VIROLOGY MATTERS

FEBRUARY 2019

Prof. ANNA-LISE WILLIAMSON awarded SAMRC Gold Medal

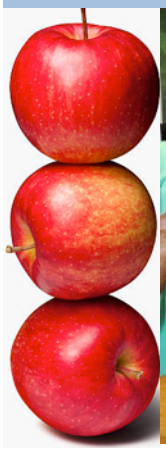
South African Medical Research Council Gold medals are awarded annually to established senior scientists who have made seminal scientific contributions that have impacted on the health of people, especially those living in developing countries. Anna-Lise is internationally recognised in two major research areas. The first is vaccinology, with an emphasis on the development of novel vaccines, and the second is in the field of human papillomavirus (HPV) research.

Anna-Lise holds a South African Research Chairs Initiative (SARChi) research chair in vaccinology and is actively training many postgraduate students. Her standing is confirmed by an H-index of 47 on Google Scholar and her work has been cited >6,500 times. We congratulate Anna-Lise on her exceptional achievements!

End Of Year Function

Congratulations to the winning team!!!

This year's theme for the Virology End of Year Function was "A Minute To Win It", inspired by the successful TV show. Contestants had 30 seconds to compete in a series of challenges. The winners were the "What has Science Ever Done for Us" Team from Prof Anna-Lise Williamson's research group.



New Staff and Students

ANDREW REDD

Andrew Redd, PhD is a Staff Scientist at the US National Institute of Allergy and Infectious Diseases at the NIH, and is an Assistant Professor at Johns Hopkins University. Dr Redd received his PhD from Harvard University under the mentorship of Dr Max Essex during which he spent a year performing research at the Botswana-Harvard Partnership in Gaborone, Botswana. Since graduating Dr Redd has studied HIV transmission dynamics, viral evolution, and HIV superinfection in multiple countries around the world with a special emphasis in Uganda and South Africa. He is visiting UCT for nine months to work on three ongoing collaborations with researchers in South Africa. First, he is working with Dr Elmi Muller and Prof. Carolyn Williamson on their ongoing HIV+ to HIV+ kidney transplantation project. Second, Dr Redd is collaborating with Dr Landon Myer in Epidemiology to examine ARV drug resistance and adherence in pregnant mothers in Cape Town. Lastly, Dr Redd is working on a large scale project examining HIV testing and linkage to care in emergency departments in the Eastern Cape.

SIMI ABRAHAM

Simi is an intern from Northwestern University finishing her Masters in Biotechnology. She is a native to the breathtaking great state of Colorado and graduated from University of Colorado Denver with a major in Biology and minors in Chemistry and Honors Multidisciplinary Research Methods. She has worked in various health fields (Pharmacy, Hematology-BMT, Pulmonology, and Dermatology) as a student researcher and clinical research coordinator. She really enjoys her bioinformatics project with Dr Lindi Masson and finds the research to be very exciting! She has a passion for Global Health and Women's Health issues and hopes to pursue a career that allows her to have the best of both worlds. Simi loves to travel with good friends, is a dedicated foodie and tea snob, and is usually found listening to Bollywood music. She is looking forward to exploring South Africa as much as possible before her internship expires in March!

New Staff and Students

MICAELA LURIE

Micaela Lurie is a Masters student, specialising in Medical Virology, continuing from an Honours degree in Immunology and Infectious Diseases. Her work focuses on Chlamydia. Outside of her academic career, she loves to travel and explore new places. She functions on coffee and popcorn. A huge dog lover who would one day love to adopt as many as possible.

DEAN KAYTON

I am a bioinformatician in the HIV Diversity Group, Division of Medical Virology, University of Cape Town. I am a remote working techie who enjoys living in fun and adventurous locations off the beaten track. I am currently residing in Kosi Bay where I get to do things like watch baby turtles hatching, go over to Mozambique for a daytrip, and sleep in caves in the middle of nowhere. During the week I am connected up to electricity and wifi, eyes glued to a laptop screen all day, navigating the internet for answers to problems which need solving. I enjoy programming, data science and statistics. I am fascinated by artificial intelligence and machine learning, something I am getting more and more involved in.

I enjoy that my career skills allow me to interface with specialists in various different areas and I'm having a lot of fun learning things I never knew about biology in my current role.

FAITH OGUNGBE

I am currently a student at Northwestern University in Evanston, IL, USA getting my Master of Science degree in Biotechnology. I graduated from Northwestern in 2017 with my Bachelor of Arts degree in Anthropology, concentrating on Human Biology with a minor in Business Institutions. I am currently completing an internship with Dr Jo Ann Passmore's group to able to obtain my certificate in Global Health and Sustainability Biotechnologies for my degree. I have truly enjoyed my experience in the lab and in Cape Town in general and am excited to continue on with this wonderful learning experience!

Graduates

Dr Harris Onywera's graduation, surrounded by family and Prof Anna-Lise Williamson

PhD

- Smritee Dabee
- Emmanuel Margolin
- Harris Onywera

Masters

- Deelan Doolabh
- Fatuma Guled
- Valerie Masete

Honours

- Bekiswa Abulele
- Kate Bergh
- Micaela Lurie
- Temhlanga Mndzebele
- Keletso Phohlo

SAMRC Gold Medal for Prof Anna-Lise Williamson

University of Cape Town (UCT) Vaccinology Research Chair Professor **Anna-Lise Williamson**, internationally recognised for her research on vaccinology and human papillomavirus (HPV) in Africa, was awarded a gold medal at the SA Medical Research Council (SAMRC) Scientific Merit Awards gala event in Cape Town on the 30th August 2018.

The annual event, a highlight on South Africa's health calendar, recognises and celebrates leading health researchers through a set of medal awards. The gold medal is awarded to established senior scientists in recognition of seminal scientific contributions that have impacted on the health of people, especially in developing countries.

The other gold medalists for 2018, both from Stellenbosch University, were Prof. Soraya Seedat, executive head of the Psychiatry department, and Prof. Gerhard Walzl, executive head of the Department of Biomedical Sciences in the Faculty of Medicine and Health Sciences.

Anna-Lise is internationally recognised in two major research areas. The first is vaccinology, with an emphasis on the development of novel vaccines, and the second is in the field of HPV research.

She holds a South African Research Chairs Initiative (SARChi) research chair in vaccinology and is actively training postgraduate students. Her standing is confirmed by an H factor of 47 on Google Scholar, which is considered "excellent".

Source: https://www.news.uct.ac.za/article/-2018-09-04-gold-medal-for-uct-vaccinology-research-chair

Colin Kaplan Award

DANIEL SHEWARD

Daniel Sheward was awarded the 2018 Colin Kaplan Award for his outstanding work in the field of HIV pathogenesis. Daniel is the first author of a manuscript published in the high impact journal, Host Cell and Microbe (2017 impact factor: 17.872), entitled "HIV Superinfection Drives *De Novo* Antibody Responses and not Neutralization Breadth". The journal focuses broadly on the study of microbes, with an emphasis on the interface between the microbe and its host.

Daniel played an integral role in the conceptualization of the study including the formulation of the aims and methodology. He was responsible for the data analysis, prepared all the visualizations and wrote the original draft(s) of the manuscript.

The manuscript was well received by reviewers (see excerpts below):

"This is a very important study that I believe will be the seminal paper going forward on HIV superinfection as it pertains to induction of bnAbs. The study is technically sound and the study well carried out."

"The results obtained are important because they debunk a 25 year old HIV-1 vaccine strategy to generate broad and effective anti-viral neutralizing antibodies that has repeatedly failed and should be discarded: sequential immunization with randomly chosen heterologous Env immunogens present on mature virus particles."

"These are important findings building on technically sound analyses."

- Prof Carolyn Williamson
Dean of the Faculty of Health Sciences

A/Prof Wendy Burgers awarded EDCTP grant

At the end of 2018, A/Prof. Wendy Burgers took up her award of a Senior Fellowship from the European and Developing Countries Clinical Trials Partnership (EDCTP). The project is entitled CaTCH-22 - **C**haracterizing the spectrum of **T**B and **C**o-infection with **H**IV - the role of Th**22** cells. It will run for the next 5 years and is valued at over R8 million. The project seeks to understand the extraordinary susceptibility of HIV-infected individuals to developing TB, as well as demonstrate a role for different T helper cell subsets in TB immune control, knowledge which can feed into the rational design of a vaccine for TB. In particular, the project hopes to characterise Th22 cells in TB immunity, and how these cells are affected by HIV co-infection, HIV treatment and TB treatment.

Wendy says: "My team and I are very excited about this fellowship. Not only does it enable us to continue our research in understanding immunity to TB during HIV co-infection, but also work on our favourite cell subset, Th22 cells, which seem to be a little unusual and HIV seems to like them a lot! Also, it is essentially a capacity development grant – 2 PhD students, an MSc student and a postdoctoral fellow will be trained over the course of the grant, while undertaking the research. A new postdoctoral fellow and a Junior Research Fellow will join our team soon, and we look forward to discovering new things and sharing our findings with the Division. Also to add - these are excellent grants to apply for, for anyone doing clinical research, and there are fellowships available at senior and training levels. I have a very good relationship with the EDCTP and regularly review EDCTP grants and fellowships, so have insight into what they are looking for in their applications. If anyone is interested in applying for these funding schemes, I am happy to provide assistance and advice."

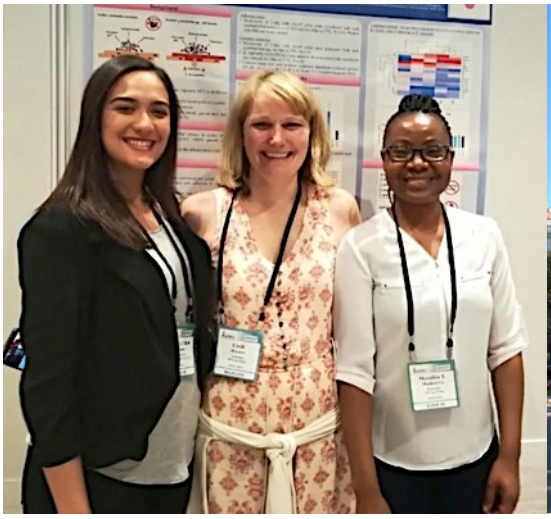
Promotions

Dr Ros Chapman (HIV Vaccines) was promoted to **Senior Research Officer.**

Dr Melissa-Rose Abrahams was appointed as an **NGAP Lecturer**

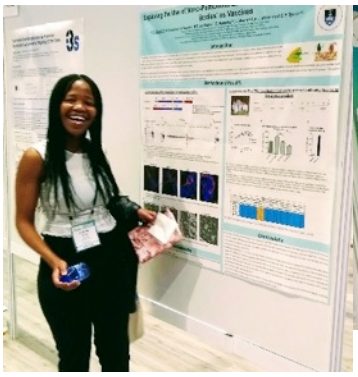
Dr Lindi Masson was promoted to **Senior Lecturer.**

HIV R4P Conference 2018

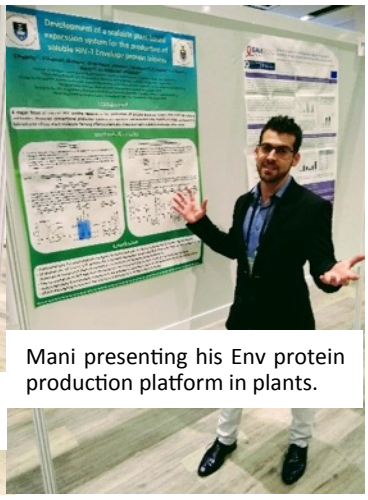


HIV R4P Conference 2018

We had quite a contingent of the ALW^{plus} group (I am counting in Gerald and Godfrey as well, they are pretty much honorary members) travelling to R4P this year. Next to enjoying Madrid and the great food there, we did some real science ourselves but most importantly, some networking. Here for instance we're hanging with Gerald's buddies at the opening reception. Oh, one of them turned out to be a journalist from Uganda who covers scientific topics from Africa, so hopefully I didn't embarrass myself too much otherwise you'll be reading all about that soon.

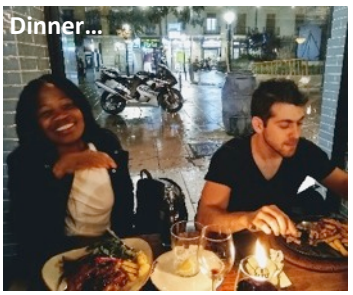


Phindile presenting her Env Zera-nanoparticles.



Mani presenting his Env protein production platform in plants.

Although no major breakthroughs were reported at this HIVR4P meeting, the take-home message from this conference by the leaders in the HIV-1 prevention field is that a vaccine with efficacy of 60% will be sufficient when combined with non-vaccine based prevention methods. This was emphasized in three different plenary talks from Linda-Gail Bekker, Anthony Fauci and John Mascola. Although this sounded academically convincing and a vaccine efficacy of 60% should be achievable in the near future, I do wonder how this would work in reality with (lack of) access and adherence to non-vaccine based prevention methods. This first issue was further emphasized by at least two other plenary talks in which Maureen Luba gave the example that in her home country of Malawi the only method of prevention…

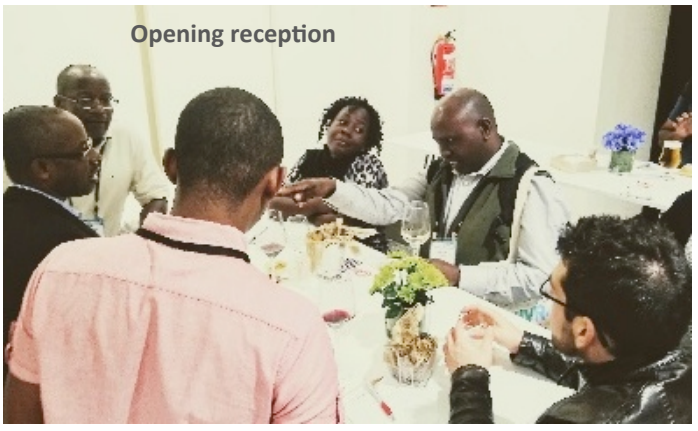


Dinner… Most of us had some nice Spanish food in this busy restaurant, ranging from lamb chops to pork ribs which were washed down with an excellent Rioja. Godfrey, ordering a burger, has clearly gone full-blown American. No paella this time around but we did gorge ourselves on that the following day in a tiny little place filled with locals.

Dessert… After leading us wrongly to a bakery first, Mani found us this great ice-cream parlour in the centre of town. The bakery did well out of this little detour with Mani (shame-) buying possibly one of the worst cookies ever made by mankind for a pretty hefty fee* as well.
*Not even taking into account the exchange rate.

Coffee… Then we stumbled on this cool little coffee place inside a hotel and I felt right at home, look at this Delft Blauw lobby!

Reception… Everyone hard at work networking at the opening reception. Judging by her face, I think Gerald is having a hard time convincing the journalist next to him of his point!



HIV R4P Conference 2018

available were condoms and Michael Meulbroek telling the audience that in Spain there is no government scheme for PrEP. But hopefully a combination of improved vaccine and better access to different prevention methods can be pulled off!

This issue about availability of prevention solutions was the major concern within the advocacy community. They want people to have their own choice in the kind of prevention ('Who's Choice? Our Choice!'), ranging amongst others from PrEP (systemic and topical) to counselling (including violence and substance abuse), availability of microbicides and access to vaccines.

There was huge excitement around the large phase II/III clinical trials HVTN100/702 (adaptation of RV144 in Africa), HVTN703/704 (antibody (VRC01) mediated protection (AMP)) and HVTN705 (Ad26 Mos4 plus gp140 protein boost). However, these are currently still underway, so no data on outcome was disclosed. Furthermore, small phase I clinical trials for HIV-1 Vaccine 2.0 (as dubbed by Rogier Sanders) have just started or are planned for the near future and are based around four different concepts of 1) native-like Env trimers, 2) lineage Env immunogens, 3) germline-targeting Env and 4) Env epitope-focussing. As these are all protein vaccine based approaches, there was a huge emphasis on antibody responses.

There were antibodies everywhere, antibodies and SOSIPs. But as Wendy Burgers nicely reminded us in the 'Let's Talk T-cells' session, next to V1V2-loop binding antibodies everyone remembers as a correlate of reduced infection risk in the RV144 trial, poly-functional CD4+ T cell responses were just as good as a measure.

So although we will learn a lot from the phase II/III and the Vaccine 2.0 phase I clinical trials (hopefully at the next HIVR4P in Cape Town!) and I am really looking forward to the outcomes, there will still be some way to go in my opinion. Bring on those prime-boosting regimens for some T-cell help for HIV-1 Vaccine 3.0 ☺.

At the meeting, two South Africans were honoured: Gcobisa Madlolo with the 2018 Omololu Falobi Award for Excellence in HIV Prevention Research Community Advocacy and Linda-Gail Bekker with the Desmond Tutu Award for HIV Prevention and Human Rights.

–Michiel van Diepen

Keystone Symposium
Genital Tract Microbiome in Sexual and Reproductive Health

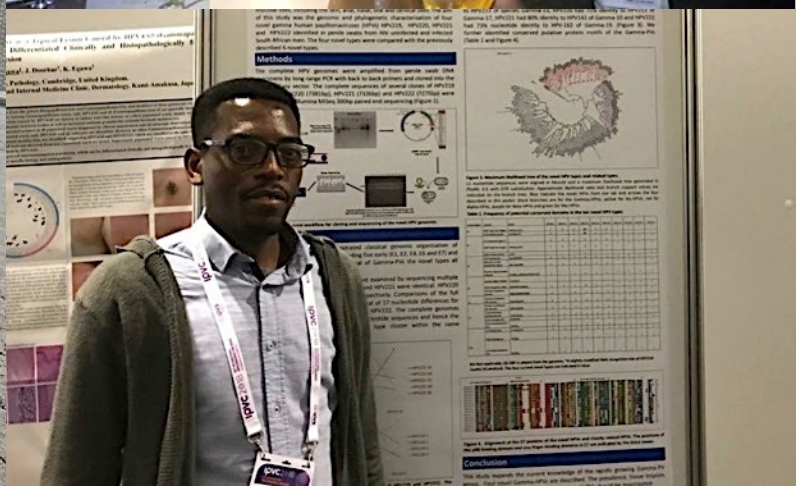
The Symposium was held from the 11th to 15th December at the Southern Cape Sun Hotel in Cape Town, South Africa. One of the aims of the meeting was to bring HIV genital microbiome researchers together with pregnancy and reproductive health microbiome researchers to facilitate discussion and collaboration between the two groups whose research areas overlap substantially.

At the meeting the current understanding of female and male genital tract microbiology and immunology, including functional microbiology and biofilms, was presented and knowledge gaps identified. Potential mechanisms leading to adverse outcomes, and a variety of potential prevention and/or treatment interventions, were presented and discussed. It was clear from the meeting that exponential progress has been made in recent years and this will hopefully lead to efficacious public health interventions to reduce the high prevalence of adverse sexual and reproductive health outcomes in women, especially in resource-poor settings.

A/Prof. Jo-Ann Passmore was Co-Chair of the meeting and many researchers from the Division of Virology attended and presented their work, including Prof. Anna-Lise Williamson, Dr Lindi Masson, Dr Rubina Bunjun, Lyle Curry, Dr Arghavan Alisoltanidehkordi, Anna Happel, Monalisa Manhanzva, Andrea Abrahams, Dr Brian Kullin, and Dr Ramla Tanko among others.

Source: https://www.keystonesymposia.org/18S6

32nd International Papillomavirus Conference



The conference was held from the 2nd to the 6th October 2018 in Sydney, Australia. The aim of the meeting was to provide a platform for sharing knowledge and research advances on human papillomavirus in relation to cancer development, detection, epidemiology and prevention. It covered a wide range of topics including viral replication and life cycle, functions of oncoproteins, genome and RNA modification and regulation, HPV testing methodology and application, pathogenesis, epidemiology, cancer screening and public health issues. Areas related to cervical, anogenital, oropharyngeal and other cancers possibly associated with HPV were also discussed. Some sessions also focused on HPV genomics with regards to classification, proposed new classification and use of metagenomics and high throughput sequencing in discovery of novel papillomavirus types.

The conference was attended by Prof. Anna-Lise Williamson, Dr Harris Onywera, Ongeziwe Taku and Alltalents Murahwa.

-Alltalents Murahwa

9th HIV Prevention Workshop

(12th – 16th November 2018, Durban, South Africa)

Senior and young investigators from across the globe attended the 9th annual HIV prevention workshop, hosted by CAPRISA, the Ragon Institute, AHRI and HPP, held in the tranquility of the Drakensberg at the Cathedral Peak hotel, on the 12-16th November. The meeting focused on broadly neutralizing antibodies (bNAbs) and vaccine research as the field moves towards longer term immune based prevention strategies.

The meeting kicked off with a discussion on achieving the UNAIDS goal of 90-90-90, to achieve epidemic control. This session included discussion around the need to improve ART access to males to prevent HIV transmission to young females (Quarraisha Abdool Karim), to better implement test and treat strategies (Mark Siedner), the epidemiological pathways of HIV transmission (Frank Tanser), and some enlightening and worrying findings about the lack of uptake of ART in young women, even though they understood the risks of HIV (Krista Dong). The other three sessions of the day focussed on host and epigenetics, strategies and models of HIV vaccine and cure research, and tissue-specific HIV infection and the role this plays in prevention and cure strategies.

Notable talks included how epigenetics can be used to determine the regulation of mucosal immunity (Paul Mclaren) and how transcriptomics can be used to assess risk of HIV acquisition (Lyle Mckinnon), how CD8+ T cells can migrate against blood flow to perform antiviral activity (Uli Von Andrian), and how gut CD4+ T cells are irreversibly depleted (Hendrik Kløverpris). Tom Hope delivered a visually stimulating talk on how antibodies and viruses are distributed in the body using a macaque model and ground-breaking microscopy techniques. The sessions on bNAbs and vaccines focussed on antibody structure and the impact on vaccine design, how to target HIV reservoirs as well as HIV eradication and cure.

Notable talks included the importance of priming during vaccine trials to elicit bNAbs (Bill Schief); the conformational changes of HIV envelope during receptor or antibody binding (Pamela Bjorkman); the central nervous system (Alex Sigal) and lymph nodes (Zaza Ndhlovu) as reservoir sites and their role in viral evolution and escape during ART; and the role of viral evolution and diversity in latency establishment (Melissa-Rose Abrahams, Kavidha Reddy, Kamini Gounder and Jaclyn Mann), and bNAb development (Bongiwe Ndlovu).

The final session focused on future HIV prevention strategies. Talks included the use of bNAbs as PrEP and the use of innate stimulants for the reversion and eradication of HIV latency (Dan Barouch); the potential use of monkey bNAbs in passive immunisation and the benefits of the primate models (Mario Roederer); the modification of bNAbs for improved efficacy (Lucio Gama); and the hurdles faced with the use of bNAbs (Mohammad Sajadi).

Delegates were treated to a welcome respite from the scientific discussions with an amazing array of activities that included a guided hike, a guided quad bike tour, a zip line canopy tour, and a helicopter ride to Cathedral Peak. Delegates left the meeting inspired by novel ideas.

-Ross Cromarty

https://www.caprisa.org/NewsAndEvents/Read/10328

Farewells

Bioinformatician, **Dr Arghavan Alisoltanidehkordi** had her final day with the Masson group after spending a year working on cervicovaginal metaproteomics analysis. She has moved to the University of California in the USA where she is now working in the cancer and genetics field.

Her farewell party was hosted at the Mount Nelson on January 31st 2019. The group is sad to see her go but very excited for her bright future.

Celia Rademeyer has been part of the HIV Diversity Group for the last 9 years, and she left the group in 2018 to take a break from science for a year or two. Presently she is taking a more active role in her and her husband's business, and she has also taken up teaching pottery (a long-time dream of hers). Her full writeup can be seen in the Aug 2018 edition of the Newsletter. Her formal going away was on the 19th of October 2018 at Deer Park Café.

Dr Ziyaad Valley-Omar

"I have been in or around the Division of Medical Virology since my honours year in 2002. Back when the ethidium in our gels was in black and white and we made up our own mini prep reagents (kids don't know how good they have it). It has been an honour to study and work under the guidance of researchers that I hold in high regard, who have facilitated invaluable networking and research opportunities. At the conclusion of my association with the NICD in November, I commenced with a medical scientist position within the Groote Schuur NHLS tissue immunology diagnostic laboratory where my primary function is to setup high-resolution HLA typing capabilities by next generation sequencing for solid organ and bone marrow transplant purposes. I am a molecular virologist at heart (I think that's a thing) and intend to continue virus-related research efforts within my new position through partnerships with the Division of Virology. I have not left and you will still find me lurking whenever and wherever there is cake."

Getting to know the Virology team with 6 quick questions

Marius Tincho

What's the most interesting thing about you that we wouldn't learn from your CV?
That I like to cook my own food thus I hardly eat out or order takeaways.

What is the funniest thing that has happened to you recently?
It may be the fact that many people assume that I am a Jehovah's witness, because of the way I carry myself or behave. Also because they assume that many people coming from Central African regional countries are Christians.

You've been given an elephant. You can't give it away or sell it. What would you do with it?
An elephant is a very big animal and is an endangered species in many parts of the world. Taking it in this perspective, I would return the animal to its natural habitat and make sure that it is taken care of. On the other hand, it would be nice to lend the animal to others to transport their goods, or it can render service to peoples. However, looking at the statement in a philosophical way, it would be a big responsibility to receive such a massive gift and not be able to give it away or sell it. The elephant here may symbolise, wealth, intellectual knowledge or any valuable item. Thus, it would be unreasonable not to share it or give it to someone in need. The world we live today is at the crossroad of many turmoils and we need to change our way of life and behaviour such that we can live together, share with one another what we possess or have. It is only by given and sharing, help each other, come in need to someone that we fulfil our true purpose earth, that we find happiness. Hence, I will celebrate the gift I receive but sharing it with others and they would benefit from it even if they can possess it.

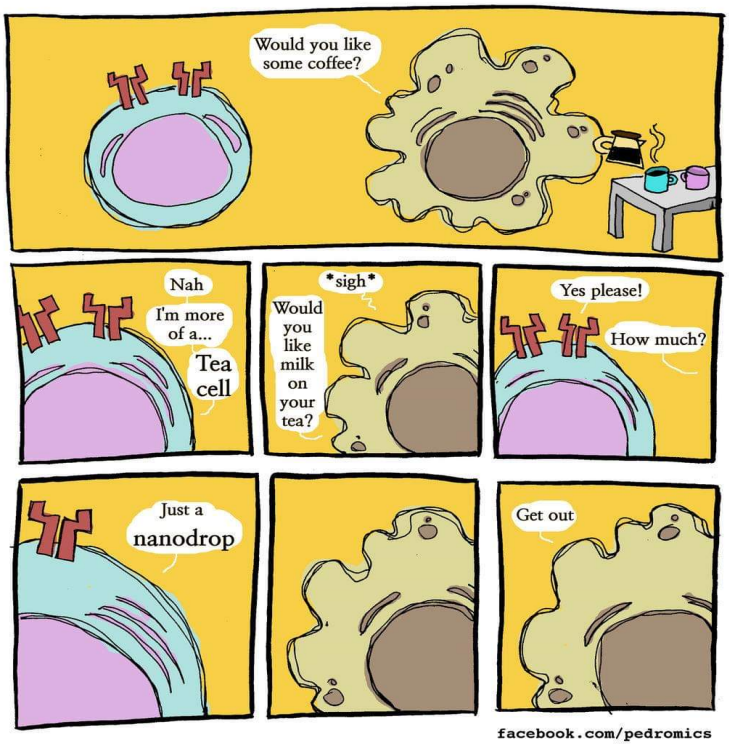
What would your autobiography be called?
"The journey of my life, the product of my efforts"

A penguin walks through that door right now wearing a sombrero.
What does he say and why is he here?
The penguin to me "Is there a space for me in your house?"
Why is he here? "My habit has been destroyed and I need to adapt to the new situation".

How would you describe your job to a child?
People are different and the way we act, behave, talk and even the way react to problem and happiness, and it is the same when we become sick. For more than 30 years, there is a bad small animal, called HIV that make many people become sick when it gets into their blood. Thanks to the fact that we are all different, some people do not become sick and they can prevent the animal to destroy their body because their body produces good soldiers that can help fight the bad animal. But other sick peoples cannot produce these soldiers and they become very sick. And they can die if they are do not receive their medicines. So, my work will consist of looking at the different substances which allow some sick peoples to produce these good soldiers and some other sick peoples cannot produce them. I will also examine the quantities of substances produced by sick peoples with good soldiers and compare them with the quantities produced by sick peoples with weak or no soldiers. I will also examine how these quantities are linked to the production of these good soldiers.

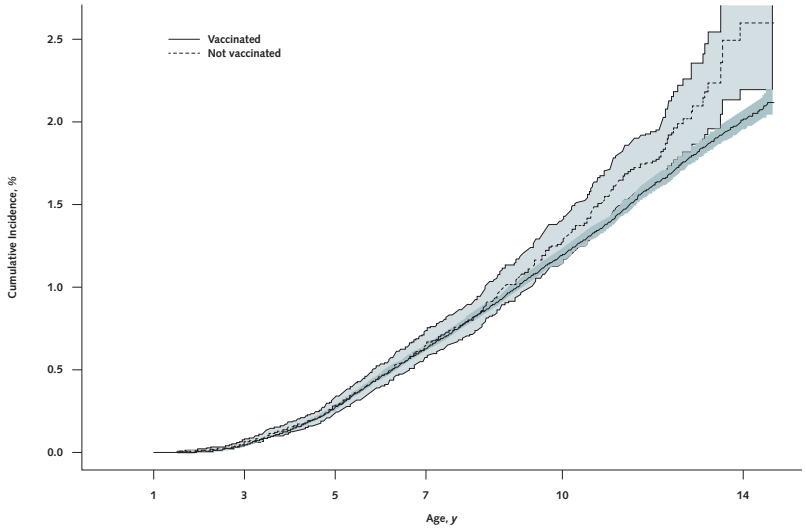
Miscellaneous corner

Spotted in December 2018's edition of Country Life, our very own Talita York



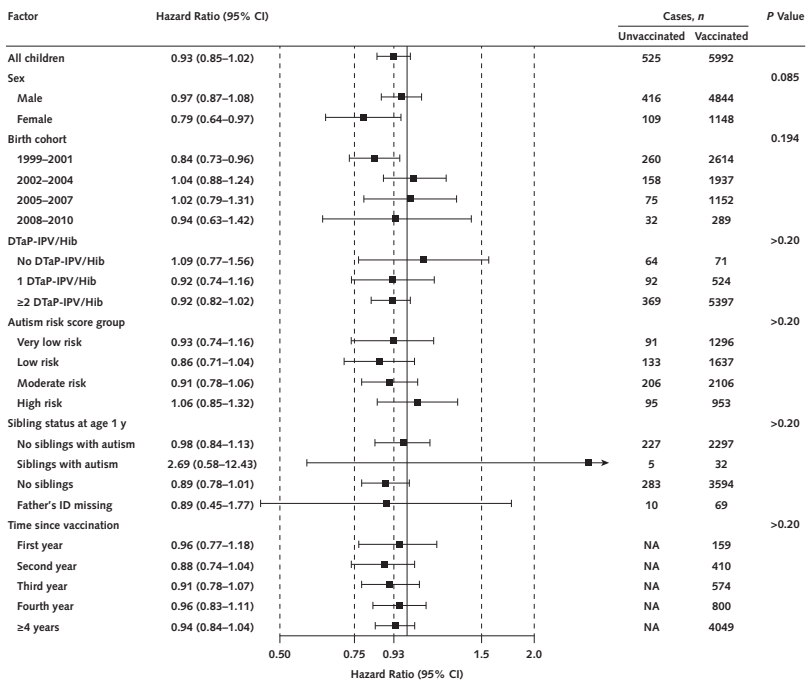
Hot off the press

Figure 2. Cumulative incidences of autism (unadjusted and with 95% CI bands) in 657 461 children born in Denmark between 1 January 1999 and 31 December 2010, by vaccination status and age.



Children at risk, *n*						
Vaccinated	3457	571 550	493 444	391 259	235 016	37 267
Not vaccinated	654 004	66 497	36 343	27 392	18 949	823

Figure 3. Association between measles, mumps, rubella vaccination and autism in subgroups of 657 461 children born in Denmark between 1 January 1999 and 31 December 2010.



Fully adjusted autism hazard ratios comparing children who received measles, mumps, rubella vaccine with those who did not. The hazard ratios are depicted on a logarithmic scale, with bars representing 95% CIs. *P* values are from a test of homogeneity of effect. DTaP-IPV/Hib = diphtheria, tetanus, acellular pertussis, inactivated poliovirus, and *Haemophilus influenzae* type b vaccine; NA = not applicable.

Nationwide Danish study finds no association between measles, mumps, rubella vaccination and autism

Since the publication of the controversial Wakefield article in 1998 (that was subsequently retracted), the possible link between measles, mumps, rubella (MMR) vaccination and autism has continued to cause concern, despite >10 subsequent observational studies finding no association between MMR and autism.

On Monday the 5th of March 2019, a nationwide study published in Annals of Internal Medicine (impact factor 19.4) has found no increased risk of autism in children who received MMR vaccination in Denmark (adjusted hazard ratio: 0.93; 95% confidence interval: 0.85 to 1.02). This is one of the largest studies conducted to date, including 657,461 children born in Denmark over a ten-year period. This study further validates the results of another study, including 537,000 children that was conducted in 2002 and published in the New England Journal of Medicine.

Despite this powerful evidence, it is likely that vaccination hesitancy will persist as parents continue to encounter claims that vaccines cause autism on social media and elsewhere.

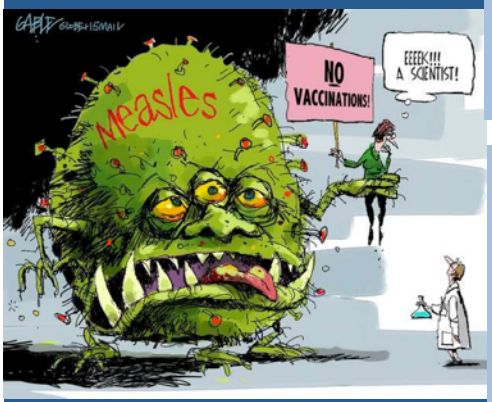
Hviid, Anders et al. "Measles, Mumps, Rubella Vaccination and Autism: A Nationwide Cohort Study." Annals of Internal Medicine 2019. DOI: 10.7326/M18-2101

Have you heard?

Precision CRISPR editing

The most popular gene-editing tool, CRISPR-Cas9, generates breaks in the genome that are subsequently repaired by a mix of cellular pathways. Yet, the repair outcomes are not random. Using machine-learning algorithms to analyze large amounts of Cas9-mediated, genome-wide editing events in a range of cells, Shen *et al.*, Allen *et al.*, and Chakrabarti *et al.* uncovered sequence determinants of repair outcomes and devised rules to predict editing products. These findings provide insights into the repair process and instruct the design of guide RNAs to achieve more precise editing.

Mao, Steve. "Precision CRISPR editing." Science 363.6424 (2019): 242-243.



Addressing vaccination hesitancy through vaccine communication science

Studies to identify the underlying reasons for vaccination failure are critical for designing vaccination interventions and campaigns to increase uptake. A recent study used behaviour–disease interaction models to study how vaccine compliance can be influenced by a wide range of factors.[1] Influential factors include lack of disease awareness and misalignment between individual interest and the population interest. Another key factor is that vaccines are imperfect in the sense that (i) there can exist unwanted, adverse side effects of various degrees, albeit being minor most of the time, and (ii) some vaccines only confer partial protection against the disease. These factors cause exaggerated perceived risk or cost of vaccination compared to benefit.

In this study, the authors suggest that well-studied mechanisms for promoting altruistic behaviour can be used to improve vaccine compliance.[1] Another study published in Nature reported that while traditional vaccination campaigns endorse harm and fairness, individuals with high levels of vaccine hesitancy value liberty and purity more highly than those with low hesitancy.[2] Inclusion of these themes in vaccine discussions may improve coverage.

[1]Chen, Xingru, and Feng Fu. "Imperfect vaccine and hysteresis." Proceedings of the Royal Society B 286.1894 (2019): 20182406.
[2]Amin, Avnika B., et al. "Association of moral values with vaccine hesitancy." Nature Human Behaviour 1.12 (2017): 873.

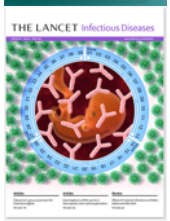
Food Club

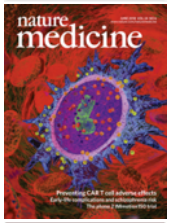
The GEMS group has been running a functional food club at the Desmond Tutu HIV Foundation (DTHF) Youth Centre in Masiphumelele since 2018, with the intention of increasing knowledge and competence around pre- and probiotic functional food preparation – building reproductive health from the inside out. Forming the basis of Tamlyn Martin's multidisciplinary MPhil degree with Jo-Ann Passmore and Virginia MacKenny (crossing the divide of Health Sciences and Michaelis Arts), this Functional Food Club was recently awarded a major NRF Social Engagement grant to the value of R600,000 per year for 3 years.

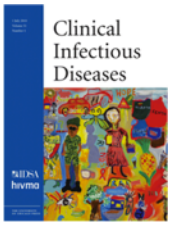
Tamlyn explains "Each week, the teen chefs from the Youth Centre work in collaborative groups to master, adapt and prototype creative re-interpretations of simple foods. We are always blown away by the sophisticated and truly delicious inventions that have come out of our weekly cook ups". The participants are a mixture of ages from 12 -20 years, both boys and girls and we are delighted that they come from a variety of schools in the area, this creates the opportunity for kids from different communities to bond over food. "The project also encompasses food gardening and it's been beautiful seeing our amazing garden produce being used in our food - particularly the herbs. Many of the students are also gardening at home and we have received such lovely feedback from their families about how their involvement in the cooking club has transformed their attitudes toward food on many levels." We are delighted that the project has received such generous funding and are looking forward to truly refining the participant's skills and understanding of functional foods, permaculture gardening, hospitality and even creative entrepreneurial skills in these areas.

As part of the project we are also following principles of sustainability and ecological awareness, as such we have set up a "Cook Book Club" and we are always looking for donations of previously loved cool books, tableware, old pots, general kitchen equipment or gardening tools. If you'd like to make a donation, please contact Tamlyn Martin @ 074-4075413.

Publications (Aug 2018 – Feb 2019)

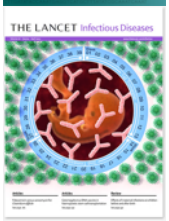


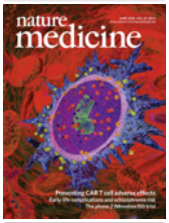


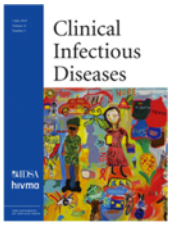


1. Abrahams MR, Joseph SB, Garrett N, Tyers L, Moeser M, Archin N, Council OD, Matten D, Zhou S, Doolabh D, Anthony C, Goonetilleke N, Karim SA, Margolis DM, Pond SK, illiamson C, Swanstrom R. The Replication-Competent HIV-1 Latent Reservoir is Primarily Established Near the Time of Therapy Initiation. 2019 January 1. bioRxiv. Pages 512475. Cold Spring Harbor Laboratory
2. Abdool Karim SS, Passmore JS, Baxter C. The microbiome and HIV prevention strategies in women. Curr Opin HIV AIDS. 2018 Jan;13(1):81-87. doi: 10.1097/COH.0000000000000431.
3. Chetwin E, Manhanzva MT, Abrahams AG, Froissart R, Gamieldien H, Jaspan HB, Jaumdally SZ, Barnabas SL, Dabee S, Happel AU, Bowers D, Davids L, Passmore JA, Masson L. Antimicrobial and inflammatory properties of South African clinical Lactobacillus isolates and vaginal probiotics. Scientific Reports volume 9, Article number: 1917 (2019)
4. Day CL, Abrahams DA, Bunjun R, Stone L, de Kock M, Walzl G, Wilkinson RJ, Burgers WA, Hanekom WA. PD-1 Expression on Mycobacterium tuberculosis -Specific CD4 T Cells Is Associated with Bacterial Load in Human Tuberculosis. Front Immunol. 2018 Aug 31;9:1995. doi: 10.3389/fimmu.2018.01995. eCollection 2018. PubMed PMID: 30233588; PubMed Central PMCID: PMC6127207.
5. Jaumdally SZ, Masson L, Jones HE, Dabee S, Hoover DR, Gamieldien H, Langwenya N, Myer L, Todd CS, Passmore JS. Lower genital tract cytokine profiles in South African women living with HIV: influence of mucosal sampling. Sci Rep. 2018 Aug 15;8(1):12203. doi: 10.1038/s41598-018-30663-8. PubMed PMID: 30111808; PubMed Central PMCID: PMC6093917.
6. Jhilmeet N, Lowe DM, Riou C, Scriba TJ, Coussens A, Goliath R, Wilkinson RJ, Wilkinson KA. The effect of antiretroviral treatment on selected genes in whole blood from HIV-infected adults sensitised by Mycobacterium tuberculosis. PLoS One. 2018 Dec 27;13(12):e0209516. doi: 10.1371/journal.pone.0209516. eCollection 2018. PubMed PMID: 30589870; PubMed Central PMCID: PMC6307796.
7. Lennard K, Dabee S, Barnabas SL, Havyarimana E, Blakney A, Jaumdally SZ, Botha G, Mkhize NN, Bekker LG, Lewis DA, Gray G, Mulder N, Passmore JS, Jaspan HB. Microbial Composition Predicts Genital Tract Inflammation and Persistent Bacterial Vaginosis in South African Adolescent Females. Infect Immun. 2017 Dec 19;86(1). pii: e00410-17. doi: 10.1128/IAI.00410-17. Print 2018 Jan. PubMed PMID: 29038128; PubMed Central PMCID: PMC5736802.
8. Mabvakure BM, Scheepers C, Garrett N, Abdool Karim S, Williamson C, Morris L, Moore PL. Positive selection at key residues in the HIV Envelope distinguishes broad and strain-specific plasma neutralizing antibodies. J Virol. 2018 Dec 19. pii: JVI.01685-18. doi: 10.1128/JVI.01685-18. [Epub ahead of print] PubMed PMID: 30567996.
9. Masson L, Barnabas S, Deese J, Lennard K, Dabee S, Gamieldien H, Jaumdally SZ, Williamson AL, Little F, Van Damme L, Ahmed K, Crucitti T, Abdellati S, Bekker LG, Gray G, Dietrich J, Jaspan H, Passmore JS. Inflammatory cytokine biomarkers of asymptomatic sexually transmitted infections and vaginal dysbiosis: a multicentre validation study. Sex Transm Infect. 2019 Feb;95(1):5-12. doi: 10.1136/sextrans-2017-053506. Epub 2018 Jul 17. PubMed PMID: 30018088.
10. Mbulawa ZZA, van Schalkwyk C, Hu NC, Meiring TL, Barnabas S, Dabee S, Jaspan H, Kriek JM, Jaumdally SZ, Muller E, Bekker LG, Lewis DA, Dietrich J, Gray G, Passmore JS, Williamson AL. High human papillomavirus (HPV) prevalence in South African adolescents and young women encourages expanded HPV vaccination campaigns. PLoS One. 2018 Jan 2;13(1):e0190166. doi: 10.1371/journal.pone.0190166. eCollection 2018. PubMed PMID: 29293566; PubMed Central PMCID: PMC5749739.

Publications (Aug 2018 – Feb 2019)

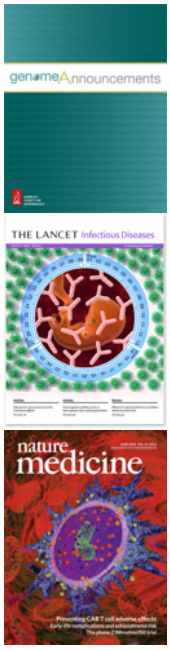






11. Mbulawa ZZ, Kularatne R, Kufa-Chakezha T and Williamson AL. 2017. Sentinel Surveillance of human papillomavirus genotypes among young women attending public healthcare facilities in South Africa, 2017. National Institute for Communicable Disease Public Health Surveillance Bulletin. 2018. 16(2):91-97 (Impact factor: None).
12. McKinnon LR, Achilles S, Bradshaw CS, Burgener A, Crucitti T, Fredricks DN, Jaspan HB, Kaul R, Kaushic C, Klatt N, Kwon DS, Marrazzo JM, Masson L, Mcclelland S, Ravel J, Janneke HHM van de Wijgert, Lenka A Vodstrcil, Gilda Tachedjian. The evolving facets of bacterial vaginosis: implications for HIV transmission. 2019 Jan 14. Journal AIDS research and human retroviruses Issue ja
13. Motaze NV, Manamela J, Smit S, Rabie H, Harper K, duPlessis N, Reubenson G, Coetzee M, Ballot D, Moore D, Nuttall J, Linley L, Tooke L, Kriel J, Hallbauer U, Sutton C, Moodley P, Hardie D, Mazanderani AH, Goosen F, Kyaw T, Leroux D, Hussain A, Singh R, Kelly C, Ducasse G, Muller M, Blaauw M, Hamese M, Leeuw T, Mekgoe O, Rakgole P, Dungwa N, Maphosa T, Sanyane K, Preiser W, Cohen C, Suchard M. Congenital rubella syndrome surveillance in South Africa using a sentinel site approach: a cross-sectional study. Clin Infect Dis. 2018 Sep 8. doi: 10.1093/cid/ciy758. [Epub ahead of print] PubMed PMID: 30203002.
14. Pillay T, Sobia P, Olivier AJ, Narain K, Liebenberg LJP, Ngcapu S, Mhlongo M, Passmore JS, Baxter C, Archary D. Semen IgM, IgG1, and IgG3 Differentially Associate With Pro-Inflammatory Cytokines in HIV-Infected Men. Front Immunol. 2019 Jan 23;9:3141. doi: 10.3389/fimmu.2018.03141. eCollection 2018. PubMed PMID: 30728825; PubMed Central PMCID: PMC6351442.
15. Rametse CL, Adefuye AO, Olivier AJ, Curry L, Gamieldien H, Burgers WA, Lewis DA, Williamson AL, Katz AA, Passmore JS. Inflammatory Cytokine Profiles of Semen Influence Cytokine Responses of Cervicovaginal Epithelial Cells. Front Immunol. 2018 Dec 4;9:2721. doi: 10.3389/fimmu.2018.02721. eCollection 2018. PubMed PMID: 30568652; PubMed Central PMCID: PMC6290331.
16. Sallin MA, Kauffman KD, Riou C, Du Bruyn E, Foreman TW, Sakai S, Hoft SG, Myers TG, Gardina PJ, Sher A, Moore R, Wilder-Kofie T, Moore IN, Sette A, Lindestam Arlehamn CS, Wilkinson RJ, Barber DL. Host resistance to pulmonary Mycobacterium tuberculosis infection requires CD153 expression. Nat Microbiol. 2018 Nov;3(11):1198-1205. doi: 10.1038/s41564-018-0231-6. Epub 2018 Sep 10. PubMed PMID: 30202016.
17. Sheward DJ, Marais J, Bekker V, Murrell B, Eren K, Bhiman JN, Nonyane M, Garrett N, Woodman ZL, Abdool Karim Q, Abdool Karim SS, Morris L, Moore PL, Williamson C. HIV Superinfection Drives De Novo Antibody Responses and Not Neutralization Breadth. Cell Host Microbe. 2018 Oct 10;24(4):593-599.e3. doi: 10.1016/j.chom.2018.09.001. Epub 2018 Sep 27. PubMed PMID: 30269971; PubMed Central PMCID: PMC6185870.
18. Sivro A, Schuetz A, Sheward D, Joag V, Yegorov S, Liebenberg LJ, Yende-Zuma N,Stalker A, Mwatelah RS, Selhorst P, Garrett N, Samsunder N, Balgobin A, Nawaz F, Cicala C, Arthos J, Fauci AS, Anzala AO, Kimani J, Bagaya BS, Kiwanuka N, Williamson C, Kaul R, Passmore JS, Phanuphak N, Ananworanich J, Ansari A, Abdool, Karim Q, Abdool Karim SS, McKinnon LR; CAPRISA004 and RV254 study groups. Integrin α(4)β(7) expression on peripheral blood CD4(+) T cells predicts HIV acquisition and disease progression outcomes. Sci Transl Med. 2018 Jan 24;10(425). pii: eaam6354. doi: 10.1126/scitranslmed. aam6354. PubMed PMID: 29367348.
19. Smuts H, Cronje S, Thomas J, Brink D, Korsman S, Hardie D. Molecular characterization of an outbreak of enterovirus-associated meningitis in Mossel Bay, South Africa, December 2015-January 2016. BMC Infect Dis. 2018 Dec 29;18(1):709. doi: 10.1186/s12879-018-3641-4. PubMed PMID: 30594238; PubMed Central PMCID: PMC6311073

Publications (Aug 2018 – Feb 2019)



20. Tanko RF, Soares AP, Masson L, Garrett NJ, Samsunder N, Abdool Karim Q, Abdool, Karim SS, Riou C, Burgers WA. Residual T cell activation and skewed CD8+ T cell memory differentiation despite antiretroviral therapy-induced HIV suppression. Clin Immunol. 2018 Oct:195:127-138. doi: 10.1016/j.clim.2018.06.001. Epub 2018 Jun 5. PubMed PMID: 29883708.
21. van Diepen MT, Chapman R, Moore PL, Margolin E, Hermanus T, Morris L, Ximba P1,, Rybicki EP, Williamson AL (2018). The adjuvant AlhydroGel elicits higher antibody titres than AddaVax when combined with HIV-1 subtype C gp140 from CAP256. PLoS One. 2018 Dec 17;13(12):e0208310. doi: 10.1371/journal.pone.0208310. eCollection 2018.
22. Wood LF, Brown BP, Lennard K, Karaoz U, Havyarimana E, Passmore JS, Hesseling AC, Edlefsen PT, Kuhn L, Mulder N, Brodie EL, Sodora DL, Jaspan HB. Feeding-Related Gut Microbial Composition Associates With Peripheral T-Cell Activation and Mucosal Gene Expression in African Infants. Clin Infect Dis. 2018 Sep 28;67(8):1237-1246. doi: 10.1093/cid/ciy265. PubMed PMID: 29659737.

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