 98 Nyaope users who were recruited from Soshanguve, Mabopane and Ga-Rankuwa. Demographic data were collected using a self-administered questionnaire. Liver, renal, thyroid and gonadal functions as well as

haematological parameters were assessed from blood samples. All biochemistry tests were analysed on the Abbott Architect ci8200 and haematological tests on the ADVIA® 2120i System.

RESULTS

Compared to normal ranges, significant differences were found in the serum electrolytes, anion gap, liver enzymes, gonadal hormones and differential blood counts, while the renal function tests did not show significant differences. Of the Nyaope users, 86.7% (n=85) showed abnormalities in the range of laboratory tests performed, with the number of participants with specific organ dysfunctions ranging from 10.2% to 31.6%.

CONCLUSIONS

Nyaope compromises physical health and organ functions on selected cases. Conducting further studies on occult infections and possible bone marrow suppression is recommended.

MOLECULAR APPROACHES FOR CHARACTERISATION OF CICATRICIAL ALOPECIA

¹T. Sikhakhane, ¹H. Adeola, ¹N. Khumalo

¹University of Cape Town, Hair and Skin Research Laboratory, Groote Schuur Hospital

BACKGROUND

The term “cicatricial alopecia” comprises a group of hair-loss disorders characterised by permanent destruction of the hair follicle. Although the cause and pathogenesis of these conditions remain poorly understood, it is known that ultimately the follicular units are replaced by fibrous tissue leading to progressive and permanent scalp hair loss. This condition affects males and females and can often lead to several psychological disturbances such as anxiety, depression, low self-esteem, feelings of loneliness, and social isolation.

OBJECTIVES

In this study, we aim to identify novel molecular diagnostic and therapeutic approaches/biomarkers for better disease classification as also to understand the aetiology and molecular pathogenesis of primary cicatricial alopecia (PCA) using proteomic and genomic methods.

METHODS

We will identify potential diagnostic and therapeutic biomarkers of various PCA

using state-of-the-art, label-free, mass spectrometry. Furthermore, top ranking potential biomarkers will be validated by various genomic and proteomic techniques including histopathology, immunohistochemistry, molecular imaging, PCR and sequencing.

RESULTS

The success of the study will result in the development of reliable and robust diagnostic biomarkers and a more elegant classification system for the different types of scarring alopecia.

CONCLUSIONS

Acquiring this vast information will contribute to closing the knowledge gap in the molecular pathogenesis of PCA and thus improve the management of this condition that results in distress, depression and psychological disturbances, particularly in females. The success of this study will not only benefit South Africa but the whole world, as this disease is not geographically limited.

**SAMRC SCHOLARSHIP BENEFICIARIES WHO HAVE COMPLETED
THEIR DEGREES (MASTERS/DOCTORATE) IN THE PAST 12 MONTHS:
BY PROGRAM**



**MS. COLLEEN VAN WYK
ADMINISTRATIVE ASSISTANCE (RCD)**

SAMRC CLINICIAN RESEARCHER DEVELOPMENT (M.D PHD) PROGRAMME

Name & Surname	Institution	Research Topic	Supervisor
Dr Andre Rose	University of Free State	Radiation-induced lens changes and development of a radiation frameworks for interventionists	Prof William Raire
Dr Goodman Sibeko	University of Cape Town	Pilot testing models of task shifting for the care of serious mental illness in South Africa	Prof Dan Stein
Dr Mohammed Dalwai	University of Cape Town	Assessing the reliability and validity of the South African triage scale in low to middle income setting	Prof Lee Wallis
Dr Aneesa Vanker	University of Cape Town	Indoor air pollution and tobacco smoke exposure in a South African birth cohort	Prof RP Gie
Dr Kwazi Ndlovu	University of KwaZulu-Natal	The effect of HIV infection on the management of renal failure among patients undergoing peritoneal dialysis	Prof Alain Guy Honore Assounga
Dr Vuyani Mhlomi	University of Oxford (UK)	The role of syntiocytotrophoblast extracellular vesicles in the regulation of cardiovascular physiology in normal pregnancy and preeclampsia	Prof Manu Vatish
Dr Alex Doruyter	Stellenbosch University	Default mode network in social anxiety disorder: correlations with neuropsychiatric measures of social cognition and dopaminergic function	Prof James Warwick

SAMRC INTERNSHIP SCHOLARSHIP PROGRAMME (ISP)

Sibusiso Senzani (PhD)	University of Witwatersrand	Characterization of mycobacterial amidases and their role in bacterial growth and physiology	Prof Bavesh Kana
Nicola Cardoso (PhD)	University of Witwatersrand	Characterization of the electron transport chain in mycobacteria	Prof Bavesh Kana
Neo Mokhesi (MSc)	University of Cape Town	The investigation of miRNA expression in thyroid carcinoma among South African patients	Dr C Dandara
Kebareng Rakau (MSc)	Sefako Makgatho Health Science University	Molecular characterization of rotavirus infection in children attending Dr George Mukhari academic hospital and Oukasie Primary Healthcare and their association with histo blood group antigen profile	Dr Seheri and Dr Gedezho

NATIONAL HEALTH SCHOLARSHIP PROGRAMME (NHSP)

Zamasomi Luvuno (PhD)	University of KwaZulu-Natal	A Study of transgendered people access and management of sexual reproduction	TBC
Jenny Coetzee (PhD)	University of Witwatersrand	Factors affecting HIV infection amongst female sex workers in Soweto, South Africa	Prof G Gray, Co-Supervisor Prof Rachel Jewkes
Ferdinand Mukumbang (PhD)	University of the Western Cape	A realist evaluation of the antiretroviral treatment adherence club programme in the metropolitan area of the Western Cape Province, South Africa	Prof Brian van Wyk, Co Supervisor Prof Bruno Marchal and Dr Sara van Belle
Robyn Meissner (PhD)	University of Cape Town	A randomized control trail comparing occupational therapy interventions that aim to improve developmental outcomes for HIV-positive children (aged 6 months – 5 years)	Dr Gretchel, Co Supervisor Ramugondo

SAMRC RESEARCH CAPACITY DEVELOPMENT INITIATIVE POST-GRADUATE SCHOLARSHIP PROGRAMME

Ms Matume (PhD)	University of Venda	Diversity in APOBEC3 and CCR5 host genes and HIV-1 in a South African population	Prof Bessong
Ms Tanganedzani (MSC)	University of Venda	Determinants of adherence to HAART in a prospective HIV cohort in South Africa	Prof Bessong
Ms Sangweni (MSC)	University of Zululand	The Cardioprotective Effect of Lanostery Triterpene from protorhus Longifolia on H9c2 Cardiomyoblasts	Dr Rabia Johnson
Ms Malemela (MSC)	University of Limpopo	Investigation of the probable anti-cancer effects of the crude methanol extract of Dicerocaryum Senecioides, (Klotzch) J.Abels, leaves on cervical Hela cancer cells	Dr VG Mbazima

