Annual Research Symposium 2023

Date: 15-16 Aug
Venue: K-RITH Tower Building
Time: 8h30-15h00
It is a pleasure for me to write a short message wishing you well at our Annual Research Symposium.

This event is a flagship event in our academic calendar that provides an opportunity for staff and students to inform us of their current research projects, in a competitive manner. It is very much aligned to our new strategic plan and goal 3 of Excellent research, innovation and entrepreneurship.

Accelerating interdisciplinary research is at the heart of our goal as well as developing research leadership and capacity. Our mission also requires UKZN’s researchers to go further by conducting research of high quality leading to important new findings that impact the field of study and thereby enhance the stature of the institution.

Even further, our very own mandate is to drive research agendas that would shape the communities that we serve ensuring better care for our people. Browsing through this book of abstracts, I am impressed with not only the high standard of the studies but that many are novel findings. It is also impressive that the majority of our submissions are from our postgraduate students, the majority of whom we have supported through our CHS Scholarships.

Let’s take this opportunity to give substance to the University’s research mission and to display the talents of our research community and communicate the pre-eminence of the College’s research. I want to wish all presenters and adjudicators the best of luck. The process is a daunting one and I do not envy you.

- Professor Busisiwe Ncama
As I welcome you to our Annual Research Symposium, I would like to reflect on both our new strategic goals as a University and our mandate in terms of our partnership with the Department of Health in this province.

It is imperative that all of us, as healthcare professionals and scientists, produce research that is novel and impactful. I’m sure you can relate to the saying that as an academic and a scientist, you either ‘Publish or Perish’.

At UKZN, one of our research goals is Excellence and High Impact research. The research that we produce should enable Healthcare policies that uplift the lives of the communities we serve. Health research has high value to society and we should never forget this.

Having reviewed several of the studies that will be presented today, I am pleased with the standard and I’m confident that this new generation of scientists will be at the forefront of significant discoveries, the development of new therapies, and a remarkable improvement in health care and public health.

Science today is rapidly changing with technological advancements and it is becoming more complex with the rampant burden of diseases. Globally, scientists recognise the importance of working together, in diverse teams of excellence and expertise to find solutions to the ever changing healthcare landscape.

Revolutionary advances in the study of genetics, epigenetics and other markers of health and disease are now making it possible to identify, study and create more personalized approaches to health care which will lead to improvements in both the effectiveness and safety of therapies. It is important for you to recognise and embrace these changes in your research endeavours in order to make healthcare accessible to all. I want to wish you all the best as you present your studies and I want to encourage you to participate fully in the sessions.

- Professor Anil Chuturgoon
An NRF A1 rated scientist, CEO and President of the South African Medical Research Council (SAMRC), Professor Glenda Gray is a qualified pediatrician and co-founder of the internationally recognised Perinatal HIV Research Unit in Soweto, South Africa.

Prior to her appointment at the SAMRC, she was the Executive Director of the Perinatal HIV Research Unit, an affiliate of Wits University.

Glenda's global profile includes a role as Co-PI of the HIV Vaccine Trials Network (HVTN), an international collaboration for the development of HIV/AIDS prevention vaccines.

She has served as a Protocol Co-Chair of the multi-country Ensemble Study investigating the single-dose Ad26.COV2.S vaccine as an emergency response intervention.

She received South Africa’s highest honour – the Order of Mapungubwe - for her pioneering research in PMTCT. She is a member of the board of GARDP, AAHI and a member of the WHO TB-STAG.
Scientific Committee

- Prof Anil Chuturgoon (Dean: Research)
- Dr. Kgothatso E Machaba (Scientific Writer- CHS)
- Dr. Nireshni Mitchev (Postdoctoral Fellow)
- Dr. Bestinee Naidoo (Postdoctoral Fellow)
- Dr. Bongekile Ngobese (Postdoctoral Fellow)
- Dr. Nakita Reddy (Postdoctoral Fellow)
- Dr. Terisha Ghazi (Postdoctoral Fellow)

Adjudicators

- Dr. Kgothatso E Machaba
- Dr. OJ Pooe from UKZN Life Sciences Biochemistry.
- Dr Terisha Ghazi
- Dr. H Khumalo from UKZN Medical Biochemistry.
- Dr. N Hlengwa From UNIZULU Biochemistry and Microbiology.
- Dr. J Giandhari from KRISP.
- Dr. Ayanda Magwenyane from MUT.

Sponsors

- Beckman Coulter
- The Scientific Group
- Rodon Global
- ThermoFisher
- UKZN DVC: Research Office
- UKZN CHS
## PROGRAMME: 15-16 AUGUST 2023

### OPENING SESSION

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<tr>
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<tr>
<td>08h30</td>
<td>Introduction</td>
<td>Professor Anil Chuturgoon</td>
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<td>08h40</td>
<td>Official Welcome</td>
<td>Professor Busisiwe Ncama</td>
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<td>08h50</td>
<td>Introduction of Key-note speaker</td>
<td>Professor Mosa Moshabela DVC: Research</td>
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<td>08h55</td>
<td>Preventing Future Pandemics in SA</td>
<td>Professor Glenda Gray President: SAMRC</td>
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<tr>
<td>09h15</td>
<td>Q and A session</td>
<td>Professor Anil Chuturgoon</td>
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<tr>
<td>09h20</td>
<td>Closure</td>
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### SESSION 1: TRACK 1

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<th>Time</th>
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<tbody>
<tr>
<td>09h30</td>
<td>Dhaneshree Bestinee Naidoo</td>
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<tr>
<td>09h45</td>
<td>Vino Dorsamy</td>
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</tr>
<tr>
<td>10h00</td>
<td>Zama Ndloondo Princess Msibi</td>
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- **Dhaneshree Bestinee Naidoo**: Centella asiatica decreases nuclear factor kappa-beta (NF-κB) protein expression, decreases pro-inflammatory cytokine levels and modulates apoptosis in leukaemic (THP-1) cell
- **Vino Dorsamy**: Schistosomiasis in Pregnancy: Addressing the Neglect
- **Zama Ndloondo Princess Msibi**: Gold nanoparticle mediated gene delivery combined with oleanolic acid treatment confers enhanced gene expression in 6-hydroxydopamine-exposed PC12 cells
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<tr>
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<tr>
<td>10h15</td>
<td>Angezwa Siboto</td>
<td>Effect of rhenium (V) compound with uracil derived ligands on selected markers associated with cardiovascular function in diet-induced prediabetic rats.</td>
</tr>
<tr>
<td>10h30-11h00</td>
<td><strong>TEA BREAK</strong></td>
<td><strong>TEA BREAK</strong></td>
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<td>15 AUG</td>
<td><strong>SESSION 1: TRACK 2</strong></td>
<td><strong>SUSSER AND STEIN</strong></td>
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<tr>
<td>09h35</td>
<td>Eman Hussain Elmubarak Elhassan</td>
<td>Design of multifunctional biomimetic/pH-responsive hybrid NLCs for targeted delivery of vancomycin against MRSA-induced sepsis.</td>
</tr>
<tr>
<td>09h40</td>
<td>Kimera Tamzin Suthiram</td>
<td>Kojic acid induces mitochondrial stress in vitro human melanoma cells (SK-MEL1).</td>
</tr>
<tr>
<td>09h45</td>
<td>Gloria Sukali</td>
<td>Characterization of Candida isolates from South African pregnant and non-pregnant women.</td>
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<tr>
<td>09h50</td>
<td>John Alake</td>
<td>Fabrication of cheap and sensitive mitoxantrone electrochemical sensor based on iron oxide nanoparticles and black carbon from the recycling of used iron wool and tissue paper.</td>
</tr>
<tr>
<td>09h55</td>
<td>Darko Kwabena Adu</td>
<td>Electrochemical detection of artemisinin using cobalt sulphide-reduced graphene oxide nanocomposite</td>
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<tr>
<td>10h00</td>
<td>Sibusiso Mabizela</td>
<td>Evaluation of pharmaceutical inventory management challenges at public health facilities in King Cetshwayo district: A retrospective quantitative study</td>
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<tr>
<td>10h05</td>
<td>Shaik Bajibaba</td>
<td>Design and synthesis of quinoline-pyrimidine inspired hybrids as potential plasmodial inhibitors</td>
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### 15 AUG

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<tr>
<td>11h00</td>
<td>Kiara Ramchunder</td>
<td>Characterizing an essential Mycobacterium tuberculosis zinc metalloprotease Rv2017 as a potential novel target for drug discovery</td>
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<tr>
<td>11h15</td>
<td>Nakita Reddy</td>
<td>The in vitro and in vivo efficacy of novel metallo-β-lactamase inhibitors co-administered with meropenem to target CREs</td>
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<tr>
<td>11h30</td>
<td>Jessica Paken</td>
<td>Cisplatin-Associated Ototoxicity amongst Cervical Cancer Patients: A Prospective Cohort Study in South Africa</td>
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<tr>
<td>11h45</td>
<td>Nomusa Christina Mzimela</td>
<td>Immune Cell and Inflammatory Marker Status in Pre-diabetic Patients in the EThekwini District of Durban, South Africa</td>
</tr>
<tr>
<td>12h00</td>
<td>Silondoloze Mtanjana</td>
<td>Evaluation of the neutralization sensitivity between plasma and cerebrospinal fluid (CSF) derived HIV-1 subtype C clones.</td>
</tr>
<tr>
<td>12h15</td>
<td>Eman Abdallah Ismail Abdallah</td>
<td>Dual-decorated liposomes based on a novel targeting peptide and hyaluronic acid for enhanced and targeted therapy against bacterial infections and sepsis</td>
</tr>
<tr>
<td>12h30</td>
<td>Bongekile Ngobese</td>
<td>Low prevalence of macrolide resistance in Mycoplasma genitalium infections in a cohort of pregnant women living with human immunodeficiency virus</td>
</tr>
<tr>
<td>12h45</td>
<td>Xylia Quintina Peters</td>
<td>Therapeutic Path to Triple Knockout: Investigating the Pan-inhibitory Mechanisms of AKT, CDK9, and TNKS2 by a novel 2-Phenylquinazolinone derivative in Cancer Therapy- An In-Silico Investigation</td>
</tr>
<tr>
<td>13h00</td>
<td>Mbali Kubheka</td>
<td>Anti-HIVs of bioactive compound(s) isolated from Alternaria alternata.</td>
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<tr>
<td>13h15-14h00</td>
<td>LUNCH BREAK AND CLOSURE</td>
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<tr>
<td>15 AUG</td>
<td>SESSION 2: TRACK 2</td>
<td>SUSSER AND STEIN</td>
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<tr>
<td>11h00</td>
<td>Mayanka Naicker</td>
<td>Repositioning FDA approved drugs to identify potential Heat Shock Protein 90 inhibitors in cancer treatment</td>
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<tr>
<td>11h05</td>
<td>Sachin Balaso Mohite</td>
<td>Development of niosomes for encapsulating captopril-quercetin prodrug to combat hypertension</td>
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<tr>
<td>11h10</td>
<td>Nikita Nundlall</td>
<td>The Prevalence and Risk Factors for Genital Mycoplasmas in Human immunodeficiency virus infected pregnant women from King Edward VIII hospital</td>
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<td>11h15</td>
<td>Rumbidzai Chireshe</td>
<td>Diabetes Mellitus comorbidity and risk factors among HIV patients at primary care facilities in Harare, Zimbabwe</td>
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<tr>
<td>11h20</td>
<td>Letisha Girdhari</td>
<td>Synthesis and biological evaluation of novel β-lactam metallo β-Lactamase inhibitors</td>
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<td>11h25</td>
<td>Kayla Pillay</td>
<td>Phenotypic and genotypic diversity of Gardnerella vaginalis isolates from South African pregnant women.</td>
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<td>11h30</td>
<td>Omishka Hirachund</td>
<td>Mortality trends during the first three waves of the Covid-19 pandemic at a district level hospital in South Africa, a retrospective descriptive analysis</td>
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<td>11h35</td>
<td>Kimberleigh Bianca Govender</td>
<td>Facile Synthesis of Oxazolidinones as Potential Anti-bacterial Agents</td>
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<td>11h40</td>
<td>Pavalini Pillay</td>
<td>The efficacy of VAMMFT compared to “Bogota bag” in achieving sheath closure following temporary abdominal closure at index laparotomy</td>
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<tr>
<td>11h45</td>
<td>Caitlin Ramnarain</td>
<td>Genotyping of Chlamydia trachomatis from vaginal swabs by restriction analysis of the outer membrane protein gene</td>
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<td>11h50</td>
<td>Nelisiwe Zikhali</td>
<td>Determination of coreceptor usage of human immunodeficiency type 1 subtype C viruses from infants infected in-utero.</td>
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<td>11h55</td>
<td>Londiwe Cele</td>
<td>The role of E6/E7 mRNA in the prevalence and the progression of cervical neoplasia in High-Risk Human Papilloma Virus (HR-HPV) and Human Immunodeficiency virus (HIV) positive women in South Africa</td>
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<tr>
<td>12h00</td>
<td>Yasheen Maharaj</td>
<td>A retrospective review of autoimmune hepatitis at Inkosi Albert Luthuli Central Hospital</td>
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<td>12h05</td>
<td>Minenhle Siyabonga Buthelezi</td>
<td>Factors associated with metal constituents in indoor particulate matter in different communities in South Africa</td>
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<td>12h10</td>
<td>Mduduzi Rhini</td>
<td>Analysis of the physical demands of a competitive soccer match in South Africa in relation to playing positions.</td>
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<tr>
<td>12h15</td>
<td>Reratilwe Mphahlele</td>
<td>The epidemiology and factors that impact asthma outcomes of school-going adolescents in KwaZulu Natal, South Africa.</td>
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<tr>
<td>12h20</td>
<td>Boitumelo Setlhare</td>
<td>In vitro effect of Traditional Medicine (Product Nkabinde) on HIV and Chlamydia trachomatis co-infection.</td>
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<tr>
<td>12h25</td>
<td>Sabah Ismail</td>
<td>An analytical investigation into noise levels in public health sector neonatal intensive care units in the eThekwini District</td>
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<tr>
<td>12h30</td>
<td>Kiara Govender</td>
<td>The Probiotic Effect of Yoghurt and Lactobacillus Species Strains Isolated from Yoghurt on the Reduction of Vulvovaginal Candidiasis</td>
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<tr>
<td>12h35</td>
<td>Thandeka Innocentia Kubheka</td>
<td>The evolution of anti-Tat antibodies and its role in the development of prophylactic and therapeutic HIV-1 vaccine.</td>
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**LUNCH BREAK AND CLOSURE**

**DAY TWO**

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<th>SESSION 3, TRACK 1</th>
<th>K1 AND K2</th>
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<tr>
<td>8h30</td>
<td>Bongeka Mkhize</td>
<td>Does RAAS activity in prediabetes contribute to the development of osteoporosis</td>
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<td>8h45</td>
<td>Melendhran Pillay</td>
<td>Emergence of Dolutegravir resistance in integrase strand transfer inhibitor-naïve patients in KwaZulu-Natal, South Africa</td>
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<tr>
<td>9h00</td>
<td>Christiaan Arnoldus Gouws</td>
<td>Synthesis, radiolabeling and preliminary in vitro assessment of novel radiopharmaceuticals as potential bacterial-specific radiotracers using positron emission tomography imaging.</td>
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<tr>
<td>9h15</td>
<td>Lonwabo Njani</td>
<td>Prevalence, knowledge, and association of dietary supplement usage among University of KwaZulu-Natal students.</td>
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<tr>
<td>9h30</td>
<td>Ntokozo Ntshangase</td>
<td>Extensive Epitope Mapping and Longitudinal HIV-1 Env Sequencing in an Individual Infected with Subtype C who Developed Broadly Neutralizing Antibodies</td>
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<tr>
<td>9h45</td>
<td>Nireshni Mitchev</td>
<td>Assessment of antibiotic resistance and efflux pump gene expression in Neisseria gonorrhoeae isolates by qPCR and regression analysis</td>
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<tr>
<td>10h00</td>
<td>Theolan Adimulam</td>
<td>Polymorphisms within the SARS-CoV-2 human receptor genes associates with variable disease outcomes across ethnicities</td>
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<tr>
<td>10h15</td>
<td>Mamokoena Kuali</td>
<td>Effect of endogenous and exogenous female sex hormone levels on human immunodeficiency type 1 subtype C (HIV-1C) latent reservoir reactivation</td>
</tr>
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<td>10h30-11h00</td>
<td>TEA BREAK</td>
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<td>Time</td>
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<tr>
<td>08h30</td>
<td>Fahima Moosa</td>
<td>Investigating the effectiveness of a web-based learning tool to improve isiZulu clinical communication skills</td>
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<tr>
<td>08h35</td>
<td>Makabongwe Mazibuko</td>
<td>Patulin alters the alpha-1 adrenergic receptor signalling and induces epigenetic modifications in the kidneys of C57BL/6 mice</td>
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<td>08h40</td>
<td>Deshanta Naicker</td>
<td>Investigating the Host-Binding Properties of Neisseria Gonorrhoeae in South African Population</td>
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<td>08h45</td>
<td>Mbuso Sibazo</td>
<td>Sport Science and Non-Sport Science Students’ Motivations and Barriers for Gym Based Exercise in a University Gym Setting</td>
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<td>08h50</td>
<td>Palesa Mosili</td>
<td>The association between HPA axis activity and prediabetes in patients</td>
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<tr>
<td>08h55</td>
<td>Nombuso Xulu</td>
<td>The effects of oleanolic acid (OA) on red blood cell structure and function in pups born from L-NAME induced preeclamptic dams</td>
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<td>09h00</td>
<td>Siphamandla Mkhize</td>
<td>Assessing Healthcare Practitioner’s knowledge, perceptions and practices about diabetes screening at Primary Healthcare Clinics (PHC) at Ethekwini North in KwaZulu Natal.</td>
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<td>09h05</td>
<td>Sbongumusa Dlamini</td>
<td>Efflux pump inhibitory nanostructured lipid carriers for enhanced delivery of antibiotics</td>
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<td>09h10</td>
<td>Nelao Mhata</td>
<td>Prevalence of depression, anxiety and burnout in medical students at the University of Namibia</td>
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<td>09h15</td>
<td>Kieran John Jacoby</td>
<td>Epigenetic alteration of M. tuberculosis complex strains during exposure to cholesterol reveal unique methylome motifs</td>
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<tr>
<td>09h20</td>
<td>Thilona Arumugam</td>
<td>Decoding the Role of DNA Methylation on HIV pathogenesis</td>
</tr>
<tr>
<td>09h25</td>
<td>Aaliyah Mangerah</td>
<td>Virtual screening of the South African Natural Compounds Database for the identification of potential inhibitors against M. tuberculosis MmpL3.</td>
</tr>
<tr>
<td>09h30</td>
<td>Siphamandla Nyawose</td>
<td>The Effects of Consuming Amino Acids L-Arginine, L-Citrulline (and in Combination) as a Beverage or Powder on Athletic Performance. A Systematic Review</td>
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<tr>
<td>09h35</td>
<td>Husna Mohamed</td>
<td>The awareness, Attitudes and Perceptions of young adults towards leisure noise at a University in Durban, South Africa.</td>
</tr>
<tr>
<td>09h40</td>
<td>Anmol Gokul</td>
<td>Investigating the role of 2', 5'-oligoadenylates-1 in HIV infection</td>
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10h30-11h00 TEA BREAK

16 AUG  SESSION 4, TRACK 1  K1 AND K2

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<tr>
<td>11h00</td>
<td>Oyesanmi A Fabunmi</td>
<td>High-dose oral contraceptives induce hyperinsulinemia without altering immune activation in diet-induced obesity which persists even following a dietary low-fat diet intervention.</td>
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<tr>
<td>11h15</td>
<td>Aabida Khan</td>
<td>Case series: describing clinical features of INSTI naïve patients with DTG resistance in KwaZulu-Natal.</td>
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<tr>
<td>11h30</td>
<td>Darian Naidu</td>
<td>Anti-HIV-1 activities of Alternaria alternata partially purified bioactive secondary metabolites on different HIV subtypes</td>
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<tr>
<td>11h45</td>
<td>Nokuthula Mtshali</td>
<td>Diabetes Related Knowledge, Attitude And Practice Towards Exercise And Its Benefits Among Individuals With Type-2 Diabetes Mellitus</td>
</tr>
<tr>
<td>12h00</td>
<td>Mthokozisi Bongani Nxumalo</td>
<td>Hexacyclen(1,4,7,10,13,16-Hexaazacyclooctadecane) Induced ROS/RNS-Mediated Apoptosis and Downregulated NF-κB Cell Survival Pathway in Colorectal Adenocarcinoma (Caco2) Cells.</td>
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<tr>
<td>12h15</td>
<td>Ishani Dayaram</td>
<td>SARS-CoV-2 in South Africa: A descriptive epidemiological study</td>
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<tr>
<td>12h30</td>
<td>Zekhethelo Mkhwanazi</td>
<td>Programmed Death-ligand 1 expression on t lymphocytes is associated with β2-microglobulin levels in treatment-naive patients with chronic Lymphocytic Leukaemia</td>
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**13H00-14H00** LUNCH BREAK
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<td>11h00</td>
<td>Shoohana Singh</td>
<td>Differential expression of the angiotensin receptors (AT1, AT2, and AT4) in the placental bed of HIV-infected preeclamptic women of African ancestry</td>
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<tr>
<td>11h15</td>
<td>Shreyal Maikoo</td>
<td>Effect of HIV-1C Transmitted/Founder Viruses 5’ LTR Genetic Variation on Viral Reservoir Size and Latency Reversal Potential</td>
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<tr>
<td>11h30</td>
<td>Jivanka Mohan</td>
<td>Antiretrovirals Promote Insulin Resistance in HepG2 Liver Cells through miRNA Regulation and Transcriptional Activation of the NLRP3 Inflammasome</td>
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<tr>
<td>11h45</td>
<td>Thabani Sibiya</td>
<td>Spirulina platensis Ameliorates Oxidative Stress Associated with Antiretroviral Drugs in HepG2 Cells</td>
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<tr>
<td>12h00</td>
<td>Siqiniseko Sinikiwe</td>
<td>Moringa oleifera Lam Leaf Extract Stimulates NRF2 and Attenuates ARV-Induced Toxicity in Human Liver Cells (HepG2)</td>
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<tr>
<td>12h15</td>
<td>Khulekani Dlamini</td>
<td>Perceptions of South African Athletes with Disabilities to Optimize Participation in Sport During Global Pandemics such as COVID-19.</td>
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<tr>
<td>12h30</td>
<td>Kimona Kisten</td>
<td>Evaluating the Impact of C171Q Mutation on the Potency of Thiolactomycin to M. tuberculosis KasA Binding Pocket: Insights from Molecular Dynamics Simulations and Tailored-Pharmacophore Studies</td>
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<td>Time</td>
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<td>12h45</td>
<td>Khanyisile Mngomezulu</td>
<td>Combination of traditional medicine product (SDK-2) with TNF-alpha synergistically reactivate latent HIV-1 subtype C virus in vitro</td>
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<tr>
<td>13h00-14h00</td>
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<td>LUNCH BREAK</td>
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<td>14h30-15h00</td>
<td>AWARDS CEREMONY</td>
<td>K1 AND K2</td>
</tr>
</tbody>
</table>
CENTELLA ASIATICA DECREASES NUCLEAR FACTOR KAPPA-BETA (NF-κB) PROTEIN EXPRESSION, DECREASES PRO-INFLAMMATORY CYTOKINE LEVELS AND MODULATES APOPTOSIS IN LEUKAEMIC (THP-1) CELLS

Dhaneshree Bestinee Naidoo, Alisa Phulukdaree 1, Anil Amichund Chuturgoon 1 and Vikash Sewram 2, 3

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2 African Cancer Institute and 3 Division of Health Systems and Public Health, Department of Global Health, Stellenbosch University.

The medicinal plant Centella Asiatica possesses many beneficial properties. An ethanolic Centella Asiatica leaf extract (C) and a fraction of C (C3) were obtained in our previous study. This study aimed to examine the anti-inflammatory and anti-proliferative effects of C and C3 in leukaemic (THP-1) cells.

In THP-1 cells, cytotoxicity of C and C3 were evaluated (WST-1 viability assay; 24 h and 72 h; [0.1 mg/ml]). Oxidant scavenging activity (spectrophotometry), cytokine (TNF-α, IL-6, IL-1β and IL-10) concentrations (ELISA), nitrite levels (Griess assay), caspase activities (luminometry) and nuclear factor kappa-beta (NF-κB: p50, p65) protein expressions (western blotting) were assessed.

THP-1 viability was decreased (24 h) and increased (72 h) by C and C3 (p<0.003). Oxidant scavenging activity was increased by C and C3 (p<0.0001). In THP-1 cells, C and C3 decreased nitrite, TNF-α, IL-1β, and IL-6 whereas increased IL-10 levels (p<0.0001). Notably, C3 demonstrated a greater effect than C. In THP-1 cells, C and C3 decreased NF-κB (p50, p65) protein expressions (p<0.0001). At 24 h, C and C3 increased caspase (-8, -9, -3/7) activities (p<0.0001) while at 72 h, C and C3 modulated caspase activities (p<0.009).

Taken together, C and C3 elicited anti-inflammatory and anti-proliferative (24 h) effects in THP-1 cells.
SCHISTOSOMIASIS IN PREGNANCY: ADDRESSING THE NEGLECT

Vino Dorsamy, Chauntelle Bagwandeen

School of Nursing and Public Health

Introduction
Infection with Schistosomiasis (SCH) in pregnancy may lead to adverse outcomes. Controversies about the safe treatment of SCH during pregnancy still exist. In order to effectively test and treat, the prevalence of SCH in a pregnant population requires determination.

Aims
To determine the prevalence of Schistosoma haematobium in pregnancy
To compare the accuracy of PCR testing to standard microscopy

Methods
Sample: 220 pregnant women attending a district hospital in Durban
Urine was analysed for S. haematobium by microscopy. DNA was subjected to PCR using SCH-specific primers. Amplicons were sequenced to confirm the identity of products. The sensitivity of PCR was compared to microscopy.

Results
S. haematobium was diagnosed in 5.9% of women by both microscopy and PCR. Of these, 69.2% had heavy-intensity of infection, 36.4% had pre-eclampsia, and 38.5% had low birth weight babies. Younger age was significantly associated with infection (p=.013). Sequencing analysis confirmed PCR products generated were from Schistosoma species. Receiver operator characteristic analysis was 1 making PCR an excellent classifier compared to microscopy.

Discussion and Conclusion
The prevalence of SCH was 5.9%. The PCR technique was as sensitive as microscopy with the advantages of ease of use, reduction of observer bias, and higher throughput. SCH should be tested for in pregnancy, and treated.
GOLD NANOPARTICLE MEDIATED GENE DELIVERY COMBINED WITH OLEANOLIC ACID TREATMENT CONFERS ENHANCED GENE EXPRESSION IN 6-HYDROXYDOPAMINE-EXPOSED PC12 CELLS

Zama Ndlondlo Princess Msibi, Musa Mabandla.

School of Laboratory Medicine and Medical Sciences

Introduction
The use of gold nanoparticles (AuNPs) as gene delivery vectors is rapidly emerging as an effective alternative to traditional vectors. With safer, more effective vectors, the potential for gene therapy to provide a disease-modifying alternative has offered promise as an effective treatment for Parkinson’s disease (PD), an incapacitating neurodegenerative disorder. A combination of gene therapy and effective neuroprotective agents such as oleanolic acid (OA), a biologically active pentacyclic triterpenoid compound that has been shown to ameliorate early-stage PD symptoms in cell cultures in animal models, may provide effective symptom relief with a possible disease-modifying effect.

Aim
The aim of this study was to investigate the therapeutic effect of AuNP-mediated human gene delivery, in combination with OA treatment on PC12 cells exposed to the neurotoxin 6-hydroxydopamine.

Methods
NHS functionalized AuNPs, with PEG spacer molecule were separately ligated to human amino acid decarboxylase and GTP Cyclohydrolase 1 genes. A combination of gene therapy and OA treatment was performed on 6-hydroxydopamine exposed PC12 cells. We made use of the MTT assay in assessment of cell viability; gene expression studies for transgene uptake by the host genome; dopamine ELISA essay for dopamine production assessment; and TEM for analysis of AuNP uptake by PC12.

Results
The AuNP-gene constructs successfully transduced PC12 cells with no significant cytotoxicity observed, as evidenced by the expression of both human genes, enhanced dopamine production and cell viability analyses, with observed endocytosis of AuNPs.

Conclusion
Combination of gene therapy and OA treatment provides an enhanced effect on dopamine production and cell viability, which may potentially provide an improved effect of Parkinsonian symptom relief.
EFFECT OF RHENIUM (V) COMPOUND WITH URACIL DERIVED LIGANDS ON SELECTED MARKERS ASSOCIATED WITH CARDIOVASCULAR FUNCTION IN DIET-INDUCED PREDIABETIC RATS.


Background
Prediabetes is closely associated with several diseases such as cardiovascular disease (CVD). Metformin is used to manage prediabetes and CVD complications but has been shown to have reduced efficacy in the absence of lifestyle intervention. This study sought to investigate whether the novel rhenium (V) compound can prevent CVD in diet-induced prediabetic rats in both the presence and absence of dietary intervention.

Methods
Prediabetes was induced in rats using a high-fat carbohydrate diet. The rats were then treated for 12 weeks with rhenium (V) compound while selected parameters such as lipid profile, blood pressure, glutathione peroxidase (GPx), and total superoxide dismutase (SOD) were measured and lastly, the inflammatory status in the cardiac tissue was measured on selected inflammatory markers that include cardiac CRP, plasma IL-6 and TNF-α.

Results
The administration of the rhenium (V) compound resulted in a significant reduction of total cholesterol, low-density lipoproteins, triglycerides, and BMI. It also ameliorated high blood pressure with a concomitant increase in nitric oxide and high-density lipoprotein levels.

Conclusion
Rhenium (V) compound possesses cardio-protective effects by preventing and restoring lipid and hemodynamic profiles in prediabetic rats. These preclinical observations may suggest that investigated rhenium (V) compound can attenuate prediabetes-associated cardiovascular complications.
Cancer remains a global threat due to its impact on growing life expectancy. With the many efforts and methods of combating the disease, complete success remains a challenge. Aberrant DNA methylation is understood to be the primary reason for improper gene silencing, which can result in carcinogenesis and tumor progression.

DNA methyltransferase B (DNMT3B) enzyme is considered a potential target for the treatment of several cancers due to its important role in DNA methylation. However, only a few DNMT3B inhibitors have been reported. Herein, in silico molecular recognition techniques such as Molecular docking, Pharmacophore-based virtual screening, and MD simulation were employed to identify potential inhibitors of DNMT3B that can halt aberrancy in DNA methylation. Therefore, the study aims to evaluate specific natural compounds as initial lead compounds for predicting potential inhibitors of DNMT3B using in silico modeling techniques.

Findings initially identified 878 hit compounds based on a designed pharmacophore model from the reference compound Hypericin. Molecular docking was used to rank the hits by testing their efficiency when bound to the target enzyme and the top 3 were selected. Molecular dynamic simulation of the final 2 hits showed good stability, flexibility, and structural rigidity of the compounds on DNMT3B.

Finally, thermodynamic energy estimations show both compounds had favorable free energies comprising -26.04kcal/mol for Zinc77235130 and -15.73kcal/mol for Zinc33330198. Zinc77235130 showed consistency in favorable results across all the tested parameters and was thus selected as the lead compound for further experimental validation. The identification of this lead compound will form an important basis for the inhibition of aberrant DNA methylation in cancer therapy.
DESIGN OF MULTIFUNCTIONAL BIOMIMETIC/PH-RESPONSIVE HYBRID NLCS FOR TARGETED DELIVERY OF VANCOMYCIN AGAINST MRSA-INDUCED SEPSIS

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4 Discipline of Human Physiology, UKZN

The fight against bacterial sepsis requires innovative strategies to improve the targeting and effectiveness of antibiotics. The use of biomimetic/stimuli-responsive nanocarriers shows significant potential in enhancing the treatment of bacterial sepsis and overcoming antimicrobial resistance.

In this study, a novel hyaluronic acid-lysine conjugate (HA-Lys) was synthesized for the formulation of multifunctional biomimetic/pH-responsive hybrid NLCs loaded with vancomycin (VCM-HNLCs) to treat MRSA sepsis. The HA-Lys conjugate was synthesized and characterized by FTIR, H1NMR, and C13NMR. VCM-HNLCs were prepared using a hot homogenization ultrasonication technique and had an average particle size, PDI, ZP, EE%, and DL% of 111.7+-0.814nm, 0.101+-0.014, -2.44+-0.571mV, 76.27+-1.200% and 8.36+-0.250%, respectively.

In vitro, biocompatibility studies demonstrated the biosafety and non-hemolytic activity of VCM-HNLCs. VCM-HNLCs showed faster drug release at pH 6 than pH 7.4 and exhibited enhanced and pH-dependent antibacterial and biofilm eradication activities, with a significant efflux pump inhibitory activity against MRSA, compared to bare VCM. In silico simulations and MST studies confirmed the strong binding affinity of VCM-HNLCs to Toll-like receptor2 (TLR2) compared to its natural substrate.

In conclusion, the results demonstrate the potential of VCM-NLCs as novel multifunctional nanocarriers to reduce the spread of AMR-bacteria and improve the clinical outcome of VCM use in sepsis management.
Kojic acid (KA, 5-hydroxy-2-hydroxymethyl-4-pyrone), a well-known skin lightener, chemo-sensitizes complex III inhibitors disrupting mitochondrial respiration in fungi. The mitochondrial effect of KA in humans has not been studied. Therefore, this study determined the mitochondrial effect of KA in melanoma cells by assessing mitochondrial output (MTT assay and ATP luminometry), oxidative damage (protein carbonyls and TBARS), membrane integrity (LDH assay), antioxidant responses and mitochondrial homeostasis proteins (Western Blot). KA increased cell viability and the concentration with the highest cell survival (100 µg/ml) displayed the greatest decrease in ATP levels. To determine the effect of depleted ATP, we assessed oxidative damage and the subsequent initiation of antioxidant responses. The oxidative stress marker (MDA) was increased at lower concentrations (25 and 100 µg/ml). In the presence of oxidative stress, antioxidant responses are initiated to reduce damage to susceptible macromolecules. LDH levels were decreased, indicating that cell membranes were not damaged by KA treatment. KA caused protein oxidation and increased Lon protease expression. Sirtuin 3 expression was decreased at all concentrations. In conclusion, KA initiated protein damage resulting in mitochondrial stress which activated mitochondrial homeostasis initiators and impaired mitochondrial output.
CHARACTERIZATION OF CANDIDA ISOLATES FROM SOUTH AFRICAN PREGNANT AND NON-PREGNANT WOMEN

Gloria Sukali, Prof Nathlee Abbai, Dr Nonkululeko Mabaso.

Clinical Medicine

Candida infections are a serious health threat to women. Over the years increased drug resistance pattern has been observed, and characterization of candida isolates has become the gold standard method used in determining antimicrobial susceptibility profiles and resistance mechanisms in vaginal Candida infection. However, there is a lack of data on the antimicrobial susceptibility profiles of South African Candida isolates to amphotericin B. The current study aims to fill this gap.

A total of 72 Candida isolates obtained from Self-collected vaginal swabs were obtained by culture. The isolates were typed using the ABC genotyping method. Susceptibility testing was performed using the broth microdilution assay to measure the minimal inhibitory concentrations (MICs) for clinical isolates of amphotericin B. Statistical analyses were conducted using STATA where P-values ≤0.05 were considered significant.

The majority of the isolates yielded genotype A followed by Genotype B and C with the prevalence of 62.5%, 26.4%, and 11.11%, respectively. Of the 72 isolates tested, 79.2% of the isolates were resistant to amphotericin B and 20.8% of the isolates were susceptible to amphotericin B.

The current study had a high level of resistance to the antifungal amphotericin B. There is a need for antimicrobial resistance (AMR) monitoring.
FABRICATION OF CHEAP AND SENSITIVE MITOXANTRONE ELECTROCHEMICAL SENSOR BASED ON IRON OXIDE NANOPARTICLES AND BLACK CARBON FROM THE RECYCLING OF USED IRON WOOL AND TISSUE PAPER.

John Alake, Zondi Nate, Darko Kwabena Adu, Blessing Wisdom Ike, Ruchika Chauhan, and Rajshekhar Karpoormath.

1 Department of Pharmaceutical Chemistry, UKZN.
2 Department of Biotechnology & Chemistry, Faculty of Applied and Computer Sciences, Vaal University of Technology.
3 Rhodes University Biotechnology Innovation Centre (RUBIC), Rhodes University.

Introduction
Mitoxantrone is a valuable chemotherapy anticancer drug. Developing rapid and sensitive detection and quantification techniques for mitoxantrone is crucial for monitoring treatment, cancer research, and pharmaceutical analysis. The previous works have demonstrated the tremendous efficiency and advantages of the electrochemical detection of mitoxantrone. Despite the prospect of the previously reported electrochemical sensors for mitoxantrone, there is still room for more cost-effective, sensitive, and simple alternatives.

Aim
The aim was to research an electrochemical sensor with a cheaper source of electrode materials through recycling. The current study successfully recycled domestically used iron wool and tissue paper wastes into functional electrode materials: iron oxide nanoparticles (Fe3O4) and black carbon (BC).

Methods
The synthesis of BC was achieved by completely charring used tissue paper in sulphuric acid followed by ultrasonic disintegration. Also, Fe3O4 NP was synthesised through a simple, rapid rusting of iron chippings with hydrogen peroxide. The materials were then mixed to produce nanocomposite Fe3O4 NP: BC. Cyclic voltammetry and differential pulse voltammetry were used to study the behaviour of the modified electrodes toward Tenofovir.

Results
The result showed that combining the two materials in a Fe3O4 NP: BC = 1:2 ratio improved the active surface area of the carbon electrode and conferred superior electrocatalytic properties compared to the individual materials. The Fe3O4 NP: BC modified electrode was highly sensitive towards mitoxantrone with a linear range of 5 ×10^-6 to 1.0×10^-4 M and a detection limit of 2.55 ×10^-10 M. The current electrode’s detection limit is lower than all the DNA-based electrodes reported for the drug and is the simplest electrode reported.

Conclusions
The approach used to recycle these materials from their respective starting material is the simplest compared to other recycling methods reported. The current electrode’s detection limit is lower than all but one of the electrodes reported for the reported whiles being the simplest and cheapest. The current research is the first to report this synthetic approach to obtaining iron oxide and black carbon composite.
ELECTROCHEMICAL DETECTION OF ARTEMISININ USING COBALT SULPHIDE-REDUCED GRAPHENE OXIDE NANOCOMPOSITE.

Darko Kwabena Adu, John Alake, Blessing Wisdom Ike

School of Health Sciences

The increase in the sale of counterfeit drugs in developing countries calls for the development of an affordable analytical tool to strengthen quality control measures to eradicate the counterfeiting of drugs. Due to this, a Cobalt sulphide-reduced graphene oxide (CoS/rGO) nanocomposite was synthesized using the solvothermal method and used to fabricate an electrochemical sensor for the detection of artemisinin. The CoS/rGO nanocomposite was characterized using X-ray diffraction spectroscopy, Fourier transform infrared spectroscopy, scanning electron microscopy, and Transmission electron microscopy. The electrochemical sensor was fabricated by modifying the surface of the glassy carbon electrode with CoS/rGO nanocomposite. A differential pulse voltammetric technique was used for the detection of artemisinin. A detection limit of 0.0148 µM with a linear range of 30-100 µM was obtained under optimum conditions. The CoS/rGO nanocomposite illustrated selectivity towards artemisinin in the midst of interfering agents and in the urine matrix. Therefore, CoS/rGO nanocomposite can be used to synthesize an electrochemical sensor for the quality control of drugs.
EVALUATION OF PHARMACEUTICAL INVENTORY MANAGEMENT CHALLENGES AT PUBLIC HEALTH FACILITIES IN KING CETSHWAYO DISTRICT: A RETROSPECTIVE QUANTITATIVE STUDY

Sibusiso Mabizela, Prof. Varsha Bangalee

College of Pharmaceutical Sciences.
Hilma Nambili Nakambale, College of Pharmaceutical Sciences

Introduction: This study evaluates the relationship between overstocking, stockouts, and expiry-related wastages in King Cetshwayo District, KwaZulu-Natal, South Africa. It also seeks to understand how redistribution was implemented to address these pharmacy inventory management challenges.

Methods: This retrospective quantitative study was based on records of a basket of 392 essential medicines used in public healthcare facilities within the district. A Pearson’s correlation analysis was used to test the association between stockouts, overstocking, and expiry-related wastage. Additionally, linear regression analysis was used to test if stockouts, overstocking, and expiry predicted redistribution. Descriptive statistics were used to report the extent of these challenges.

Results: The study found no significant relationship between stockouts and either overstocking or expiry-related wastage. However, a moderate positive correlation was observed between overstocking and expiry-related wastage ($r^2 = 0.47$, p-value = 0.020). Stockouts accounted for 4.5% of the variance in redistribution (p-value < 0.01), while overstocking and expiry-related wastage explained 68% of the variance ($r^2 = 0.68$, p-value < 0.001). Salbutamol inhalants (4.0%), paracetamol tablets (3.5%), and azithromycin tablets (3.3%) were the most commonly stocked-out medicines.

Conclusion: Our findings indicate a need to implement measures to improve pharmacy inventory management, availability surveillance and standardise redistribution practices.
DESIGN AND SYNTHESIS OF QUINOLINE-PYRIMIDINE INSPIRED HYBRIDS AS POTENTIAL PLASMODIAL INHIBITORS

Shaik Baji Baba, Francis Kayamba, Mohite Sachin, Karpoormath Rajshekhar*

Department of Pharmaceutical Chemistry, UKZN

Artemisinin-based combination therapy is the first-line therapy of Plasmodium falciparum malaria. Proteases that are expressed during the erythocytic stage of Plasmodium falciparum are newly explored drug targets for the treatment of malaria. Research on antimalarial pharmacophores revealed that, in addition to other vast medicinal properties, the pyrimidine moiety displayed admirable antimalarial properties.

Objective: Design and synthesis of novel quinoline-pyrimidine hybrids and evaluation of their inhibitory activity against the NF54 chloroquine-susceptible strain as a promising class of antimalarial compounds.

Method: The promising anti-plasmodial activity of the synthesised analogues were designed using molecular hybridization approach, synthesized by new chemical routes and performed in vitro antiplasmodial activity.

Conclusion: The anti-plasmodial screening revealed that most analogues showed promising to potent activity with half-maximal inhibitory concentration IC50:0.32μM-4.30μM. Compound with 1,4-diamine butyl linker and 4-hydroxyl phenyl on fourth and sixth position of pyrimidine found the most prominent activity with an IC50 of 0.32±0.06 μM, with a favourable safety profile of 9.79 to human kidney epithelial (HEK293) cells.

Presenter’s e-mail address: shaikphd@gmail.com
Tuberculosis (TB) is the single most infectious bacterial disease in the world. The intracellular pathogen Mycobacterium tuberculosis (Mtb) causes almost two million deaths annually. Despite TB being curable, total eradication of it is difficult for many reasons such as drug resistance. It is therefore imperative that new treatment strategies emerge. Zinc metalloproteases are virulence factors that contribute to the pathogenicity of bacterial species. Mtb possesses novel zinc metalloproteases which are hypothesized to represent promising pharmacological targets. This project aims to characterize the role of the essential Mtb Rv2017 zinc metalloprotease and to deduce its potential as a new target for drug discovery. This was accomplished through the creation of a gene knock-down mutant strain with reduced expression of the target gene using the CRISPRi-dCas9 system. Thereafter, an examination of the mutant’s growth, physiology, antimicrobial tolerance, and virulence was conducted. Bioinformatics analysis revealed that Rv2017 potentially regulates the repair of DNA damage. Additionally, the mutant strain displayed slow and stunted growth, impaired biofilm formation, and exhibited increased susceptibility to antibiotics and UV light. The results indicate that the Rv2017 gene does contribute to the growth and physiology of Mtb and therefore could serve as a new drug target; potentially revolutionizing TB treatment.
β-lactams are the most prescribed class of antibiotics due to their potent, broad-spectrum antimicrobial activities. However, alarming rates of antimicrobial resistance now threaten the clinical relevance of these drugs, especially for the carbapenem-resistant Enterobacterales (CRE) expressing the metallo-β-lactamases (MBLs).

Antimicrobial agents specifically targeting these enzymes to restore the efficacy of last resort β-lactam drugs, are desperately needed. Herein, we present a cyclic zinc chelator covalently attached to a β-lactam scaffold i.e., BP1. Observations from in vitro assays have indicated that BP1 restored the efficacy of meropenem to < 0.5 mg/L, with sterilizing activity occurring from 8 hours post-inoculation.

Furthermore, BP1 was non-toxic against human hepatocarcinoma cells (IC50 > 1000 mg/L) and did not inhibit the human zinc-containing enzyme glyoxylase II up to 500 μM. Enzyme inhibition studies and molecular docking of BP1 with NDM-1 and VIM-2 shed light on BP1’s mode of action. In Klebsiella pneumoniae NDM-infected mice, BP1 co-administered with meropenem was efficacious in reducing the bacterial load by > 3 log10 units post-infection.

The findings herein propose a favourable therapeutic combination strategy that restores the activity of the carbapenem antibiotic class and complements the few MBL inhibitors under development, with the ultimate goal of curbing antimicrobial resistance.
CISPLATIN-ASSOCIATED OTOTOXICITY AMONGST CERVICAL CANCER PATIENTS: A PROSPECTIVE COHORT STUDY IN SOUTH AFRICA

1Jessica Paken*, 1Cyril D. Govender, 1Mershen Pillay, 2Merga B Feyasa, 3Vikash Sewram*

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3African Cancer Institute, Department of Global Health, Faculty of Medicine and Health Sciences, Stellenbosch University

Cisplatin remains a popular cancer chemotherapeutic, despite an irreversible ototoxic effect on patients’ auditory systems. However, there is a paucity of epidemiological information on its extent and severity during cervical cancer treatment.

Using a prospective cohort study design, 82 patients with cervical cancer, receiving weekly cisplatin chemotherapy (50 mg/m2 body surface) at a tertiary-level hospital in South Africa, underwent audiological assessments at various intervals. We describe the temporal impact of cisplatin exposure on hearing loss, its combined effect with HIV infection, and estimate ototoxicity incidence in this cohort. The median age was 52 years with Stages IIB (45%) and IIIB (35.4%) cancers being most common.

Complaints of reduced hearing sensitivity increased significantly (p<0.0001). Bilateral, asymmetrical sensorineural hearing loss, with greater effect in the extended high-frequency range, was evident. Cisplatin dosage was significantly associated with ototoxicity severity at one- (p=0.017), three- (p=0.010), and six-month (p=0.015) post-treatment follow-up. HIV-seropositivity (53.7%) was significantly associated with NCI-CTCAE Grading Scale at three- (p=0.022) and six months (p=0.023) post-treatment. Multiple Tobit regression revealed a cumulative dose effect bilaterally, after adjustment for age and HIV status, evident from 9000Hz and above in the right ear. The incidence was ototoxicity was 98% at a cumulative dose of 150mg/m2.

The findings of this epidemiologic study highlight the temporal course and severity of ototoxicity experienced by cervical cancer patients treated with cisplatin, with greater impact in the HIV-positive subgroup, thus underscoring the need for audiological monitoring and timely interventions in this cohort.
IMMUNE CELL AND INFLAMMATORY MARKER STATUS IN PRE-DIABETIC PATIENTS IN THE ETHEKWINI DISTRICT OF DURBAN, SOUTH AFRICA

Nomusa Christina Mzimela, Aubrey Mbulelo Sosibo, Phikelelani Siphosethu Ngubane, and Andile Khathi

Department of Human Physiology, UKZN

Prediabetes is an intermediate state between normoglycaemia and type 2 diabetes. Pre-diabetes is characterized by moderate insulin resistance. Insulin resistance triggers the immune response and inflammation. This study sought to investigate the changes in immune cell concentration during the prediabetic state in the eThekwini district in Durban, South Africa.

A study was conducted with a blood sample population (n= 292) from ages 25 to 45 years, collected from King Edward Hospital upon approval by UKZN Biomedical Research Ethics Committee. Samples were divided into a non-diabetic group (n=30), a pre-diabetes group (n=90), and a type 2 diabetes group (n=172) upon confirmation using ADA criteria. The immune cell concentration of experimental groups was measured by a haemocytometer. The cytokines were measured by multiplex assay and ELISA. The results showed a decrease in neutrophils, lymphocytes, and monocytes percentage and an increase in eosinophils and basophils percentage in the PD group by comparison with the ND group.

A significant increase in TNF-α concentration, increase in CD40L, and fibrinogen in the PD group by comparison with the ND group was reported. A clinical decrease in CRP, IL-6, and p-selectin concentrations in the PD group by comparison with the ND group was also observed. Changes in immune cells and inflammatory markers observed indicate that there is immune activation.
EVALUATION OF THE NEUTRALIZATION SENSITIVITY BETWEEN PLASMA AND CEREBROSPINAL FLUID (CSF) DERIVED HIV-1 SUBTYPE C CLONES.

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Introduction
Antiretroviral therapy (ART) is effective in the prevention and treatment of HIV. However, the major challenge in achieving cure is the establishment of viral reservoirs. Broadly neutralizing antibodies (bNAbs) are promising as an alternative to ART. Although, it is not clear whether bNAbs can eliminate variants from latent reservoirs. The aim of this study was to compare HIV-1 Env sequences between plasma and CSF-derived variants and evaluate their neutralization sensitivity to bNAbs.

Methods
Matching plasma and CSF samples were obtained from seven chronic HIV-1 infected, ART-naive individuals co-infected with cryptococcal meningitis in Durban, KwaZulu-Natal. HIV-1 env was amplified by single genome amplification (SGA) and sequencing. HIV-1 env sequences were compared between plasma and CSF-derived strains. Selected HIV-1 Env amplicons were used in the production of Env-pseudotyped viruses and their susceptibility to bNAbs was tested using the TZM-bl neutralization assay.

Results
We found variations in amino acid (AA) signatures between plasma and CSF-derived clones, especially in the V2-loop, V3-loop, and the CD4 binding site. Single point mutations, including the deletion of the N160 glycan, were only observed in the CSF-derived clones, while plasma-derived clones had a unique Q170K mutation. In addition, the deletion of N234 and N276 glycans in the CD4 binding site was observed in the CSF while the plasma was conserved. We found different mutations between plasma and CSF at N295 and N332 in V3 loops.

Conclusion
Variations in amino acid signatures were observed between plasma and CSF-derived clones and they could result in differences in the neutralization sensitivity. These findings provide important information for using bNAbs in vaccine development studies.
DUAL-DECORATED LIPOSOMES BASED ON A NOVEL TARGETING PEPTIDE AND HYALURONIC ACID FOR ENHANCED AND TARGETED THERAPY AGAINST BACTERIAL INFECTIONS AND SEPSIS

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¹Discipline of Pharmaceutical Sciences, UKZN.
2 United States International University-Africa, Nairobi, Kenya

Introduction
Bacterial infections and sepsis are currently prioritized by WHO as the biggest global health threats which lack satisfactory treatment. Nano-drug delivery approaches significantly enhanced the efficacy and targetability of small drugs. This study aimed to design vancomycin-loaded multi-functional liposomes targeting the sepsis microenvironment.

Method
Novel (P3), TLR4 targeting peptide was designed using data filtering technology (DFT), and TLR4-binding was confirmed using MD and MST. P3-conjugated Liposomes were formulated and coated with an HA layer (HA-P3-Lipo). Liposomes were characterized in terms of size, polydispersity index (PDI), zeta potential, entrapment efficiency and drug release, biocompatibility, and in vitro antibacterial activity.

Results
In silico results confirmed strong binding between P3 and TLR4 which was significantly stronger than Lipopolysachharides. The size, PDI and zeta potential of HA-P3-Lipo were 121.9 ± 1.25 nm, 0.258 ± 0.02, and -25.1 ± 1.1 mV respectively, with 61.87± 2.1% encapsulation efficiency and sustained release of VCM with 70% attained at 48 Hrs. P3 ligand exposure was confirmed by degradation of the HA layer upon incubation with HAase. The antibacterial activity against methicillin-susceptible and resistant Staphylococcus aureus (MSSA and MRSA) revealed the superiority of HA-P3-Lipo with a significant reduction in the MIC against tested strains. Improved biofilm eradication was obtained, with 39,6% inhibition for HA-P-Lipo compared to 8,6% for VCM.

Conclusion
HA-P3-Lipo has shown significant potential to enhance the activity of VCM against sepsis.
LOW PREVALENCE OF MACROLIDE RESISTANCE IN MYCOPLASMA GENITALIUM INFECTIONS IN A COHORT OF PREGNANT WOMEN LIVING WITH HUMAN IMMUNODEFICIENCY VIRUS

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Objective: 
Increasing macrolide resistance by Mycoplasma genitalium is occurring through the widespread use of azithromycin to treat sexually transmitted infections (STIs). To date, few published studies on macrolide resistance patterns in South African pregnant women exist. This study aims to provide more information on this.

Methods: 
The study included 385 HIV-positive pregnant women from which vaginal swabs were collected and screened for M. genitalium using the TaqMan assay. Macrolide resistance-associated mutations in the 23S rRNA gene were determined for all M. genitalium positive samples using the AllplexTM MG & AziR assay. This promoted the simultaneous detection and identification of M. genitalium and six mutations (A2058C, A2058G, A2058T, A2059C, A2059G, and A2059T) responsible for azithromycin resistance. The correlation between the TaqMan, AllplexTM MG, and AziR assay for M. genitalium identification was also performed on a subset of 121 samples.

Results: 
Of the 385 samples tested, 14 (3.6%) were positive for M. genitalium and tested positive on the AllplexTM assay indicating a good correlation with the TaqMan Assay. One positive sample carried a mutation at position A2059G denoting macrolide resistance. Mutations in the other regions of the 23S rRNA were not detected.

Conclusion: 
Despite the low prevalence of resistance determinants, ongoing antimicrobial resistance surveillance is vital, as azithromycin is used as a treatment in the management of vaginal discharge syndrome.
Introduction

Blocking the oncogenic Wnt/β-catenin pathway has lately been investigated as a viable therapeutic approach in the treatment of cancer. This involves the multi-targeting of members of the tankyrase-kinase family, which propagate the oncogenic Wnt/β-catenin signaling pathway.

Aim and Methods

During a recent investigation, the pharmacological activity of 2-(4-aminophenyl)-7-chloro-3H-quinazolin-4-one was repurposed to serve as a ‘triple-target’ inhibitor of TNKS2, AKT, and CDK9. Yet, the molecular mechanism that surrounds its multi-targeting activity remains unanswered. As such, this study aims to explore the pan-inhibitory mechanism of 2-(4-aminophenyl)-7-chloro-3H-quinazolin-4-one towards AKT, CDK9, and TNKS2, using in silico techniques.

Results

Results revealed favorable binding affinities for 2-(4-aminophenyl)-7-chloro-3H-quinazolin-4-one towards TNKS2, CDK9, and AKT, respectively. Pan-inhibitory binding of 2-(4-aminophenyl)-7-chloro-3H-quinazolin-4-one is illustrated by close interaction with specific residues on tankyrase-kinase. Structurally, 2-(4-aminophenyl)-7-chloro-3H-quinazolin-4-one had an impact on the flexibility, solvent-accessible surface area, and stability of all three proteins, which was illustrated by numerous modifications observed in the unbound as well as the bound states of the structures, which evidenced the disruption of their biological function.

Conclusion

Determining the criticality of the interactions that exist between the pyrimidine ring and catalytic residues could offer insight into the structure-based design of innovative tankyrase-kinase inhibitors with enhanced therapeutic effects.
ANTI-HIVS OF BIOACTIVE COMPOUND(S) ISOLATED FROM ALTERNARIA ALTERNATA.

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Introduction:
The introduction of antiretroviral drugs has reduced the morbidity of people living with AIDS. However, the development of HIV drug resistance, viral reservoirs, and drug toxicity delayed the eradication of HIV. Therefore, there is an urgent need to develop novel anti-HIV drug candidates with improved resistance profiles, reduced drug toxicity, and target viral reservoirs. A relatively untapped resource for anti-HIV-1 drug discovery lies in endophytic fungi.

Aim:
We investigated the bioactive compound(s) from Alternaria alternata as a potential anti-HIV compound.

Methods:
The A. alternata P04PR2 was partially purified using SPE (MAX, MCX, and HLB columns). MTT assay was used to test the cell viability and cytotoxicity in the TZM-bl cells treated with A. alternata PO4R2 10-fold dilution. Antiviral activity of A. Alternata was evaluated using a luciferase-based antiviral assay. Then GC-MS was used to identify the bioactive compounds present in A. alternata.

Results:
The MTT yielded CC50 285 µg/mL and cell viability was 80%. The MCX showed to have more anti-HIV inhibition compared to all other columns with an IC50 of 0.03262 µg/mL and 86% inhibition. Three bioactive compounds, for which antiviral activity could be attributed, were propargylamine, 1,2Cyclobutanedicarbonitrile, and coumarin.

Conclusion:
This study showed that three bioactive compounds from A. alternata fungal endophytes could be developed as potential anti-HIV agents.
Heat Shock protein 90 (Hsp90) has been identified as a potential drug target in cancer inhibition. Several drugs have been predicted as potential inhibitors against Hsp90 N-terminal however, this study is based on a drug repurposing approach. In silico methods applied included virtual screening, molecular docking, molecular dynamic simulations, and post-molecular dynamic tests to give insight on potential inhibitors. Post molecular dynamics parameters such as RMSD, RMSF, MM/PBSA binding free energies, RoG, SASA, and hydrogen bond analysis were conducted. This approach was found promising in identifying in silico hits that exhibit better binding affinities than the control inhibitor, Radicicol (RD), which is not FDA-approved. The hit Lapatinib displayed a higher total binding energy ($\Delta G_{\text{bind}}$) compared to RD with a $\Delta G_{\text{bind}}$ score of $-42.38 \pm 0.09$ kcal/mol compared to RD with a score of $-37.26 \pm 0.18$ kcal/mol. The results revealed that RD is less stable compared to the proposed inhibitor. These findings were reiterated by the lower RMSD, RMSF, RoG and SASA of Lapatinib.
Novel and effective anti-hypertensive agents are required to manage hypertension; therefore, we synthesised a novel antihypertensive drug from captopril and quercetin (cap-que) and explored its antihypertensive potential in a niosomal formulation via molecular hybridisation. The cap-que hybrid was synthesised, and its structure was characterised via NMR, FTIR, and HRMS. Niosomes were then loaded with cap-que using the thin-film hydration method. The particle size, polydispersity index, surface charge and drug entrapment efficiency (EE%) of the formulation were 418.8 ± 4.21 nm, 0.393 ± 0.063, 16.25 ± 0.21 mV, and 87.74 ± 2.82%, respectively. The drug release profile showed a sustained release of the active compound (43 ± 0.09%) from the niosomal formulation, compared to the parent drug (80.7 ± 4.68%), over 24 h. The cell viability study confirmed the biosafety of the formulation. The in vivo study in a rat model showed enhanced antihypertensive activity of the hybrid molecule and niosomal formulation which reduced systolic and diastolic pressure when compared to the individual, bare drugs. The findings of this study concluded that the antihypertensive potential of captopril can be enhanced by its hybridisation with quercetin, followed by niosomal nano drug delivery.
Background:
Mycoplasma hominis and Ureaplasma parvum have been recently linked to sexually transmitted diseases and other conditions. There are a limited number of studies conducted on South African pregnant women which have assessed the prevalence and risk factors for genital mycoplasmas.

Methods:
This study included 264 HIV-infected pregnant women attending the King Edward VIII antenatal clinic in eThekwini, South Africa. DNA was extracted using the PureLink Microbiome kit and pathogens were detected using the TaqMan Real-time PCR assays. The statistical data analysis was conducted in a freely available Statistical Computing Environment, R software, version 3.6.3 using the RStudio platform.

Results:
The prevalence of M. hominis and U. parvum, was 215/264 (81.4%), and 203/264 (76.9%), respectively. In the M. hominis positive group, a significantly (p=0.004) higher proportion, 80.5% tested positive for U. parvum infection when compared to 61.2% among the M. hominis negative. Of the U. parvum-positive women, a significantly (p=0.004) higher proportion of women (85.2%) tested positive for M. hominis when compared to 68.9% among the U. parvum negative. In the unadjusted and adjusted analysis, being M. hominis positive increased the risk for U. parvum by approximately 3 times more (p=0.014) and 4-fold (p=0.008), respectively.

Conclusion:
This study showed a significant link between M. hominis and U. parvum infection. To date, there are a limited number of studies that have investigated M. hominis being a risk factor for U. parvum infection. Therefore, the data presented in the current study now fills in this gap in the literature.
DIABETES MELLITUS COMORBIDITY AND RISK FACTORS AMONG HIV PATIENTS AT PRIMARY CARE FACILITIES IN HARARE, ZIMBABWE

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Introduction
The convergence of HIV and non-communicable diseases in sub-Saharan Africa requires an integrated and coordinated approach. This study aimed to determine the prevalence of type 2 diabetes mellitus (T2DM) among People living with HIV (PLWH) in Harare, Zimbabwe and associated factors.

Methods
HIV-positive patients attending eight primary health care clinics in Harare were recruited between October 2021 to October 2022. Data were captured on clinical history, socio-demographic and behavioural characteristics, and analysed using descriptive statistics and binary logistic regression.

Results
Of the 140 participants, 56.4% (n=79) were female and 52.9% (n=74) were older than 40 years. The prevalence of Diabetes Mellitus (DM) was 15.7% (n=22). Age, level of education, marital status and occupation were not associated with HIV-DM co-morbidity. Obesity (body mass index > 30kg/m2), smoking and alcohol consumption were associated with increased risk for DM co-morbidity. Regular physical activity was associated with reduced risk for DM.

Conclusion
PLWH are at increased risk for DM co-morbidity. Health providers should promote regular physical activity to clinic attendees and address weight management and smoking history.

Keywords: Diabetes Mellitus; T2DM prevalence; HIV; non-communicable diseases; primary health care; Sub-Saharan Africa; Zimbabwe.
SYNTHESIS AND BIOLOGICAL EVALUATION OF NOVEL B-LACTAM METALLO B-LACTAMASE INHIBITORS

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β-Lactamases are enzymes that hydrolyse the β-Lactam antibiotics, thus deactivating them. There are two types of β-Lactamases, namely, serine β-Lactamases (SBLs) and Metallo β-Lactamases (MBLs). One of the strategies to overcome β-Lactamase-mediated resistance is to develop β-Lactamase inhibitors that deactivate the β-Lactam enzymes and restore the efficacy of existing antibiotics.

There are no commercially available MBL inhibitors (MBLIs), making the need to develop one crucial. In this study, we present 12 novel potential MBLIs (via multi-step chemical synthesis), which have been shown to restore the complete efficacy of meropenem (≤ 2 mg/L) against NDM-producing Klebsiella pneumoniae in vitro. These compounds contain a zinc metal chelator, conjugated to different commercially available β-Lactam antibiotics to assist with drug transport, lipophilicity, and pharmacokinetic/ pharmacodynamic properties.

The biological evaluation of compounds 26b-c has further highlighted the downstream application of these compounds since they are non-toxic at the selected doses. Time kill assays indicate that compounds 26b-c exhibit sterilizing activity towards NDM-producing Klebsiella pneumoniae in vitro, using minimal concentrations of meropenem.

The overall findings of this study, the novel series of beta-lactam MBLIs reported herein, are potent, efficacious, and safe therapeutic alternatives, that have the potential of becoming promising MBLIs in the near future.
Background
The diversity of Gardnerella vaginalis (G. vaginalis), the predominant pathogen responsible for the progression of bacterial vaginosis (BV), is yet to be explored in South Africa. The phenotypic (biotypes) and genotypic (genotypes) diversity of G. vaginalis from South African pregnant women was investigated to establish links across BV positive, intermediate, and negative states.

Methods
n=150 pregnant women, recruited from a public hospital in Durban, South Africa, provided two self-collected vaginal swabs for BV diagnosis by Nugent scoring and G. vaginalis culture. β-galactosidase, lipase and hippurate test profiles generated five biotypes. Biotype 3 was the most prevalent. Genotyping using Amplified Ribosomal DNA Restriction Analysis and TaqI digestion, and phylogenetic analysis followed. Results. 49.3% of the women were BV negative, 28.7%, were BV intermediate, and 22%, were BV positive. Sixteen isolates harbored four genotypes with Genotype 1 (GT1) dominating. The most frequent genotype/biotype pairing was GT1/biotype 3, distributed across BV-negative and intermediate groups. Phylogenetic analysis revealed heterogenic gene clusters and biotypes, i.e., isolates from BV intermediate and positive women clustered together and shared similar biotypes.

Conclusion
This study was the first to report on the genotypic and phenotypic diversity of G. vaginalis isolates from South African women. Diversity assessments will elucidate the pathogenic potential of G. vaginalis.
MORTALITY TRENDS DURING THE FIRST THREE WAVES OF THE COVID-19 PANDEMIC AT A DISTRICT LEVEL HOSPITAL IN SOUTH AFRICA, A RETROSPECTIVE DESCRIPTIVE ANALYSIS.

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Introduction and aim
South Africa experienced high mortality during the SARS-CoV-2 (C19) pandemic. Resources were limited, particularly at the district hospital (DH) level. Overwhelmed healthcare facilities and a lack of research in at a primary care level made the management of patients with C19 challenging. The objective of this study was to describe the in-hospital mortality trends among individuals with C19 at a DH in South Africa.

Methods
Retrospective observational analysis of all adults who were demised in hospital from C19 between 1 March 2020 and 31 August 2021 at a DH in South Africa. Variables analysed included: background history; clinical presentation; investigations and management.

Results
Of the 328 participants who were demised in the hospital, 60.1% were female, 66.5% were older than 60, and 59.6% were of Black African descent. Hypertension and Diabetes Mellitus were the most common comorbidities (61.3% and 47.6% respectively). The most common symptoms were dyspnoea (83.8%), and cough (70.1%). “Ground-glass” features on admission chest X-rays were visible in 90.0% of participants, and 82.8% had arterial oxygen saturations less than 95% on admission. Renal impairment was the most common complication present on admission (63.7%). The median duration of admission before death was four days (IQR 1.5 - 8). The overall crude fatality rate was 15.3%, with the highest crude fatality rate found in wave two (33.0%).

Conclusion
Older participants with uncontrolled comorbidities were most likely to demise from C19. Wave two (characterised by the ‘Beta’ variant) had the highest mortality rate.

Contribution
This study provides insight into the risk factors associated with death in a resource-constrained environment. Accepted for publication SA Journal of Family Physicians.
FACILE SYNTHESIS OF OXAZOLIDINONES AS POTENTIAL ANTI-BACTERIAL AGENTS

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The high death rates associated with TB are due mainly to multi- and extensive-drug-resistant TB. Thus, there is a growing need for antibiotics that can treat both. Derivatization of existing antibiotics offers a quick method for screening potentially new antibiotics. Antibiotics such as Linezolid, which contains an oxazolidinone core, is clinically approved for multi-drug resistant TB. An efficient organocatalyzed microwave-assisted synthesis for novel Linezolid analogues has been developed. The general synthesis of these compounds begins with a L-proline catalyzed three component Mannich reaction between commercially available 3-fluoro-4-(4-morpholinyl)-aniline, formaldehyde, and α-hydroxyacetone. The subsequent Mannich product was then reduced and cyclized with CDI to form the oxazolidinone core. The resultant oxazolidinone was then further derivatized by means of reduction and acetylation. The novel Linezolid derivatives obtained were then evaluated for their anti-bacterial activity against M. smegmatis, where they displayed moderate to good antimicrobial activities. The racemic 5-acetyl-3(3-fluoro-4-morpholinophenyl) oxazolidine-2-one demonstrated the best MIC of 8 µg/mL, which was the same value obtained for the commercial Rifampicin. The method developed is a valuable addition to the field since it can synthesize highly sought-after oxazolidinone derivatives using commercially available reagents in a shorter time than previously reported methods.
THE EFFICACY OF VAMMFT COMPARED TO "BOGOTA BAG" IN ACHIEVING SHEATH CLOSURE FOLLOWING TEMPORARY ABDOMINAL CLOSURE AT INDEX LAPAROTOMY.

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Introduction
Following the widespread adoption of damage control surgery and the increased awareness of intra-abdominal hypertension across the globe, there has been an increased use of the open abdomen (OA). Although the use of OA may be life-saving, it is associated with significant morbidity. This has highlighted the need for improving and standardizing the management of the OA.

Objectives
Determine the efficacy of VAMMFT versus Bogota bag in achieving secondary abdominal closure in trauma patients.

Methods
A retrospective observational study was performed using the HEMR database comparing demographics, mechanism of injury, admission vitals, and biochemistry between patients with Bogota bag and VAMMFT. The rate of secondary abdominal closure was assessed in both groups, with complications such as ECF, open abdomen, and death. Variables were assessed as predictors of abdominal closure in both groups.

Results
There were no statistical differences between the Bagota and VAMMFT groups in terms of demographics, injuries, admission vitals, and biochemistry. 73% of patients in the VAMMFT group achieved secondary abdominal closure compared to 54.9% in the Bagota group with an OR of 2.2 (1.4-3.7), p 0.001. The incidence of ECF in the VAMMFT group was 5.2% and 1.9% in the Bagota group (p 0.103). Length of hospital stay was 30 versus 17 days in the VAMMFT and Bagota groups respectively, OR 1.41 (1.30-1.54), p<0.001. There were no independent predictors of closure identified in the VAMMFT group. Age was inversely related to secondary closure in the Bogota group. VAMMFT failure was most commonly due to lack of stock (39%), followed by protocol violations (33%).

Conclusion
VAMMFT is an appropriate management strategy to achieve secondary abdominal closure in trauma patients provided that principles of proper application are followed. Outcomes may be improved with adequate availability of resources and training of staff. Further studies are required to determine predictors of secondary abdominal closure.
Introduction
Chlamydia trachomatis (C. trachomatis) is a common cause of bacterial sexually transmitted infections (STIs). The genetic characterization of C. trachomatis serovars reveals significant genetic diversity in this organism.

Aim
To investigate the diversity of C. trachomatis serovars in human immunodeficiency virus (HIV)-infected pregnant women in South Africa.

Methods
For this study, 385 vaginal swab samples were tested for the presence of C. trachomatis. The swabs were collected from HIV-infected pregnant women at the King Edward VIII Hospital in Durban, South Africa. The outer membrane protein (omp1) gene from C. trachomatis was amplified and positive amplicons were digested with restriction enzymes AluI, DdeI, and HinfI for the assignment of serovars.

Results
The prevalence of C. trachomatis in the study population was 12.2% (47/385). Serovar E (46.5%) was the most frequent serovar in our study population, followed by serovars F (20.9%), G (14.0%), and D (11.6%). Serovar I (4.7%), which was detected in two samples, was the least frequent.

Conclusion
Five different serovars were observed among the participants. The high genetic diversity observed in this study contributes to the challenges regarding future vaccine design and the development of antigen-based rapid diagnostic tests for Chlamydia.
DETERMINATION OF CORECEPTOR USAGE OF HUMAN IMMUNODEFICIENCY TYPE 1 SUBTYPE C VIRUSES FROM INFANTS INFECTED IN-UTERO.

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Background
Maraviroc (MVC) is an entry inhibitor approved by the FDA for HIV prevention. However, the efficacy of MVC is dependent on viral co-receptor tropism and tropism determination is therefore clinically important. However, the phenotypic tropism of HIV-1 subtype C has not been fully characterised especially in infants, and it may also evolve over time. Furthermore, genotypic prediction algorithms that rely on the analysis of the V3-loop of the HIV-1 env remain insufficiently validated. The aim of this study was to investigate HIV-1 co-receptor tropism in viruses that establish infection in infants.

Methods
HIV-1 env was amplified from plasma collected at birth or one-month post-infection from 16 HIV-1 infected infants from KwaZulu-Natal, South Africa and the amplicons were sequenced using Sanger sequencing. The V3-loop was analysed using various software algorithms including calculating the Net charge, Geno2pheno, WebPSSM, PhenoSeq, 11/25 rule, and the number of potential N-linked glycosylation sites (PNGS). The coreceptor usage was predicted using these software algorithms. The env amplicons were cloned using pcDNA 3.1 TOPO Expression Kit. The coreceptor usage of infant clones was determined on TZM-bl cells in the presence or absence of Maraviroc (CCR5 antagonist) and AMD3100 (CXCR4 antagonist).

Results
The software algorithms showed 87.5% of infant-derived transmitted/ founder clones used CCR5, while 12.5% of clones used CXCR4 coreceptors. Similarly, the phenotypic TZM-bl assay also showed fourteen infant-derived T/F clones used CCR5, while two T/F clones used CXCR4 coreceptor.

Conclusions
Taken together, these findings suggest that HIV-1 subtype C mainly uses CCR5 to establish an infection in infants that are infected in-utero, although transmission of CXCR4-using variants was also possible. This study suggests that CCR5 antagonists may be highly efficacious in blocking in-utero mother-to-child HIV-1 subtype C infection.
THE ROLE OF E6/E7 MRNA IN THE PREVALENCE AND THE PROGRESSION OF CERVICAL NEOPLASIA IN HIGH-RISK HUMAN PAPILLOMA VIRUS (HR-HPV) AND HUMAN IMMUNODEFICIENCY VIRUS (HIV) POSITIVE WOMEN IN SOUTH AFRICA.

Londiwe Cele, Sebitloane HM, Abbai N

IARC

The major cause of cervical cancer is the persistence of high-risk human papilloma virus (HR-HPV). The oncogenic potential of HR-HPV depends on the increased expression of the HPV E6 and E7 mRNA oncogenes. The aim of the study was to determine the role of HPV E6/E7 mRNA in the prevalence and the progression of cervical neoplasia in HR-HPV and human immunodeficiency virus (HIV) positive women. This was a cohort study, a total of 377 samples (207 HPV positive at baseline and 107 HPV positive follow-ups) were analysed in this study. Visual inspection with acetic acid (VIA) was conducted on HPV-positive women. The women who were VIA-positive were randomized for either cryotherapy or thermal ablation treatment and VIA-negative women were referred to colposcopy and treated. The E6/E7 was carried out using the Arbor vita, encoE6 Cervical test. The procedure was protocol provided by the kit. The study results showed that 88% of participants were negative for HPV E6/E7 mRNA and 12% were positive. The positive participants were 81.1% and 16.4% via negative and 51.7% and 48.3% went for cryotherapy and thermal ablation respectively. The p-value for HPV E6/E7 mRNA was less than 0.005 (p<0.001) compared with cervical neoplasia (CIN). Our data showed that an increase in HPV E6/E7 mRNA correlates with the severity of CIN as per other studies. Participants that were CIN1, LSIL, and benign at baseline which were positive for HPV E6/E7 mRNA at follow-up have increased in severity to CIN2+. A more controlled study needs to be done where all participants have done similar treatment at baseline to test the effect of each treatment on the progression of cervical neoplasia for better treatment of cervical cancer.
A RETROSPECTIVE REVIEW OF AUTOIMMUNE HEPATITIS AT INKOSI ALBERT LUTHULI CENTRAL HOSPITAL

Yasheen Maharaj

Introduction
Autoimmune hepatitis (AIH) has scarcely been reported on in patients of black African descent. Similarly, few studies have focused on the relationship between AIH and HIV.

Aims
We aim to describe the presenting features of AIH from a single referral center in a Sub-Sahara African setting. We also compare the presenting features of HIV-infected and HIV-uninfected patients.

Methods
This study was a retrospective chart review. Patients were included if they fulfilled the criteria for the International AIH Group simplified score for probable or definite AIH, were 18 years or older at inclusion, and attended the adult Gastroenterology clinic at IALCH for the period 1/1/2015 to 31/12/2020 on at least 2 occasions.

Results
Forty cases were included, of which 33 (82.5%) were female and 33 (82.5%) were black African. The median age at diagnosis was 26 years. Sixteen patients were HIV-infected, with a significantly older age of disease onset as compared to their HIV-uninfected counterparts (median age 38 vs 17.5 years, p-value <0.001). There were few other significant differences between HIV-infected and HIV-uninfected patients.

Conclusion
AIH is a disease most commonly affecting young females. Age of onset is significantly older in HIV-infected patients, however, there are few other differences in comparison to HIV-uninfected patients.
This study aimed to investigate the variation of metal constituents’ concentrations in indoor PM collected from different communities, and their association of metals with household characteristics and indoor occupant activities.

PM2.5 and PM10 samples were collected in south and north Durban, and Highveld regions. These samples were analyzed for metals using Inductively coupled plasma optical emission spectroscopy (ICP-OES). Standardized interviews on indoor household exposures, and structured household walkthrough assessments provided additional covariates. Multivariate linear regression models were developed using factors from the factor analysis, and variables identified in the bivariate analysis.

Metal concentrations (Cd, Fe, Mn, and Pb) in PM2.5 varied significantly in different geographical locations (p < 0.05). Some metallic components in PM were strongly correlated (Pb with As, Hg, and Mn; Hg with As, Mn, and Pb, Fe with Mn and Cr). Multivariate linear regression models showed that household characteristics including household age, presence of a ceiling, and floor type were significantly associated with Cr, Fe, and Hg in indoor PM, respectively (p < 0.05).

The key metals identified in these indoor samples of PM were Cd, Cr, Fe, Hg, Mn, and Pb, and these were primarily influenced by household characteristics. The association of metallic components in indoor PM with household characteristics provides an opportunity to promote indoor air quality interventions.
ANALYSIS OF THE PHYSICAL DEMANDS OF A COMPETITIVE SOCCER MATCH IN SOUTH AFRICA IN RELATION TO PLAYING POSITIONS.

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Background
Evidence suggests that international soccer players cover a total distance between eight- and 14km in a match. This data is influenced by numerous factors including, playing position, formation, and standard of the league.

Objective
To quantify the physical demands of competitive matches on a professional South African soccer team.

Methods
A descriptive design that included, 21 players belonging to the same team. Data was collected over 23 official matches during the 2019/2020 season using PlayerTek GPS devices (10Hz). Data collected included total distance (TD); high-intensity running (HIR) distance; power plays (PP); top end-speed (TES) and distance per minute (D/min).

Results
Statistical differences were evident only in the HIR and PP. The centre forwards (CF’s) covered the highest HIR (p<.001), followed by the attacking central midfielders (ACMs: p=.006) and fullbacks (FBs: p=.016). The ACMs and CFs recorded the highest PP compared to the centre-backs (CBs). Total distance (p=.01), PP (p=.004), and D/min (p=.001) were lower in the second half than in the first half of the match.

Conclusion
The results indicate that the CFs performed more high-intensity actions, whereas the CB positions were the least physically demanding position compared to the other positions.

Keywords: physical demands, formation, playing position, total distance.
THE EPIDEMIOLOGY AND FACTORS THAT IMPACT ASTHMA OUTCOMES OF SCHOOL-GOING ADOLESCENTS IN KWAZULU NATAL, SOUTH AFRICA.

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Background
Asthma is largely undiagnosed in Africa. We aimed to describe the prevalence and risk factors of asthma and evaluate the role of objective measures in asthma diagnosis in adolescents in KwaZulu Natal (KZN).

Methods
Two cross-sectional studies were conducted in randomly selected Durban and Richards Bay schools in adolescents aged 12-14, between May 2019 and November 2021, using 1) the Global Asthma Network (GAN) questionnaire; 2) a digital survey including the Asthma Control Test (ACT) with fractional exhaled nitric oxide (FeNO) testing and spirometry (in the symptomatic group).

Results
Of 3957 adolescents included in Study 1, 52% were female. Current and severe asthma prevalence was 14% and 9%, respectively. Only 41% with severe asthma symptoms had a doctor’s diagnosis of asthma. Those exposed to traffic pollution, sedentary lifestyle, or rhinoconjunctivitis were three times more likely to have severe asthma. In study 2, of 2093 adolescents screened, 180 were included; 71%, 87%, and 41% had severe, uncontrolled, and eosinophilic (FeNO ≥ 25ppb) asthma respectively. Lung function was no different across asthma control and severity groups.

Conclusion
Severe asthma is underdiagnosed and associated with environmental factors in adolescents in KZN. More data on objective asthma measures is needed to phenotype adolescents with asthma symptoms.
IN VITRO EFFECT OF TRADITIONAL MEDICINE (PRODUCT NKABINDE) ON HIV AND CHLAMYDIA TRACHOMATIS CO-INFECTION.

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Background
The surge in HIV infection numbers globally and shortfalls in current treatments have led to a continuous quest to find alternative treatments. Most Africans rely on traditional medicines (TM) for their primary healthcare needs due to their belief that TM has holistic healing and possesses immune-boosting properties. However, less is known about the efficacy and anti-HIV mechanisms of TM. In this study, we evaluated the anti-HIV properties of Product Nkabinde (PN), a TM from KwaZulu Natal, in the presence of Chlamydia trachomatis co-infection.

Materials and Methods
A local Traditional Health Practitioner (THP) supplied PN. The half-maximum inhibitory concentration (IC50) of the standardized extract on isolated PBMCs was established using the cell viability assay over 24 hrs of incubation. TZM-BL cells were infected with different strains of HIV, co-infected with C. trachomatis, and treated with PN for 48 hours under ambient conditions, luminescence was used to detect HIV viral copies.

Results
PN had an IC50 concentration of 325.3 µg/ml. In the anti-HIV assay, PN showed antiviral activity against all the HIV strains, with an effectiveness of 69-97%. Furthermore, PN reduced HIV replication in the presence of C. trachomatis.

Conclusions
The product Nkabinde can reduce HIV replication even in the presence of C. trachomatis.
AN ANALYTICAL INVESTIGATION INTO NOISE LEVELS IN PUBLIC HEALTH SECTOR NEONATAL INTENSIVE CARE UNITS IN THE ETHEKWINI DISTRICT

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Noise is a known environmental stressor in the neonatal intensive care unit (NICU). Therefore, this study aimed to investigate noise levels in the public sector NICUs of the eThekwini District, KwaZulu-Natal Province, South Africa. An analytical observational study design with purposive sampling of public sector hospitals was used. The noise was continuously monitored with a sound level meter (CEL 450 C) in a central location for 48 hours on two consecutive days (Sunday and Monday) in the four NICUs. Data were analysed using descriptive and inferential statistics. This study included one tertiary hospital and three regional hospitals in the eThekwini District. Mean noise levels exceeded international recommendations of an A-weighted equivalent continuous sound level (LAeq) of 45 A-weighted decibels (dBA) and an A-weighted maximum sound level (LAmx) of 65 dBA in all four hospitals. The most frequently occurring sources of noise were staff conversations (30.9%, Hospital A), device alarms (21.0%, Hospital B), and the closing of metal pedal bins (20.0%, Hospital B). Mean LAeqs higher than 45 dBA were found in the mid and high frequencies in all hospitals, particularly during the afternoon. The findings emphasize the need for continuous noise monitoring, awareness, and education among healthcare professionals in the NICU.
THE PROBIOTIC EFFECT OF YOGHURT AND LACTOBACILLUS SPECIES STRAINS ISOLATED FROM YOGHURT ON THE REDUCTION OF VULVOVAGINAL CANDIDIASIS

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Background
Vulvovaginal candidiasis, caused by Candida albicans, is a common yeast infection in women. With drug resistance on the rise, alternative treatments are being explored. Lactobacillus strains isolated from yoghurt are believed to potentially improve clinical outcomes.

Objective
This study aimed to assess the efficacy of yoghurt in reducing vulvovaginal candidiasis, through the isolation of Lactobacillus species. By evaluating the anticandidal activity and exploring the synergistic effects with antifungal therapy.

Methodology
Lactobacillus strains were isolated from yoghurt samples using MRS broth and agar. The isolates underwent phenotypical-morphological characterization. Antimicrobial assays were conducted to assess the anti-Candida activity. Identification of the Lactobacillus strains was done using the 16S rRNA tool.

Results
Lactobacillus species were successfully isolated from four yoghurt brands, mainly Limosilactobacillus fermentum. The yoghurt itself did not exhibit inhibitory effects on C. albicans, however, the isolated L. fermentum strains did inhibit C. albicans utilizing higher concentrations.

Conclusion
Yoghurt samples containing Lactobacillus strains demonstrated potential inhibition of C. albicans growth, indicating reduced vulvovaginal candidiasis, through a probiotic effect. For enhanced efficacy utilizing antifungal combination therapy, further research is recommended.
THE EVOLUTION OF ANTI-TAT ANTIBODIES AND ITS ROLE IN THE DEVELOPMENT OF PROPHYLACTIC AND THERAPEUTIC HIV-1 VACCINE.

Thandeka Innocentia Kubheka

HPP

Background
Highly active antiretroviral therapy has reduced morbidity and mortality in HIV-positive people, globally with no cure or preventative vaccine to date. The HIV-1 Tat protein has been identified as a potential target in developing a prophylactic/therapeutic vaccine. Therefore, investigations on the evolutionary development of anti-Tat antibodies (IgA, IgG, IgM) from early treatment (treated one-day post-infection) HIV-positive individuals - 12 months treated (association with CD4+ T cell count and activation).

Methods
Anti-Tat C IgG, IgM, and IgA titres were measured from plasma samples using ELIZAs. 32 HIV-1 early-treated individuals enrolled in the longitudinal FRESH cohort. T-cell activation was measured by flow cytometry using HLA-DR and CD38 markers. Immune activation levels were associated with the presence of anti-Tat antibodies, the duration of treatment and T cell activation was analyzed using GraphPad Prism 5.

Result and discussion
Anti-Tat antibody levels were significantly associated with the duration of treatment (p= 0.0001) and decreased over time. CD4+ T cell counts have no effect on the level of anti-Tat antibodies. Anti-Tat IgM and IgG were preferentially detected in the early stages rather than the later stages of infection, with low T cell activation observed.

Conclusion
Anti-Tat immunity is an important therapeutic approach to improve immune reconstitution, in early-treated individuals. Tat-specific IgM and IgG antibodies in combination with cART lower the disease progression.
DOES RAAS ACTIVITY IN PREDIABETES CONTRIBUTE TO THE DEVELOPMENT OF OSTEOPOROSIS

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Introduction
Prediabetes is a metabolic disorder associated with a plethora of comorbidities including osteoporosis which occurs due to an imbalance between bone resorption and formation. Numerous mechanisms have been explored, such as the renin-angiotensin-aldosterone (RAAS) demonstrated to alter the bone microenvironment by shifting the RANKL/OPG ratio in addition to increasing resistin.

Aim
This study investigated the relationship between local and systemic RAAS in association with the development of osteoporosis in prediabetes.

Method
The study comprised 80 subjects, 40 of which were non-prediabetic (NPD) and 40 prediabetic (PD). The RAAS components; renin, angiotensin II (Ang II), angiotensin-converting-enzyme (ACE), angiotensin 1-7 (Ang 1-7), and angiotensin-converting enzyme 2 (ACE2) were measured with ELISA kits. Furthermore, RANKL, OPG, and resistin were measured with a multiplex PCR.

Results
Renin, Ang II, and ACE were upregulated and Ang 1-7 and ACE2 were downregulated in the PD by comparison to the NPD. Furthermore, the RANKL, resistin, and insulin were upregulated whilst OPG was downregulated in the PD by comparison to NPD.

Conclusion
The upregulation of Ang II, ACE, RANKL, and resistin, and the downregulation of Ang 1-7 and ACE in addition to OPG the data suggests RAAS may contribute to the development of osteoporosis in PD.
EMERGENCE OF DOLUTEGRAVIR RESISTANCE IN INTEGRASE STRAND TRANSFER INHIBITOR-NAÏVE PATIENTS IN KWAZULU-NATAL, SOUTH AFRICA

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Introduction
The current antiretroviral therapy (ART) program in Sub-Saharan Africa has been significantly hampered by the spread of non-nucleoside reverse transcriptase inhibitor (NNRTI)-resistant viruses. A large-scale roll-out of a potent integrase strand transfer inhibitor (INSTI) known as dolutegravir (DTG) was initiated by the South African National Department of Health in October 2019 as a first-line fixed-dose combination regimen known as TLD, which consists of Tenofovir (TDF), Lamivudine (3TC) & DTG for adults, adolescents, and children over the age of 10 years and weighing ≥35 kg. For patients failing a first-line regimen of TDF, EFV (Efavirenz) & FTC (Emtricitabine) [TEE], the second-line regimen is Zidovudine (AZT) plus 3TC and DTG. Despite the effectiveness of DTG, reports of the emergence of DTG-associated drug resistance mutations (DRMs) and the persistence of HIV drug resistance remains an issue. There is limited information on the selection of INSTI DRMs and subsequent treatment outcomes on INSTI-based ART, especially amongst HIV-1 subtype C infected individuals in a real-world setting with a high population prevalence of HIV.

Aim
To assess the drug resistance patterns and clinical characteristics of INSTI-naïve patients failing DTG-based ART.

Methods
Sanger Sequencing was performed on selected stored plasma specimens (n=61) from HIV-1 infected patients with virological failure on DTG-based ART. Samples received for the period, January 2021 to November 2022, were tested at the Department of Virology, National Health Laboratory Service (NHLS) in Durban, South Africa. All samples that had an integrase inhibitor resistance test result were analyzed.

Results
During the study period, there were 61 requests for HIV drug resistance genotyping for patients with virological failure on DTG-based ART. The median age was 33 (interquartile range [IQR], 18–41 years) and 65% were female. The median HIV-1 RNA level at the time of DTG failure was 4.8 log10 copies/mL (IQR, 4.4–5.4 log10 copies/mL). The median duration of DTG therapy prior to failure was 12 months (IQR, 8–16 months). Two patients were not tested for INSTI resistance because the requirements for testing were not satisfied according to national department of health recommendations. Of the remaining 59 samples evaluated for INSTI resistance, 3 yielded no amplification due to viral load <1000 cp/mL, while 56 yielded successful integrase genotyping data. DTG resistance was detected in 19 of the 56 (33.9%) genotyped samples. The most common mutations associated with DTG resistance among the 19 patients were R263K (42%), E138K (26%), H51Y (26%) and G118R (21%).

Conclusions
Suboptimal adherence and advanced HIV disease may contribute to emerging drug resistance to DTG, especially in ART experienced patients. The patients in this study who developed DTG resistance also had severe opportunistic infections like cryptococcal meningitis, multi-drug resistant tuberculosis, mycobacteria other than tuberculosis and cytomegalovirus. Surveillance to monitor INSTI resistance is crucial to guide the ART program in South Africa.
SYNTHESIS, RADIOLABELING AND PRELIMINARY IN VITRO ASSESSMENT OF NOVEL RADIOPHARMACEUTICALS AS POTENTIAL BACTERIAL-SPECIFIC RADIOTRACERS USING POSITRON EMISSION TOMOGRAPHY IMAGING.

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Introduction
The current PET-radiopharmaceuticals used for the diagnosis of bacterial infections rely on secondary host-mediated inflammatory responses, leading to false-positive findings due to misinterpreted, sterile inflammation. To discriminate between infection and inflammation, a more direct targeting mechanism for bacteria is desirable.

Aim
In this study three candidate molecules with known bacterial-specific interaction were deemed appropriate radiotracer vector scaffolds when functionalized with 1,4,7-triazacyclononane-1-succinic acid-4,7-diacetic acid (NODASA) to subsequently allow for gallium-68 complexation.

Methods
Solid phase peptide synthesis (SPPS) was used to synthesize these compounds, followed by purification using semi-prep HPLC, and characterization using HRMS/LCMS. Compounds were radiolabeled with generator-eluted 68Ga-activity, and the radiosynthesis was optimized by adjusting reaction conditions such as pH, temperature, and NODASA-compound concentration. In vitro, radiotracer stability and whole-blood distribution were assessed.

Results
All compounds were successfully synthesized and radiolabeled with gallium-68 and optimized to produce radiochemically pure products (>99%). Two compounds showed good stability up to 2 hours in human plasma. All compounds showed minimal RBC interaction and plasma protein binding, thereby mimicking a favorable expected bioavailability.

Conclusion
All three compounds are deemed promising candidate PET-radiotracers. Upcoming bacterial cell uptake assays and microPET/CT imaging studies in mice will further assess the potential of these compounds as bacterial-specific radiotracers.
PREVALENCE, KNOWLEDGE, AND ASSOCIATION OF DIETARY SUPPLEMENT USAGE AMONG UNIVERSITY OF KWAZULU-NATAL STUDENTS.

Lonwabo Njani

Introduction
Youth are susceptible to dietary supplement (DS) use but lack sufficient knowledge of the risks associated with consuming such products.

Aim
To determine the prevalence, knowledge, and association of dietary supplement usage with physical activity status amongst University of KwaZulu-Natal students.

Method
An online questionnaire was used to determine UKZN students’ knowledge and use of DS in relation to their physical activity status in two different faculties. Descriptive statistics were used for analysis and the level of statistical significance was set at p≤0.05.

Results
The prevalence of DS use was reported as 13.6% among the students. Among DS users, there was no significant difference between students from the School of Health Sciences (SHS) (58.3%) and the School of Life Sciences (SLS) (41.7%), (p=0.8). Health Science (HS) students’ knowledge of DS was significantly better for knowledge questions, compared to non-Health science (NHS) students (p=0.02). Students who participated frequently in physical activity had higher DS consumption (41.7%), compared to sedentary participants (16.7%), (p=0.03). The most prevalent reasons for DS use were reported as ‘to boost energy level’, ‘to enhance physical performance’, and ‘to boost immunity’.

Conclusion
There is a need for DS education, and their safe use among UKZN students, particularly the physically active students, irrespective of their faculties.
EXTENSIVE EPITOPE MAPPING AND LONGITUDINAL HIV-1 ENV SEQUENCING IN AN INDIVIDUAL INFECTED WITH SUBTYPE C WHO DEVELOPED BROADLY NEUTRALIZING ANTIBODIES

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Introduction
Broadly neutralizing antibodies target various epitopes on the viral Envelope (Env) protein, however some plasma samples with cross-neutralizing activity do not map to known specificities suggesting they may target novel epitopes.

Aim
This study aimed to extensively map the epitopes targeted by a donor who developed broad cross-neutralizing antibodies.

Methods
Plasma samples collected at 162 weeks post-infection were tested against consensus C (ConC) V2 wild-type and V2-loop mutants using site-directed mutagenesis. In addition, mutations (N160Y, K166R, A172E and S456R) were introduced into the transmitted/founder (T/F) sequence by site-directed mutagenesis. Autologous plasma samples were assessed against the T/F virus, virus at 162 w.p.i, and V2- and CD4-binding site mutants.

Results
Plasma neutralization sensitivity in donor AS2-0358 was not affected by the introduction of ConC V2 mutations. Interestingly the virus at 162 w.p.i resulted in a 40-fold reduction in neutralization sensitivity whilst mutation S456R led to a slight reduction in neutralization sensitivity.

Conclusion
Donor AS2-0358 plasma cross-neutralizing antibodies may not target the V2-loop. These findings suggest that AS2-0358 plasma may target a novel epitope. These findings may provide novel insights on a novel epitope that may be targeted for immunogen design.
ASSESSMENT OF ANTIBIOTIC RESISTANCE AND EFFLUX PUMP GENE EXPRESSION IN NEISSERIA GONORRHOEAE ISOLATES BY QPCR AND REGRESSION ANALYSIS

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Introduction
Treatment of gonorrhoea infection is limited by the increasing prevalence of multi-drug-resistant strains. Cost-effective molecular diagnostic tests can guide effective antimicrobial stewardship.

Aim
The aim of this study was to correlate mRNA expression levels in Neisseria gonorrhoeae antibiotic target genes and efflux pump genes to antibiotic resistance in our population.

Methods
This study investigated the expression profile of antibiotic resistance-associated genes (penA, ponA, pilQ, mtrR, mtrA, mtrF, gyrA, parC, parE, rpsJ, 16S rRNA, 23S rRNA) and efflux pump genes (macAB, norM and mtrCDE), by qPCR, in clinical isolates from KwaZulu-Natal, South Africa. Whole-genome sequencing was used to determine the presence or absence of mutations.

Results
N. gonorrhoeae isolates, from patients presenting for care at clinics, were analysed. As determined by binomial regression and ROC analysis, the most significant (p=<0.05) markers for resistance prediction in this population, and their cutoff values, were determined to be mtrC (p=0.024; cutoff <0.089), gyrA (p=0.027; cutoff <0.0518), parE (p=0.036; cutoff <0.0033), rpsJ (p=0.047; cutoff <0.0012) and 23S rRNA (p=0.042; cutoff >7.754).

Conclusion
Antimicrobial stewardship includes exploring options to conserve currently available drugs for gonorrhoea treatment. There is the potential to predict an isolate as either susceptible or non-susceptible based on the mRNA expression level of specific candidate markers, to inform patient management. This qPCR approach, with few targets, can be further investigated for use as a potentially cost-effective diagnostic tool to detect resistance.
POLYMORPHISMS WITHIN THE SARS-COV-2 HUMAN RECEPTOR GENES ASSOCIATES WITH VARIABLE DISEASE OUTCOMES ACROSS ETHNICITIES

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The contribution of human genes to the variability of disease outcomes is important across several infectious diseases. SARS-CoV-2 is no different as studies have shown that mutations within specific human genes associate with variable COVID-19 outcomes. In this study, we focused on the SARS-CoV-2 receptors and co-receptors to identify the role of specific polymorphisms within ACE2, TMPRSS2, NRP1, and CD147. Polymorphisms within ACE2 (rs2285666), TMPRSS2 (rs12329760), CD147 (rs8259), and NRP1 (rs10080) have previously been shown to associate with COVID-19 severity. Using cryopreserved samples from COVID-19-positive African, European, and South Asian individuals within South Africa, we determined the genotype frequencies of rs2285666, rs12329760, rs8259, and rs10080 using TaqMan genotyping. The genetic variant (rs2285666) is associated with COVID-19 severity with an ethnic bias. African individuals with a CC genotype demonstrate increased severe COVID-19 outcomes (OR = 7.5; 95% CI 1.164 – 80.89; p = 0.024). The expression of ACE2 and SARS-CoV-2 viral load was measured using droplet digital PCR. Our results demonstrated that specific variants (rs2285666 and rs10080) were significantly associated with increased SARS-CoV-2 viral load and worse outcomes in certain ethnicities. This study demonstrates two important findings. Firstly, the SARS-CoV-2 viral load is significantly lower in Africans compared to individuals of European and South Asian descent (p = 0.0002 and p < 0.0001). Secondly, SARS-CoV-2 viral load correlates with specific SARS-CoV-2 receptor variants. A limited number of studies have examined the receptor/co-receptor genes within Africa. In this study, we investigate genetic variants within the SARS-CoV-2 receptor/co-receptor genes and their association with COVID-19 disease severity and SARS-CoV-2 viral load across different ethnicities in South Africa. Therefore, this study provides an in-depth genetic understanding of the COVID-19 pandemic in Africa and further highlights the importance of further investigation to determine potential therapeutic targets.
EFFECT OF ENDOGENOUS AND EXOGENOUS FEMALE SEX HORMONE LEVELS ON HUMAN IMMUNODEFICIENCY TYPE 1 SUBTYPE C (HIV-1C) LATENT RESERVOIR REACTIVATION.

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Background
Combination antiretroviral therapy (cART) effectively suppresses viremia but is not curative due to the latent viral reservoir found in long-lived cells. A previous study identified ESR-1 as a key regulator of HIV-1 subtype B latency. However, its effects on other subtypes remain unknown. We, therefore, aimed to determine the effect of female sex hormone levels on the reservoir size and reactivation potential in women living with HIV (WLHIV) on suppressive cART in South Africa.

Methods
The study participants comprised participants who started treatment during acute infection and participants who started treatment during chronic infection. RNA was extracted from CD4+ T cells, DNase treated, and used to synthesize cDNA. Qualitative real-time PCR was performed to quantify ESR-1 mRNA expression levels. Plasma hormone levels were determined for E2, progesterone (P), follicle-stimulating hormone (FSH), luteinizing hormone (LH), and testosterone (T) using Enzyme-Linked Immunosorbent Assay (ELISA). The inducible viral reservoir was determined using Tat/rev Induced Limiting Dilution Assay (TILDA) by isolating CD4+ T cells, stimulating overnight and plating in a limiting dilution then performing reverse transcription qPCR.

Results
Slightly higher ESR-1 mRNA expression was observed at 1-year post-infection compared to early infection and 2 years post-successful cART. Hormone levels remained the same longitudinally, apart from LH and E2. The median LH levels were higher at seronegative than early infection (p=0.0035) and higher at 2 years post successful cART than in early infection (p=0.0081). Median E2 levels were higher during early infection than at 1-year post-infection (p=0.0434). LH levels correlated positively with CD4+ T cell counts during early infection for both early and late-treated participants and were r=0.7151 p=0.0134 and r=0.7554 p=0.0302 respectively. The reservoir has been quantified in 19 individuals; our data shows that women have a higher inducible reservoir than men. However, these data cannot be shown because the manuscript is under review.

Conclusion
These data suggest that all studied hormones except for LH and E2 are unchanged over time and have no effect on the reservoir size.
INVESTIGATING THE EFFECTIVENESS OF A WEB-BASED LEARNING TOOL TO IMPROVE ISIZULU CLINICAL COMMUNICATION SKILLS

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Introduction
Effective communication skills in a healthcare environment are vital to successful doctor-patient consultations.

Aims
The study aims to examine the efficacy of the web-based learning tool. Specifically focusing on one system in the Year two MBChB curriculum – the cardiovascular system.

Methods
This study adopts a qualitative research approach. All MBChB students who completed the Year One isiZulu modules were invited to participate voluntarily. Ethical clearance to conduct the study on Year two-six MBChB students has been granted by HSSREC (Protocol no. HSSREC/00002781/2021). A Google Forms survey was administered to all students.

Results/Discussion
The study is based on two thematic strands. Regarding language and technological needs, most students (n=25) report that their isiZulu proficiency is fair, allowing them to conduct a basic interview. However, after completing a year of isiZulu, 40% of students reported that they are not confident enough to interview an isiZulu patient, and 48% of respondents stated that they cannot engage in a fruitful and comprehensive interview with an isiZulu patient. Encouragingly, feedback on the website design has been positive with a few recommendations.

Conclusion
A lack of isiZulu clinical communication resources is evident and more research and content development is required.
The contamination of apple and apple products with mycotoxin patulin has become a global food safety and health concern associated with kidney injury. This study investigated the acute and prolonged effect of patulin exposure on adrenergic receptor signalling and epigenetic modifications in mice kidneys. C57BL/6 mice were orally administered patulin (2.5 mg/kg; 24 h and 10 d) at 0.250 ml/23 g daily. The mice kidneys were harvested, and the RNA, DNA, and protein were isolated for further studies. Quantitative PCR (qPCR) was used to quantify the relative gene expression of the alpha-adrenergic receptors (ADRA1, ADRA2A, ADRA2B) and associated signalling pathways (MAPK, MAPK14, ERK, PI3K, and AKT). Furthermore, the protein expression of ERK1/2 and MAPK was assessed using western blotting. The effect of patulin on DNA methylation was evaluated by quantifying the global DNA methylation status and gene expression of DNMT1, DNMT3A, DNMT3B, and MBD2. The gene expression of ADRA1, ADRA2A, ADRA2B, PI3K, and AKT were significantly downregulated by patulin, whereas the ERK1/2 and MAPK expression was upregulated. Patulin also upregulated the gene expression of DNMT1 while decreasing DNMT3A, DNMT3B, and MBD2 and inducing global DNA hypomethylation in mice kidneys. In conclusion, patulin alters the alpha-1 adrenergic receptors and associated signalling pathways and induces epigenetic modifications, leading to severe kidney injury.
INVESTIGATING THE HOST-BINDING PROPERTIES OF NEISSERIA GONORRHOEAE IN SOUTH AFRICAN POPULATION

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Background
CEACAM 3 (expressed by human granulocytes), results in the uptake and destruction of Opa-expressing Neisseria gonorrhoeae, hence limiting the gonococci spread. This study determined the virulence factor-host binding profile of gonococcal strains isolated from a South African population.

Method
Clinical isolates of N. gonorrhoeae (2 symptomatic vs. 1 asymptomatic) were isolated from pregnant South African women. Each isolate’s unique Opa proteins were identified via Sanger sequencing. The Opa proteins were cloned and constitutively expressed in Escherichia coli and were induced for protein expression by IPTG. Expression of the soluble N-terminal domains of human CEACAMs in 293 cells and binding assays with different Opa-expressed bacteria were performed.

Results
In both symptomatic and asymptomatic patients, most of the unique Opa proteins are bound to > 1 of the recombinant CEACAM domains. CEACAM-recognizing Opa proteins of the isolates can be grouped into two categories. The first is a large group of Opa proteins that binds only to epithelial cell CEACAMs. A second group is a small group of Opa proteins that binds to epithelial CEACAMs and to the granulocyte restricted CEACAM 3.

Conclusion
The binding pattern suggests that Opa proteins binding to CEACAMs are consistent in symptomatic and asymptomatic patients.
SPORT SCIENCE AND NON-SPORT SCIENCE STUDENTS’ MOTIVATIONS AND BARRIERS FOR GYM BASED EXERCISE IN A UNIVERSITY GYM SETTING

Mbuso Sibazo, Lonwabo Njani

Introduction
Numerous studies have been published regarding the motivations and barriers to exercise in tertiary education students, with varying outcomes observed.

Aims
To determine if there were any differences between the sport sciences (SS) and non-sport science (NSS) students in terms of motivations and barriers to gym-based exercise.

Methods
Registered UKZN students SS (75) and NSS (75) students were recruited. A Likert scale descriptive questionnaire was used. The subscales included expenses, fatigue, geographical factors, health-related factors, perception, personal reasons, social factors, time availability, and discipline & work-related factors.

Results
Regarding motivation, results showed that there were no significant differences between SS & NSS students. Significant differences in barriers to exercise between the two groups were noted. The main motives for exercise were personal reasons, discipline & work-related factors, and the main barriers were fatigue, expenses, and geographical factors. NSS students rated perception as fifth on the scale compared to SS (7th), suggesting increased feelings of self-consciousness when exercising in the gym facility compared to the SS students.

Conclusion
There is a need to focus on reducing barriers in sub-groups, to increase exercise adherence and recruitment of new gym members and/or maintain current members.
THE ASSOCIATION BETWEEN HPA AXIS ACTIVITY AND PREDIABETES IN PATIENTS

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Introduction
A dysregulated hypothalamic-pituitary-adrenal (HPA) axis in type 2 diabetic patients, a condition preceded by prediabetes, has been shown to worsen the hyperglycaemic state increasing the risk of depression. However, HPA axis activity in a prediabetic state is not well known, and whether the prediabetic state affects HPA axis regulation.

Aim
This study investigated the activity of the HPA axis in selected markers and the stress hormones related to HPA axis regulation in prediabetic patients.

Methods
The study used stored samples obtained from non-diabetic adults between the ages of 25-45 of all ethnicities from King Edward Hospital. The samples were divided into 2 groups, non-prediabetic (NPD) (n=40) and prediabetic (PD) (n=40) according to the patient’s glycated haemoglobin percentage. Insulin, cortisol (CORT) adrenocorticotropic hormone (ACTH), and epinephrine concentrations were measured from the samples.

Results
Insulin, CORT, and ACTH concentrations of the PD group were increased by comparison to the NPD group. This was followed by the observation of a decrease in epinephrine concentration in the PD group by comparison to the NPD group.

Conclusion
These observations, together, suggest that prediabetes is associated with impaired HPA axis activity and alters HPA axis regulation indicating altered stress response.
THE EFFECTS OFoleanolic Acid (OA) ON Red Blood Cell Structure AND Function IN Pups Born FROM L-NAME INDUCED PREECLAMPTIC DAMS

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Introduction
Infants delivered from preeclamptic pregnancies frequently exhibit haematological abnormalities despite current treatment strategies, indicating the need to develop alternative approaches. Our laboratory has demonstrated oleanolic acids (OA) antihypertensive effects in diabetic models which resulted in significant improvements to haematological dysfunction. However, whether these effects extend to resolving haematological abnormalities in preeclamptic mothers and their offspring remains unknown.

Aim
This study investigated the haematological function of offspring born from preeclamptic Sprague Dawley dams treated with OA.

Methods
Pups were obtained from normal and L-NAME-induced preeclamptic dams, as well as preeclamptic dams treated with OA and sildenafil citrate, and weighed at birth. The animals were then bred for 9 weeks and subjected to sacrifice; blood and plasma were subsequently collected for haematological (full blood count), biochemical analysis (erythropoietin [EPO]), malondialdehyde (MDA), glutathione peroxidase (GPx) and superoxide dismutase (SOD).

Results
Results indicated that pups born from preeclamptic dams exhibited significantly lower birth weights than those born from normal pregnancies, these disparities were mitigated in pups born from dams who received OA. Moreover, pups delivered from OA-treated dams displayed improved red blood cell (RBC) indices, EPO levels, MDA, SOD, and GPx concentrations compared to those delivered from untreated preeclamptic dams.

Conclusion
These findings suggest that OA administration modulates the haematological parameters of offspring born from preeclamptic pregnancies.
ASSESSING HEALTHCARE PRACTITIONER’S KNOWLEDGE, PERCEPTIONS AND PRACTICES ABOUT DIABETES SCREENING AT PRIMARY HEALTHCARE CLINICS (PHC) AT ETHEKWINI NORTH IN KWAZULU NATAL.

Siphamandla Mkhize, Serela Ramklass, UKZN

Introduction
Non-communicable diseases (NCDs) are the leading cause of death in South Africa. Amongst these, diabetes is reported to account for 69 deaths per day. People living with diabetes are known to access services at the primary healthcare level and have frequent contact with healthcare practitioners (HCPs) at these sites. Assessing the knowledge, perceptions, and practices of diabetes screening of these HCPs is important to identify enabling or inhibiting factors to diabetic patient care at this level of practice.

Aim
This study identified barriers and facilitators of diabetes screening from the knowledge, perceptions, and practices of healthcare practitioners at primary healthcare clinics.

Methods
This quantitative study adopted an observational analytic cross-sectional survey design to collect data from 37 nurses employed at public sector primary healthcare clinics in the eThekwini North area using an interviewer-administered questionnaire.

Results
Despite agreeing with the perceived benefits of diabetes screening, HCPs in this study displayed poor understanding and interpretation of diabetes screening and cut-off points that guide appropriate management. Poor HCP awareness of diabetes screening and diagnosis undermines the detection of diabetes leading to patient morbidity, disability, and mortality.

Conclusion
This study identified the need for continuing education programs to upskill HCPs; and the need for community health education and promotion to aid in early diabetes prevention, and improved diagnosis and treatment.
The present study is aimed at the employment of tocopherol succinate and eugenol for the preparation of efflux pump inhibitory nanostructured lipid carriers (NLCs) for ciprofloxacin (CIP) intravenous delivery against methicillin-resistant Staphylococcus aureus (MRSA) and Staphylococcus aureus.

CIP-NLCs fabricated using hot homogenization/ultrasonication technique were characterized and had a particle size of 105.8 +/- 0.38 nm, polydispersity index of 0.167 +/- 0.005, a zeta potential of -20.8 +/- 0.067, and entrapment efficiency of 82.7 +/- 2.23%. CIP-NLCs showed sustained release; at 4 hours, approximately 60% at the same time interval, free CIP was completely released. In vitro, antibacterial activity revealed that the CIP-loaded NLCs had 2-fold higher activity than the bare CIP. CIP-loaded NLCs had a superior biofilm elimination than free CIP. Furthermore, efflux pump studies showed the accumulation of ethidium bromide on the pre-treated by CIP-NLCs on MRSA, which indicates efflux pump inhibitory activity of NLCs. Therefore, this efflux pump inhibitory NLCs show potential for improved delivery of CIP and overcoming multidrug resistance.
PREVALENCE OF DEPRESSION, ANXIETY AND BURNOUT IN MEDICAL STUDENTS AT THE UNIVERSITY OF NAMIBIA

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Introduction
There is an increased prevalence of depression, anxiety, and burnout among medical students worldwide with no information from Namibia.

Aim
This study aimed to determine the prevalence of depression, anxiety, and burnout among medical students at the University of Namibia.

Methods
A quantitative descriptive cross-sectional survey was conducted utilizing a specially designed questionnaire for the study and standardized instruments to evaluate depression, anxiety, and burnout.

Results/Discussion
Of the 229 students in this study, 71.6% were female and 28.4% were male. The prevalence of depression, anxiety, and burnout was 43.6%, 30.6%, and 36.2%, respectively. The prevalence of emotional exhaustion, cynicism, and professional efficacy was 68.1% (n = 156), 77.3% (n = 177), and 53.3% (n = 122), respectively. In the final regression model, participants with a current psychiatric illness were more likely to screen positive for depression (adjusted odds ratio [aOR] 4.06, confidence interval [CI] 1.28–12.91; p = 0.02) and anxiety (aOR: 3.63, CI: 1.17–11.23; p = 0.03). Emotional exhaustion and cynicism were significantly associated with the female gender (EX: aOR, 0.40, CI: 0.20–0.79; p = 0.01) (CY: aOR, 0.42, CI: 0.20–0.91; p = 0.03).

Conclusion
More than one in three medical students at UNAM were depressed or Burnt-out.
EPIGENETIC ALTERATION OF M. TUBERCULOSIS COMPLEX STRAINS DURING EXPOSURE TO CHOLESTEROL REVEAL UNIQUE METHYLOME MOTIFS

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Previous studies have revealed that cholesterol is a crucial carbon source utilised by Mycobacterium tuberculosis and contributes to Tuberculosis infection and pathogenesis. The current study aimed to investigate the epigenetic changes during growth in cholesterol-rich media. The Mycobacterium tuberculosis complex (MTBC) lineage 8 strain together with the laboratory H37Rv were cultured in Middlebrook 7H9 and minimal media supplemented with cholesterol followed by DNA extraction, PacBio SMRT sequencing, and methylome characterization using RS Modification and Motif Analysis and DistAMo. The highest significantly methylated motifs, CTCCAG, CTGGAG, and VNCYGVNYR coding for Rv2060, rseA, and Rv1175 genes, respectively, were detected in H37Rv grown in 7H9 while an additional CYGVNYR motif was detected during growth in cholesterol-rich media. This was in contrast to the RNCYGVNYR motif detected in the Rv3632 gene for MTBC Lineage 8 strain during growth in 7H9 compared to CBBV, CTACCCGVC, GATNNNNRTAC, GNCTACSCA, GTAYNNNNATC, GVGGYMVCR and CACGCAGHNH motifs detected for pks8, Rv2459, PE_PGRS16, vapC22, fadD2, sseA, ackA genes, respectively. The current findings reveal that the clinical MTBC strains have distinct epigenetic regulations compared to the laboratory H37Rv strain, hence complete characterization of the MTBC methylation profiles in the presence of cholesterol-rich environments could provide insight into the development of novel treatment methods.
DNA methylation-mediated gene regulation has been recently associated with host-virus interaction. Previously, HIV was shown to alter the DNA methylation profiles of the host. However, these studies examined unrelated individuals which failed to take into consideration the effects of genetic and lifestyle factors on DNA methylation. Thus, this aimed to determine the effects of DNA methylation on HIV pathophysiology in a longitudinal cohort. The Infinium EPIC methylation array was used to determine the methylation profiles of PBMCs collected from 100 HIV-positive individuals followed up for 2 years. To determine differential methylation probes (DMPs) across the different time points, M-values were calculated for each probe and used for downstream analysis. We identified 8 DMPs across pre-infection and post-infection and 14,274 DMPs between pre-treatment and post-treatment timepoints. Clustering of CpG probes using Independent Component Analysis was used to assess functional enrichment. Viral loads and CD4+ T cell counts were taken into consideration in the construction of ICA clusters. Both viral load and CD4 count were shown to associate with one ICA module. Gene Ontology enrichment was performed on this module using the genes linked to the CpG probes, which revealed associations with Interleukin-1 regulation (associated with HIV-1 infectivity), viral entry/viral processes, histone modifications, and B-cell proliferation. Data from this study shows that genome methylation patterns vary across different stages of HIV infection and that these methylation patterns might have an impact on controlling HIV infection and may prove crucial for the development of future therapeutic interventions aimed at HIV-1 cure.
VIRTUAL SCREENING OF THE SOUTH AFRICAN NATURAL COMPOUNDS DATABASE FOR THE IDENTIFICATION OF POTENTIAL INHIBITORS AGAINST M. TUBERCULOSIS MMPL3.

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Introduction/Aim(s)
Tuberculosis (TB) has developed into a global health crisis, particularly in South Africa. The increase in drug-resistant strains exacerbates the need to develop novel TB treatments. MMP-L3 is a drug target for TB treatment, given its role in mycobacterial cell envelope biosynthesis. This study identifies a natural compound Cephalostatin5 as a potential inhibitor of MMP-L3.

Methods
Compounds from SANCDB were virtually screened through molecular docking against MMP-L3 to identify a hit. MD simulations of the MMP-L3-hit complex were performed using Amber18 software. MM/PBSA method was used to calculate the binding energy of MMP-L3-hit. CPPTRAJ was used to calculate RMSD, RMSF, and hydrogen bond formation to characterize MMP-L3-hit dynamics. ADMET properties of the hit were predicted using the SwissADME server.

Results
The identified hit, Cephalostatin5 (docking score = -9.3 kcal/mol), binds at the same site as MMP-L3 natural substrate, trehalose monomycolate (TMM), with an average binding energy of -45.89±4.45 kcal/mol. Cephalostatin5 formed more hydrogen bonds with MMP-L3 and exhibited low RMSD and RMSF values compared to those reported for TMM. Cephalostatin5 also displayed lower toxicity than the existing drug that targets MMP-L3, SQ109.

Discussion/conclusions
Cephalostatin5 binds to MMP-L3 at the same site as TMM with binding affinity resonating mainly from intermolecular van der Waals forces (-59.58±4.81 kcal/mol). V379 stabilizes the complex by hydrogen bond formation with Cephalostatin5. Structural conformation of Cephalostatin5 limits residue mobility at the binding site. Thus, Cephalostatin5 potentially competes with TMM for binding to MMP-L3. This study supports Cephalostatin5 as a potential inhibitor of MMP-L3 with a preferred toxicity profile over SQ109.
THE EFFECTS OF CONSUMING AMINO ACIDS L-ARGININE, L-CITRULLINE (AND IN COMBINATION) AS A BEVERAGE OR POWDER ON ATHLETIC PERFORMANCE. A SYSTEMATIC REVIEW

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Introduction
Consumption of amino acids L-arginine (L-Arg) and L-citrulline (L-Cit) are purported to increase nitric oxide (NO) production and improve physical performance. Clinical trials have shown relatively more favourable outcomes than not after supplementing with L-Cit and combined L-Arg and L-Cit. However, in most studies, other active ingredients such as malate were included in the supplement.

Objective
To determine the efficacy of consuming standalone L-Arg, L-Cit, and (in combination) on blood NO level and physical performance markers.

Methods
A systematic review was undertaken following PRISMA2020 guidelines (PROSPERO: CRD42021287530). PubMed, EBSCOhost, Science Direct, and Google scholar databases were used.

Results
An acute dose of 0.075 g/kg of L-Arg or 6 g L-Arg had no significant increase in NO biomarkers and physical performance markers (p > 0.05). Consumption of 2.4 to 6 g/day of L-Cit over 7 to 16 days significantly increased NO level and physical performance markers (p < 0.05). Combined L-Arg and L-Cit supplementation significantly increased circulating NO, improved performance, and reduced feelings of exertion (p < 0.05).

Conclusion
Standalone L-Cit and combined L-Arg with L-Cit consumed over several days effectively increases circulating NO and improves physical performance and feelings of exertion in recreationally active and well-trained athletes.
The awareness, attitudes and perceptions of young adults towards leisure noise at a university in Durban, South Africa.

Husna Mahomed and Seema Panday

Discipline of Audiology

Young adults are exposed to high noise levels in leisure venues, which increases their risk of hearing loss, which can affect their quality of life.

This study aimed to describe the young adult’s awareness, attitudes, and perceptions towards leisure noise.

The descriptive design entailed using a cross-sectional study, with an online questionnaire survey using quantitative methods. Students from first to fourth years in the Education Department of a local university in Durban, South Africa, who were aged 18-25 years old were invited to participate.

Of the 462 participants, most had a general awareness of noise and hearing loss but lacked knowledge of the negative effect of loud noise, with 95.2% using personal listening devices and 48.3% being unsure if noise can damage hearing permanently. They were unaware of methods to reduce their exposure to noise. A significant relationship between awareness of noise and attitudes ($p = 0.029$) indicated that the higher the level of awareness regarding leisure noise, the better their attitude and behavior, and the lower the risk of hearing loss.

The results highlight the need for implementing the World Health Organisation noise regulations and providing education to prevent irreversible hearing loss through exposure to leisure noise.
INVESTIGATING THE ROLE OF 2', 5'-OLIGOADENYLATES-1 IN HIV INFECTION

Anmol Gokul
CAPRISA, HPP

OAS-1 is a member of the OAS family and is responsible for antiviral activity. Over the past two decades, several studies have linked OAS-1 to HIV. More recently, the OAS-1 gene has been linked to disease severity caused by the SARS-CoV-2 virus, which led to a global pandemic. The African continent demonstrates a skewed prevalence of infectious diseases. A growing number of studies have demonstrated that one of the factors contributing to the elevated levels of infectious diseases within Africa could be due to the genomic diversity present within the continent.

The objective of the study is to investigate the expression levels of OAS-1 in HIV infection and associate them with disease outcomes. Explore the OAS-1 ethnic-specific genomic diversity among polymorphisms with clinical significance and investigate the role of methylation in HIV progression and disease severity.

Methods include DNA and RNA extraction, SNP genotyping, Sanger sequencing, and Bi-sulfide conversion.

Examining a subset of samples, we observed the expression of OAS-1 associated significantly with HIV disease progression. The data analysis of the time points showed that post-infection (3 months) vs pre-treatment (>2 years) had a statistically significant test result (p-value=0.0194), thus showing a high effect.

The preliminary data of this study, demonstrate the clinical utility of OAS-1 in HIV infection as a therapeutic intervention.
SESSION 4, TRACK 1

HIGH-DOSE ORAL CONTRACEPTIVES INDUCE HYPERINSULINEMIA WITHOUT ALTERING IMMUNE ACTIVATION IN DIET-INDUCED OBESITY WHICH PERSISTS EVEN FOLLOWING A DIETARY LOW-FAT DIET INTERVENTION.

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Introduction
Combined oral contraceptives (COCs) are known to interfere with weight gain, altered metabolic and immunological pathways. However, the modifications in arterial or venous thrombotic risk profiles of women on combined oral contraceptives remain unclear.

Aims
To assess the impact of COC on immune activation in diet-induced obesity (DIO) and to assess whether the dietary intervention of switching from a high-fat diet to a low-fat diet attenuates immunological responses.

Methods
The study design involved twenty-five-weeks-old female Sprague Dawley rats weighing between 150-200g were used for this study. In the first experimental phase, animals were randomly divided into 2 diet groups HFD (n=15) and LFD (n=5) that were monitored for eight weeks. After eight weeks, animals in the HFD group switched diets to LFD and were randomly grouped to receive high-dose COC (HCOC) and low-dose COC (LCOC) for 6 weeks.

Results
Animals kept on the HFD significantly gained weight and had a high index when compared to the LFD group (p < 0.05). Moreover, the triglyceride-glucose index (TyG) was also increased in the HFD group when compared LFD group (p < 0.001). Notably, the levels of IL-6 and TNFα were elevated in the HFD group when compared to the LFD group (p < 0.05). Interestingly, after switching from a high-fat to a low-fat diet, animals on HCOC treatment had persistently elevated insulin levels when compared to the LFD and HFD groups respectively (p < 0.05).

Conclusion
In a rat model of HFD-feeding, short-term HCOC treatment induces long-term metabolic dysregulation which persists despite dietary intervention. However, additional studies are required to confirm these findings, especially the long-term effects of this treatment on immune activation in conditions of obesity.
CASE SERIES: DESCRIBING CLINICAL FEATURES OF INSTI NAÏVE PATIENTS WITH DTG RESISTANCE IN KWAZULU-NATAL


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Introduction
South Africa transitioned to dolutegravir (DTG) based antiretroviral therapy (ART) in 2019. Its main advantages include superior viral suppression rates and a higher genetic barrier to resistance. Few cases of DTG resistance are reported in INSTI-naïve patients. We describe four cases of DTG resistance that emerged between 2021-2022.

Case summaries

Case 1 – A 33-year-old male on fixed dose combination (FDC) of TEE - Tenofovir (TDF), Emtricitabine (FTC) and Efavirenz (EFV) since 2017 was switched to TDF, Lamuvidine (3TC) and DTG (TLD) FDC in 2020. There was a virologic and immunological failure with AIDS-defining illnesses. HIV drug resistance genotyping (HIVDRT) in 2021 showed multi-class drug resistance including high-level resistance (HLR) to DTG.

Case 2 – A 32-year-old female on TEE from 2016 defaulted to ART from 2018-2020. She was re-initiated on TLD in 2020 which she continued to fail. She was also in immunological failure since ART initiation with several opportunistic infections. HIVDRT in 2021 indicated multi-class drug resistance including intermediate DTG resistance.

Case 3 - A 38-year-old male was initiated on TEE in 2017 and switched to TLD in 2020. He had virologic and immunological failure with AIDS-defining illnesses. HIVDRT in 2021 showed multi-class drug resistance including HLR to DTG.

Case 4 - A 37-year-old female on TEE from 2015 was switched to AZT, 3TC, and DTG in 2020. Both virologic and immunological failure continued. HIVDRT in 2022 demonstrated HLR to DTG and AZT.

Conclusion
This case series sheds light on the clinical features of patients that developed DTG resistance. Common factors include virologic and immunological failure with opportunistic infections. A major concern is the development of DTG resistance within two years.
Background
Highly active Antiretroviral drugs (HAART) have significantly reduced the transmission and mortality associated with Human immunodeficiency virus (HIV). Antiretroviral drugs cannot eradicate the virus from reservoirs, drug toxicity and emergence of drug resistance also posed a challenge. New classes of antiviral drugs are required to improve the HIV-1 treatment. Our recent study showed that Alternaria alternata partially purified secondary metabolites inhibit the replication of HIV-1 subtype B (NL4.3). Therefore, this study aims to test the anti-HIV-1 activity of A. alternata partially purified bioactive secondary metabolites on different HIV subtypes.

Material and methods
Cell cytotoxicity (CC50) and viability of the bioactive secondary metabolites from A. Alternata were assessed on TZM-bl cells using a 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) assay. Anti-HIV-1 activities of A. Alternate secondary metabolites on different HIV-1 subtypes (A, B, C, and D) were assessed by a luciferase based-antiviral assay to determine the percent inhibition, inhibitory concentration (IC50), and selective index (SI) of the A. alternata secondary metabolites.

Results and Discussion
Cell cytotoxicity of the crude extract expressed as CC50 was >285 μg/mL and the cell viability was 83%, which suggests the crude extract is not cytotoxic. The secondary metabolites were able to achieve 100% inhibition of subtype A (MC 2297 and PC 148), subtype B (PNL4.3), subtype C (CM019.B and CM054.11.6), and subtype D (PC 060 and PC 178). The IC50 of the viruses tested were MC 2297 (0.34 μg/mL), PC 148 (0.31 μg/mL), PNL4.3 (0.59 μg/mL), CM019.B (1.53 μg/mL), CM054.11.6 (2.44 μg/mL), PC 060 (1.59 μg/mL) and PC 178 (0.12 μg/mL). The subtype D virus PC 178 had the lowest IC50 compared to the positive control AZT (azidothymidine) which was 0.13 μg/mL indicating that it is a potent inhibitor of HIV-1 subtype D. The IC50 of the viruses tested were MC 2297 (838.0 μg/mL), PC 148 (919.38 μg/mL), PNL4.3 (477.47 μg/mL), CM019.B (186.27 μg/mL), CM054.11.6 (95.19 μg/mL), PC 060 (179.25 μg/mL) and PC 178 (2375.0 μg/mL). The selective indexes (CC50/IC50) SI for subtype D PC 178 was the highest indicating that compared to positive control AZT (1869.86 μg/mL) it has high potency with potential for second-phase testing.

DIABETES RELATED KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS EXERCISE AND ITS BENEFITS AMONG INDIVIDUALS WITH TYPE-2 DIABETES MELLITUS

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Introduction
Exercise plays an important role in preventing the progression of Type 2 Diabetes Mellitus (T2DM) and related complications. Exercise intervention has numerous benefits such as improved blood glucose uptake, blood glucose control, and decreases risk of developing further complications and other non-communicable diseases.

Aim
To determine participants' diabetes-related knowledge, attitude, and practice (KAP) towards exercise and its benefits among individuals with T2DM.

Methods
One hundred and ninety-nine participants, aged between 18-75 years from 2 sites in the greater Durban area, namely, Church located in the CBD, Cathedral Street, and Chesterville participated in the study. A validated questionnaire which consisted of KAP questions about exercise and its benefits, evaluated by true/false or unsure was utilised in the study. Descriptive and inferential statistics analysis was used to analyse data with the significance set at p<0.05.

Results
Knowledge of exercise and its benefits were reported to be significantly poor (p < 0.001), with the majority of 82% of people with T2DM did not know that physical activity and exercise are different. Attitude results showed that a significant 79.4% felt that their regular work can be used as a substitution to exercise (p<0.001), with 79.4% of participants showing good practice towards exercise (p<0.001).

Conclusion
The majority of participants in this study reported poor knowledge and attitude towards exercise. However, participants demonstrated good practice towards exercise. Therefore, educational programmes on exercise and lifestyle interventions are necessary to improve poor knowledge and attitude toward exercise in these individuals.
Colorectal cancer (CRC) is the third most common malignancy detected and the second leading cause of cancer-related mortality. Metal chelators are promising anticancer drugs. Hexacyclen is a potent metal chelator. This study investigated the molecular mechanisms of Hexacyclen in CRC cells. The MTT assay determined cytotoxicity and yielded IC20 and IC50 concentrations for testing. Mitochondrial integrity was assessed by ATP and mitochondrial membrane potential (ΔΨm) assays. Cellular oxidants were quantified by the TBARS and NOS assays, and the antioxidant response of SOD2, GSH, and Gpx1 ascertained oxidative stress. Caspase activity (-8, -9, -3/7) and phosphatidylserine externalisation evaluated cell death by apoptosis and was verified by the apoptotic proteins (NF-κB, Bcl-2, HSP70, and PARP). Cytotoxicity was established by decreased cell viability (IC20 and IC50 of 1.2µM and 5µM, respectively) and was consistent with decreased ATP and slightly altered ΔΨm. The non-significant increase in RNS and ROS was associated with increased SOD2, Gpx1, and GSH. Apoptosis was initiated by caspase-8 and caspase-9, while the NF-κB, Bcl-2, and HSP70 anti-apoptotic proteins were downregulated. Increased executioner caspase 3/7 was accompanied by phosphatidylserine externalisation. The data indicate that Hexacyclen induced ROS/RNS-mediated apoptosis in Caco2 cells. Interestingly, apoptosis proceeded concurrently with a reduction in the NF-κB cell survival pathway.
Introduction
SARS-CoV-2 infection has affected over 700 million with close to 7 million deaths globally. Studies investigating the association between HIV infection and SARS-CoV-2 outcome have yielded conflicting results. Furthermore, varying disease severity is described across ethnic groups.

Aims
The study aims to determine: 1. SARS-CoV-2 disease outcomes across ethnic groups in South Africa. 2. Association of specific comorbidities and COVID-19 severity. 3. Vaccine uptake and ivermectin use across demographic groups.

Methods
Participants who were SARS-CoV-2 positive were recruited in a longitudinal cohort (n=589). A questionnaire was completed, and patients were stratified into disease severities (mild, moderate, and severe).

Results/ Discussion
We showed that African individuals were more likely to experience mild disease compared to severe. HIV-positive individuals are more likely to not require hospitalization (p = 0.0057; OR = 0.22; 95% CI = 0.082 to 0.561). We observed that 150 (62.8%) African participants reported being unvaccinated (p<0,0001) compared to 69 (28.9%) Asian participants. Lastly, Ivermectin use during SARS-CoV-2 infection is associated with severe COVID-19 in Asian individuals.

Conclusion
Whilst African individuals were more likely to be unvaccinated, interestingly, they were associated with mild disease. This implicates host genetics in disease outcomes. In addition, HIV infection played a protective role in SARS-CoV-2 infection as these individuals were unlikely to suffer from severe disease.
PROGRAMMED DEATH-LIGAND 1 EXPRESSION ON T LYMPHOCYTES IS ASSOCIATED WITH B2-MICROGLOBULIN LEVELS IN TREATMENT-NAÏVE PATIENTS WITH CHRONIC LYMPHOCYTIC LEUKAEMIA

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Introduction
The aberrant expression of co-inhibitory proteins has been reported in patients with chronic lymphocytic leukemia (CLL). The predictive value of β2 microglobulin (β2M) as a biomarker in effectively identifying the efficacy of immune checkpoint inhibition in untreated patients with CLL has not been explored.

Aims
Thus, this study aimed at assessing immune checkpoint-mediated responses in untreated patients with CLL. Moreover, to investigate the correlation between immune checkpoint expression on T cells and β2M levels.

Methods
We evaluated immune checkpoint expression on T helper and cytotoxic T cells in patients with CLL using flow cytometry. In addition, baseline β2M and soluble programmed cell death protein 1 (PD-1) levels were also measured using the ELISA protocol.

Results
After adjusting for age and sex, β2M levels correlated with soluble PD-1 (r = 0.65, p = 0.022), and the surface expression of PD-L1 (r = 0.60, p = 0.036) on T cells.

Conclusion
The current results suggest immune checkpoint profiling in patients with CLL, and the association between β2M and the PD1/PD-L1-axis may be useful in identifying patients that may benefit from PD-1/PD-L1 checkpoint-based therapies. In addition, serum levels of PD-1 and PD-L1 in T cells are associated with markers of disease progression in patients with CLL.
The Renin-Angiotensin-Aldosterone System (RAAS) is implicated in the pathophysiology of preeclampsia (PE). Immunoexpression of AT1R, AT2R, and AT4R was evaluated within the placental bed of PE vs. normotensive (N) pregnancies stratified by HIV status. Placental bed (PB) biopsies (n = 180), were obtained from N and PE women. Both groups were stratified by HIV status and gestational age into early-and late onset-PE. Immuno-labeling of AT1R, AT2R, and AT4R was quantified using morphometric image analysis. An up-regulation of AT1R expression was noted in PE compared to the N group (p < 0.0001). Down-regulation of AT2R and AT4R expression was observed in PE vs. N group (p = 0.0042 and p < 0.0001), respectively. AT2R immunoexpression declined between HIV+ve and HIV−ve groups, while AT1R and AT4R displayed an increase. An increase in AT1R expression was noted in the EOPE−ve/+ve and LOPE−ve/+ve compared to N−ve/N+ve. In contrast, AT2R and AT4R expression decreased in EOPE−ve/+ve and LOPE-ve/+ve compared to N−ve/N+ve. A significant down-regulation of AT2R and AT4R with a concomitant elevated AT1R immunoexpression within PB of HIV-infected PE women was noted. Notable decline in AT2R and AT4R with an increase in AT1R immunoexpression in PE, EOPE, and LOPE vs. normotensive pregnancies, irrespective of HIV status.
The persistence of the latent HIV reservoir is a major block to cure. The viral promotor, long terminal repeat (LTR), drives viral transcription and is enhanced by the Transactivator of transcription (Tat). Inter- and intra-subtype LTR and genetic variation has been shown to translate into functional differences. However, the effect of this genetic variation on viral latency development or reversal is unknown. Furthermore, the only HIV latency model available is subtype B based, referred to as JLAT. On the other hand, HIV-1C is responsible for approximately 46% of global HIV infections and is predominant in sub-Saharan Africa. Therefore, a minimal genome reporter virus for subtype C (termed “C731CC”) was constructed using HIV-1C consensus LTR and Tat. Jurkat cells were infected with C731CC to develop the JLAT C model of latency. The reactivation potential of HIV-1 subtypes B and C was determined. We demonstrate that both subtypes express the same levels of Tat. Interestingly, HIV-1B was twice as sensitive to stimulation with PMA, compared to subtype C suggesting that subtype C has a higher propensity for latency establishment than subtype B. Ongoing studies involve measuring the number of integrated copies with Alu-gag PCR in both subtypes. We also replaced the consensus HIV-1C LTR and Tat in C731CC with patient-derived sequences and measured the reactivation potential of the different patient viruses with different latency-reversing agents. We demonstrate that there was variable reactivation among these patient viruses, suggesting that the HIV-1 LTR could play a role in the propensity for latency establishment and/or reversal.
ANTIRETROVIRALS PROMOTE INSULIN RESISTANCE IN HEPG2 LIVER CELLS THROUGH MIRNA REGULATION AND TRANSCRIPTIONAL ACTIVATION OF THE NLRP3 INFLAMMASOME

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Metabolic syndrome (MetS) is a non-communicable disease characterized by a cluster of metabolic irregularities. The prevalence of MetS in people living with HIV and antiretroviral (ARV) usage is increasing rapidly. Insulin resistance is a common characteristic of MetS that leads to the development of Type 2 diabetes mellitus. The progression of insulin resistance (IR) is strongly linked to inflammasome activation. This study aimed to draw links between the combinational use of Tenofovir disoproxil fumarate, Lamivudine, and Dolutegravir and inflammasome activation and subsequent promotion of IR following a 120-h treatment period in HepG2 liver in vitro cell model. Furthermore, we assessed microRNA expression as a negative regulator of the IRS1/AKT signalling pathway. The relative expression of target proteins was quantified using Western Blots, and mRNA levels were assessed using Quantitative PCR. Caspase-1 activity was measured using luminometry. Following ARV exposure, NLRP3 and IL-1β mRNA expression and caspase-1 activity significantly increased. Additionally, JNK mRNA expression was upregulated with coinciding increases in p-IRS1 protein expression and decreased IRS1 mRNA expression. Consequently, AKT and PI3K mRNA expressions decreased with significant upregulation of miR-28a expression. Results indicate combinational use of ARVs upregulates inflammasome activation and promotes IR through dysregulation of the IRS1/PI3K/AKT insulin signalling pathway.
SPIRULINA PLATENSIS AMELIORATES OXIDATIVE STRESS ASSOCIATED WITH ANTIRETROVIRAL DRUGS IN HEPG2 CELLS

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Lately, Spirulina platensis (SP), as an antioxidant, has exhibited high potency in the treatment of oxidative stress, diabetes, immune disorder, inflammatory stress, and bacterial and viral-related diseases. This study investigated the possible protective role of SP against ARV-induced oxidative stress in HepG2 cells. HepG2 cells were treated with ARVs for 96h and thereafter treated with SP for 24 h. After the treatments, the gene and protein expressions of the antioxidant response pathway were determined using a quantitative polymerase chain reaction (qPCR) and Western blots. The results show that SP increased the transcript levels of NRF-2 (p = 0.0021), Keap1 (p = 0.0002), CAT (p < 0.0001), and NQO-1 (p = 0.1432) in the HepG2 cells. Furthermore, HAART-SP induced an NRF-2 pathway response through upregulating NRF-2 (except for FTC-SP) (p < 0.0001), CAT (p < 0.0001), and NQO-1 (except for FTC-SP) (p < 0.0001) mRNA expression. In addition, NRF-2 (p = 0.0085) and pNRF-2 (p < 0.0001) protein expression was upregulated in the HepG2 cells post-exposure to HAART-SP. The results, therefore, allude to the fact that SP has the potential to mitigate HAART-adverse drug reactions (HAART toxicity) through the activation of antioxidant response in HepG2 cells.
The WHO reported that 37 million individuals are living with HIV worldwide. This chronic disease is managed by the effective use of ARV drugs. However, prolonged ARV drug-induced toxicity use remains a clinically complex problem. The aim of this study was to investigate the toxicity of ARV drugs on mitochondria and the NRF2 pathway, and its possible amelioration using Moringa oleifera Lam leaf extracts (MO). Notably, a range of functional bioactive compounds are observed with MO. Therefore, HepG2 cells were treated with individual ARV drugs: TDF, FTC, and 3TC (96h), and MO (24h). Intracellular ROS, lipid peroxidation, GSH levels, ATP, and mitochondrial polarization were assessed. Protein (pNRF2, NRF2, SOD2, CAT, and Sirt3,) and mRNA (NRF2, CAT, SOD2, Sirt3, and PGC1α) expression were measured using Western blot and qPCR, respectively. There was a significant reduction in MDA and LDH levels post-MO treatment. MO significantly reduced intracellular ROS, while increasing GSH, ATP, and mitochondrial membrane polarization. The addition of MO to ARV-treated cells significantly upregulated the expression of NRF2, SOD2, Sirt3, CAT, UCP2, PGC1α mRNA and pNRF2, NRF2, SOD2, Sirt3 proteins. MO ameliorates ARV-induced hepatotoxicity by scavenging oxidants through NRF2 pathway induction. MO shows great therapeutic potential as a supplement.
PERCEPTIONS OF SOUTH AFRICAN ATHLETES WITH DISABILITIES TO OPTIMIZE PARTICIPATION IN SPORT DURING GLOBAL PANDEMICS SUCH AS COVID-19.

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Introduction
COVID-19 has disadvantaged athletes with disabilities, and it is unknown how the impact affected their sport participation.

Aim of the study
The objective of this study was to explore the lived experiences and challenges of South African athletes with disabilities concerning sports participation during the COVID-19 pandemic.

Methods
A qualitative approach of semi-structured interviews were used to explore perceptions of athletes with disabilities (n=7) in the preceding context. Data were analysed using themes, sub-themes, and illustrative quotes reflective of what participants would like policymakers to be aware of concerning sports participation and its optimization, among disabled athletes, during the global pandemic.

Results/Discussion
The main extrinsic barriers were related to lockdown regulations; transportation limitations; sports and training barriers; limited community access; and economic factors. Intrinsic barriers highlighted psychological and social factors. Athletes with disabilities coped with the COVID-19 pandemic by using three main facilitatory factors to overcome the pandemic burden namely, personal resilience, health expert intervention, and optimizing benefits during the COVID-19 crisis.

Conclusion
Recommendations to address participation in sports and physical activity among disabled athletes, during COVID-19 or future pandemics should be based on several considerations, such as financial assistance, social interaction, and providing safe exercise modes for participation.
EVALUATING THE IMPACT OF C171Q MUTATION ON THE POTENCY OF THIOLACTOMYCIN TO M. TUBERCULOSIS KASA BINDING POCKET: INSIGHTS FROM MOLECULAR DYNAMICS SIMULATIONS AND TAILORED-PHARMACOPHORE STUDIES

Kimona Kisten and K.E. Machaba

The evolution of Mycobacterium tuberculosis (Mtb) strains prompted novel approaches to drug design and discovery. Molecular Dynamics simulations (MD) and Virtual Screening (VS) methods have proven to be useful tools in investigating protein mutations and in the identification of potential inhibitors. In the present work, we aimed at investigating the impact of the C171Q mutation on the binding of Thiolactomycin (TLM) to M. tuberculosis β-ketoacyl ACP synthase (KasA) and to further discover potential inhibitors that could possibly bind to KasA through the strategic application of these methods. In analysing the crystal structure in its wild-type and C171Q mutant forms, systems were subjected to 200 ns MD simulations followed by MD analyses including MM/PBSA, RMSD, RoG, RMSF, and RIN. A tailored-pharmacophore approach was applied to identify potential drug hits against both the wild-type and C171Q mutant. The results of calculated binding free energies (ΔGtot) of the PubChem hit 44207286 displayed a higher ΔGtot of -35.75 kcal mol⁻¹ for the wild-type and -36.34 kcal mol⁻¹ for the C171Q mutation respectively compared to TLM. This study not only provides in silico insight into the impact of the C171Q mutation on TLM binding to KasA but also identified a new potential drug-like compound against KasA.
Introduction
The persistence of HIV-1 in latent reservoirs is the principal barrier to cure development. One strategy currently being pursued to eliminate latently infected cells is to stimulate virus production from latency, which has shown limited success in clinical trials. Therefore, new latency-reversing agents (LRAs) are necessary to reactivate latent viral reservoirs and facilitate HIV-1 eradication and cure development.

Aim
We investigated the effect of a plant-based traditional medicine product in the reactivation of latent HIV-1 reservoirs.

Methods
We assessed the effect of Mixture (4 plant combination) and SDK-2 (a single plant extract) alone or in combination with other LRAs (Panobinostat, Vorinostat, and TNF-alpha) on HIV-1 provirus expression in latent HIV-1 subtype B provirus (J-Lat B cells) and latent HIV-1 subtype C provirus (J-Lat C cells) following 24-hour incubation, as measured by GFP (green fluorescence probe) reporter expression by flow cytometry.

Results
Treatment of J-Lat B cells with control LRAs (Panobinostat, Vorinostat, and TNF-alpha) induced 17%, 1.49%, and 71.9% GFP positive cells respectively, whilst there was low GFP positive cell expression in J-Lat C cells. The combination of control LRAs with the Mixture showed low levels of activity when compared to the controls alone. When administered alone, SDK-2 induced 52.7% of J-Lat B cells and 34.4% of J-Lat C cells. Interestingly, when co-incubated with control LRAs, we observed 54.6% (SDK-2 + Panobinostat), 34.6% (SDK-2 + vorinostat), 87.2% (SDK-2 + TNF-alpha) of J-Lat B induced cells and 24.6% (SDK-2 + Panobinostat), 56.9% (SDK-2 + vorinostat) and 65.4% (SDK-2 + TNF-alpha) of J-Lat C induced GFP positive cells.

Conclusion
Our data show that SDK-2 was able to enhance the activities of control LRAs in J-Lat C cells and SDK-2 in combination with TNF-alpha exhibited synergistic effects.
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