VOLUME V / EDITION 6 July 2023

NEWSLETTER

SOUTH AFRICAN IMMUNOLOGY SOCIETY

FEATURES

Interview with IUIS and FAIS Presidents

Patented Vaccine Formulations Against Heartwater

Pre-Eclampsia (Toxemia): A Mysterious Enigmatic Disease

AWARENESS

World Zoonoses Day - 6 july

Autoinflammatory Awareness Month - August

National Women's Day - 9 Aug

SAVE THE DATE

The Joint ALLSA and SAIS Congress

The International Congress of Immunology (IUIS)

MESSAGE FROM THE EDITOR

Dear SAIS,

Welcome to our July newsletter! We hope this finds you feeling snug as we embrace the last lap of winter. While the world keeps spinning, we're here to sprinkle some immunology freshness and delightful tidbits your way. Check out our survey! You could win the best immunology gift in 2023. We encourage all postgrads and postdocs to participate.

In this edition, we bring you an interview with SAIS and IUIS stalwarts, Prof Clive Gray and Prof Pa Ngom. Prof Gray and his team successfully bid and got us to host the world immunology community on home grounds - Cape Town, South Africa. Prof Pa Ngom shared with us chilling opinions on hosting the IUIS congress and the opportunities the conference brings to us as a community. Read a stimulating piece of the interview transcript on pages 5 and 6. Also, late-breaker abstracts will be opened in August. Please visit the SAIS website for details on abstract submission and registration. Remember all African scientists and African-based studies enjoy free abstract submission. Don't miss out! Also, check out the travel grants on the IUIS page for more deals.

On the 9th of August we celebrate National Women's Day. In recognition of this day, we bring you an interesting piece on an enigmatic disease, pre-eclampsia (page 6). Furthermore, from the veterinary immunology section, we celebrate an emerging African Scientist of the month, **Dr Christian Stutzer**. Dr Stutzer and his team are pioneering a home-developed livestock vaccine to prevent tick and tick-borne diseases at the University of Pretoria (page 8).

Remember, the SAIS newsletter team is here to inspire on your journey to a happier, healthier self while also reminding you to enjoy the simple pleasures of life— like laughter, fun, and friendship! Stay vibrant, stay curious, and stay tuned for an issue packed with interesting reads to make your immunology journey truly impactful.

Happy reading!

With regards,
Dr. Clement Gascua

CONTACT US!

Please send us your recent publications so we can showcase them in our Community Corner. If you are hiring/recruiting, we would be more than happy to advertise for you in the newsletter and on our social media platforms. If you have any webinars, seminars, or conferences, we would be more than happy to add it to the newsletter. You can email the editors at **webmail.saimmunology.org.za** by the 20th of each month to be featured in our next newsletter.

saimmunology.org.za

South African Immunology Society (SAIS)

@SAImmunologySociety

@SAImmunology

An African-Based Immunology Seminar Series

Genital Inflammation test device development

30 August 2023
13:00-14:00

Prof Jo-Ann Passmore
University of Cape Town
Head, Mucosal Immunology Group

https://www.keystonesymposia.org/conferences/conference-listing/meeting?eventid=7027

EARLY BIRD REGISTRATION OPEN

For more information, visit https://conf2023.theunion.org/sponsored-registration-guide/

THOUGHTS ON THE IUIS INTERNATIONAL CONGRESS?

Professor Clive Gray
President: International Congress of Immunology (IUIS)

Tell us about the journey to host the IUIS Congress here in South Africa?

Prof. Gray: It all began at immunology meeting in Tunisia, in 2015. I was at the lunch table with the IUIS Executive Committee, and one of the Executive Members suggested I put in a bid for hosting IUIS in Cape Town. At the beginning of 2016, my colleagues and myself at SAIS began to put an application together, and I thought it important to include FAIS as well. We were shortlisted with Paris, London, Mexico City and Toronto - and we were all invited to make a presentation at the bid at the Melbourne IUIS 2016 Congress. I made the bid with Faith Osier, who was the FAIS President at the time. History is history, and we got the bid - which was seven years ago... so it's been an incredibly long journey.

Were there any major roadblocks or challenges in bringing IUIS to Africa?

Prof. Ngom: One of the biggest challenges was getting everybody to come to Africa, getting the best. That's not easy because you have plan everything well in advance so that people will save the date, and to do *that* you need a good program, eminent scientists invited in good time, and at least potential sources of income. This involves a lot of meetings, drafts discussed with various executives, fundraising - and all of this must be done in such a way that is democratic and allows for everyone involved in the planning to contribute. Of course, we also have to deal with the usual African challenges, such as differences in language, region, and technical infrastructure barriers.

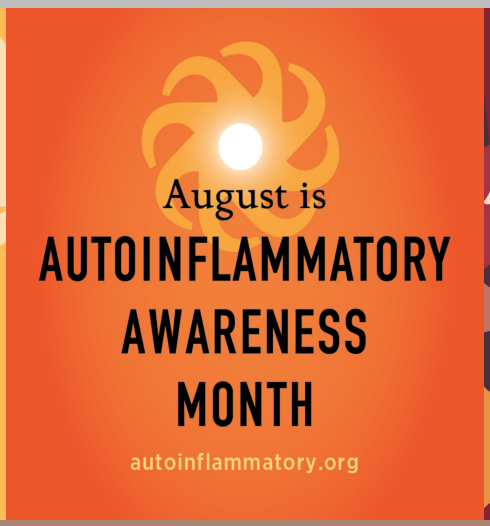
Prof. Gray: It's not only the difficulty in bringing people to Africa, but also the difficulty of bringing people who are in Africa to Cape Town - it's expensive. We do have scholarships, but if someone is from a lab that does not have much money, they won't be able to attend. Which is a great shame.

Prof. Ngom: Also, getting the gender balance right is a bit tricky. We are driven by the need to equalise the number of males and females attending. Lastly, involving the youth and trying to encourage more junior scientists to take up leadership and succeed us as the leaders of African immunology.

Professor Pa Tamba Ngom
President: Federation of African Immunological Societies (FAIS)

IUIS 2023 CAPE TOWN
18th International Congress of Immunology

AWARENESS BANNERS



SCIENTIST OF THE MONTH: DR CHRISTIAN STUTZER

Dr. Christian Stutzer is a Senior Researcher at the University of Pretoria. He is a biochemist working in the field of molecular parasitology specializing in ticks and tick-borne diseases within the agricultural sector. His current work involves the identification of novel candidates for rational vaccine design, combining immuno-informatics and proteomic tools, as well as animal trial evaluation of candidates.

Can you tell our readers about yourself and what makes you passionate about veterinary immunology?

I consider myself a biochemist moonlighting as an immunologist. When I started studying, I never thought I would become involved in research into ticks and tickborne diseases. After meeting a postdoc who was so excited and passionate about ticks and tick borne diseases, I thought "Wow, this sounds like an interesting field! Maybe I should pursue that." So I entered the field, the proverbial tick bit, and I never stopped - I'm still enjoying what I do. It's an amazing field to be in, especially when we consider the influence of ticks on agriculture and food security, which is becoming increasingly relevant. Having a biochemistry background gives me an appreciation for the little details, and with every year, I discover a new challenge or something extra special about these little things that keeps me engaged and excited. The host immunology aspect is almost like a black box, since we know so little about animal immunology - which is actually frightening. It's only recently that we as a society have started realising how animal health and human health is interconnected, which has lead to the One Health mandate from the WHO.

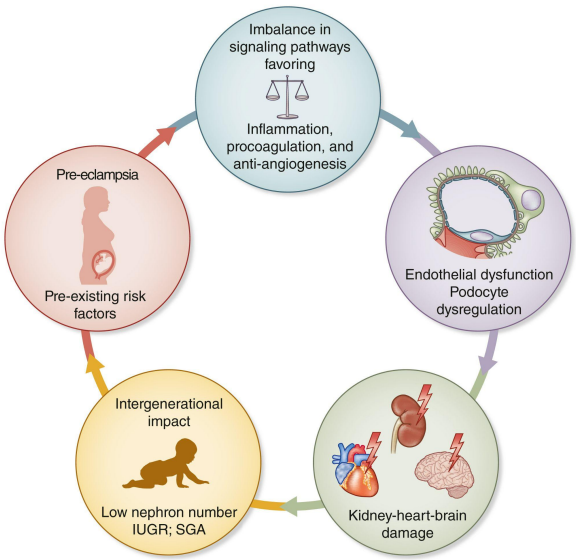
What skills do you think are unique to African scientists?

One thing I've learnt after gaining some international experience is that we really undervalue the training we get locally. We're a lot more "jack of all trades" in our abilities, whereas in the US or Europe, the scientists tend to specialise in one thing. We also have the ability to adapt, troubleshoot and problem solve, whereas scientists overseas would change the kit they use instead of delving into why something isn't working and what they need to change. We're very creative as scientists, which is key! To be a scientist you have to have a level of creativity in order to think outside the box. That flexibility can teach you so much, especially if you pair it up with good general knowledge beyond your field. There's so much to learn beyond your little niche.

PRE-ECLAMPSIA (TOXEMIA): A MYSTERIOUS ENIGMATIC DISEASE

Pre-eclampsia (PE) is an enigmatic disease and common pregnancy complication that causes severe health complications for both mother and baby. It is typically characterized by high blood pressure, protein in the urine, or other signs of organ damage. The exact cause of PE is unknown, but it is likely due to a combination of pre-existing maternal risk factors (age, family history, genetic and immune predisposition, comorbidities) and pregnancy-specific factors, such as multi-gestation and assisted reproduction. There is no cure for PE, with delivery being the only urgent treatment to prevent life-threatening complications. Traditionally, it is believed that PE is caused by the placenta and that PE is unlikely to occur after delivery. However, recent research has shown that this is not the case. PE is a continuum of vascular abnormalities that can begin before delivery and continue after. One of the significant features of PE is the dysregulation of the balance between angiogenic and anti-angiogenic factors. Angiogenic factors promote the growth of new blood vessels, while anti-angiogenic factors inhibit their growth. In PE pregnancies, there is an imbalance in favour of anti-angiogenic factors that can lead to endothelial dysfunction, which, in turn, causes hypertension. Removing the placenta after delivery can offset the production of anti-angiogenic factors, but it is not always enough to prevent postpartum hypertension. This is because the vascular abnormalities present in PE pregnancies can persist after delivery. In some cases, these vascular abnormalities can lead to long-term health problems, such as chronic kidney disease (CKD).

The association between PE and CKD has been confirmed in population studies worldwide. The intervals between PE and the development of end-stage kidney disease (ESKD) were longer in countries with a relatively low prevalence of ESKD and much shorter where ESKD incidence is highest in the world. This suggests the presence of unknown genetic and environmental factors but may also indicate that pregnancy can unmask underlying CKD and that underlying CKD may lead to pregnancy complications. Nonproteinuric diseases, including interstitial nephropathies, congenital anomalies of the kidney and the urinary tract, and polycystic kidney diseases, accounted for a significant proportion of cases, thus suggesting that relying on proteinuria and hypertension may not be enough for early diagnosis of CKD after PE. In fact, proteinuria is no longer requisite for diagnosing PE, and the degree of proteinuria is only loosely related to the clinical severity and long-term risks after PE in other words, severe outcomes may occur when proteinuria is absent. Although, it has value with considering immediate and possible long-term kidney injury.



Garovic and Piccoli. Kidney International. 2023 Aug;104(2),213-217. https://doi.org/10.1016/j.kint.2023.04.030

The current approach of advising women with a history of PE without proteinuria and hypertension that no further follow-up is necessary is misleading. Potentially progressive kidney diseases may present when proteinuria is absent and hypertension after delivery and can only be detected with imaging and functional data.

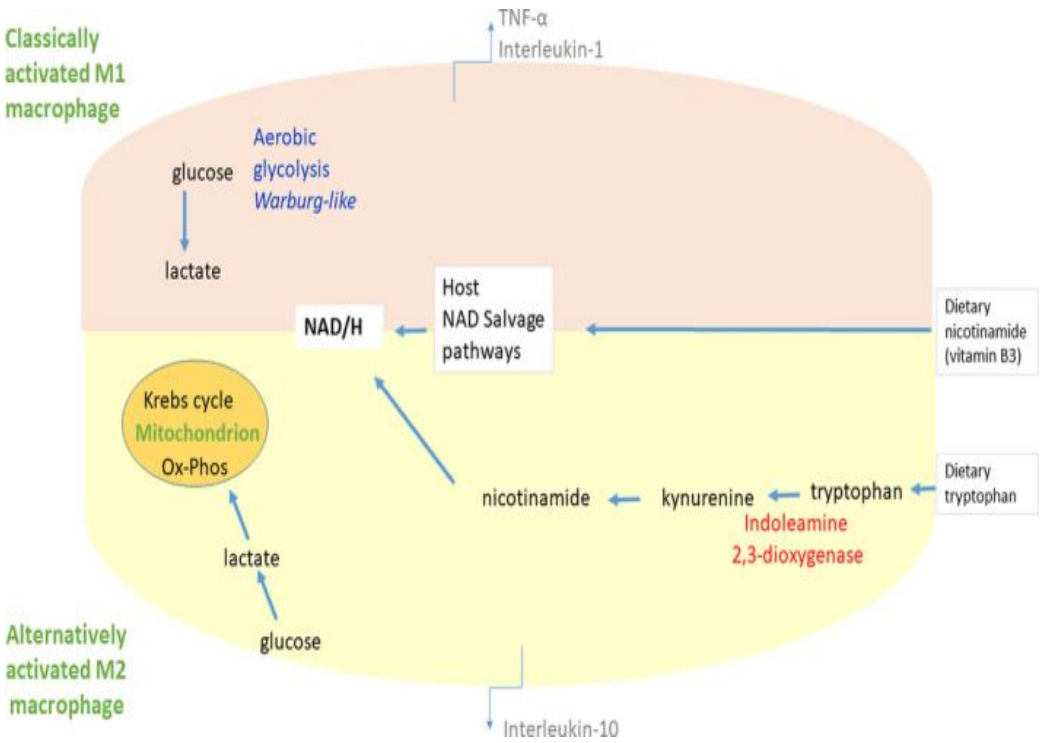
Nicotinamide pathways as the root cause of sepsis - an evolutionary perspective on macrophage energetic shifts

Melinda S Suchard and

Dana M Savulescu

In this article, the authors, Prof. Suchard and Dr. Savulescu, SAIS stalwarts, discuss divergent pathways of macrophage metabolism occur during infection. Macrophages switch between oxidative phosphorylation and aerobic glycolysis (Warburg-like metabolism) in various infections. Concurrently, macrophages shift between alternate and classical activation. A key enzyme upregulated in alternatively activated macrophages is indoleamine 2,3-dioxygenase, which converts tryptophan to kynurenine for de novo synthesis of nicotinamide. Nicotinamide can be used to replenish cellular NAD^+ supplies.

They hypothesize that an insufficient cellular NAD^+ supply is the root cause of metabolic shifts in macrophages, and assert that manipulation of nicotinamide pathways may correct deleterious immune responses. They propose evaluation of nicotinamide (Vitamin B3) and analogues, including isoniazid, nicotinamide mononucleotide and nicotinamide riboside, as potential therapy for infectious causes of sepsis, including COVID-19.



Click the image to read the article.

THE VETERINARY IMMUNOLOGY DIVISION: PATENTED VACCINE FORMULATIONS AGAINST HEARTWATER

Dr Nontobeko Thema and Dr Alri Pretorius

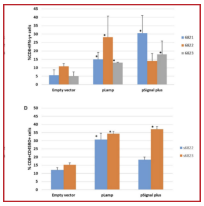
Heartwater, a tick-borne disease of domestic ruminants, constitutes a severe economic problem and introduces more productive breeds in endemic areas in sub-Saharan Africa. An intracellular rickettsia, *Ehrlichia ruminantium*, previously known as *Cowdria ruminantium*, causes heartwater and can be transmitted by the tick species *Amblyomma hebraeum*. There is molecular evidence which indicates that *E. ruminantium* may be an emerging pathogen of a life-threatening human disease. Furthermore, *E. ruminantium* infects a wide variety of wild and domestic animals, suggesting that it is a plausible zoonotic agent. Despite several attempts to develop improved vaccines to control heartwater, the live blood vaccine with numerous drawbacks is still in use, emphasising the urgent need for an improved, safer, and more effective vaccine.

In efforts to develop a recombinant vaccine against heartwater, previous work at ARC-OVR (Agricultural Research Council-Onderstepoort Veterinary Research) showed that a 1H12 DNA vaccine encoding four *E. ruminantium genes* provided 100% protection in experimental sheep following a needle challenge but failed under field conditions (tick-transmitted infection). This lack of protection obtained in field situations indicates that this recombinant vaccine requires improvement. A follow-up study was done to identify more vaccine candidates to overcome the lack of protection in the field. It must be considered that pathogen proteins may contain epitopes that can inhibit protective immune responses or induce immunopathology. These negative effects can be avoided if T-cell epitopes that specifically stimulate immune responses are identified. Research at the ARC-OVR has identified eighteen Th1 CD4+ T cell and CD8+ cytotoxic T lymphocyte (CTL) epitopes from several *E. ruminantium* proteins. These epitopes either induced positive CTL responses, proliferation of CD8+ T cells, or expression of Th1 cytokines. Selected peptides were used to construct a multiepitope DNA vaccine in a mammalian expression vector designed for dual expression of CD4+ and CD8+ specific peptides.

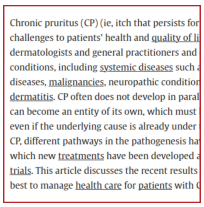
A study focusing on the importance and activation of innate immune responses after infection with *E. ruminantium* showed that toll-like receptors (TLR), TLR4 and TLR9, as well as DNA detection pathways were activated (See details in the Nefefe *et al*., 2017 paper). This indicates that heartwater vaccine formulations (including CpG motifs) and lipopolysaccharides may improve its efficacy. After this, several multi-epitope DNA vaccines were constructed and tested in sheep. For the first time, one construct provided 60% protection against laboratory tick challenge when co-administered with monophosphoryl Lipid A adjuvant, a highly purified derivative of the lipopolysaccharide component of the cell wall of *Salmonella enterica*. Therefore, the protective efficiency of the DNA vaccine construct could be significantly enhanced by co-administration of the vaccine with the MPL adjuvant via intramuscular inoculation. These vaccine formulations are patented.

See related publications on page 8

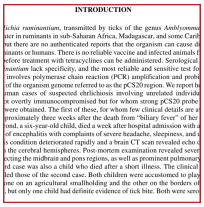
PUBLICATIONS & INTERESTING READS



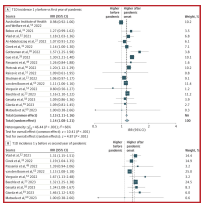
A multi-epitope DNA vaccine co-administered with monophosphoryl lipid A adjuvant provides protection against tick transmitted *Ehrlichia ruminantium* in sheep
Tshilwane *et al.* Vaccine. 2019. 37:4354-4363.
doi: 10.1016/j.vaccine.2019.06.027.



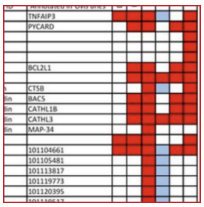
Clinical aspects and management of chronic itch
Zeidler *et al. J. Allergy Clin. Immunol*. 2023. 90: a2070.
https://doi.org/10.1016/j.jaci.2023.04.018



***Ehrlichia ruminantium*: An emerging human pathogen?**
Allsopp *et al.* Ann. N. Y. Acad. Sci. ANN. 2005. 1063: 358-360.
doi: 10.1196/annals.1355.060.

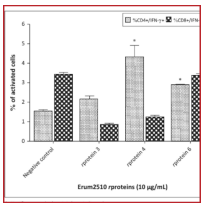


Incidence of Diabetes in Children and Adolescents During the COVID-19 Pandemic: A Systematic Review and Meta-Analysis
D'Souza *et al. JAMA Netw Open.* 2023 June 30;6(6):e2321281.
doi:10.1001/jamanetworkopen.2023.21281

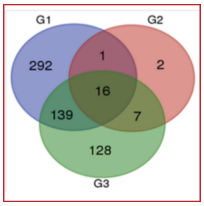


Innate immune transcriptomic evaluation of PBMC isolated from sheep after infection with *E. ruminantium* Welgevonden strain
Nefefe *et al.* Mol Immunol. 2017. 91: 238–248.
doi: 10.1016/j.molimm.2017.09.018.

Oral food challenges: Measuring what counts
Upton *et al. J. Allergy Clin. Immunol.* . 2023
https://doi.org/10.1016/j.jaci.2023.05.005



Th1 and Th2 epitopes of *Cowdria* polymorphic gene 1 of *Ehrlichia ruminantium*
Ngoepe *et al.* Onderstepoort J. Vet. Res. 2023. 90: a2070.
doi: 10.4102/ojvr.v90i1.2070.



Transcriptome analysis of *Ehrlichia ruminantium* in the ruminant host at the tick bite site and in the tick vector salivary glands
Tjale *et al.* Ticks Tick Borne Dis. 2021. 12 :101646.
doi: 10.1016/j.ttbdis.2020.101646.

Head of Department - Department of Immunology, University Of Witwatersrand / Charlotte Maxeke Johannesburg Academic Hospital

A permanent position is available as the Head of the Department of Immunology. The main purpose of the job is to create a vision and provide leadership to the department to foster excellence and harmonious delivery of teaching, research and service expectations including the assimilation, evaluation and translation of knowledge into minimum quality standards for the discipline to ensure that the investigation and diagnosis of disease within the discipline is conducted in accordance with current "best practice" throughout the organisation.

Minimum requirements & key competency

- Immunology: PhD Medical Scientist or FCPath / MMed with experience in immunology
- Doctoral degree in the relevant field and/or peer- reviewed full publications on original research will be strongly advantageous
- Registration with HPCSA as health professional in the applicable discipline
- Minimum seven (7) years postgraduate experience of which at least four (4) years at senior level with demonstrable experience of managing a diagnostic laboratory.
- Formal involvement in undergraduate and postgraduate teaching at a tertiary academic institution
- Research experience as demonstrated by authorship of peer-reviewed publications
- Prior supervision of postgraduate research at the level of Master's Degree or higher
- Strong leadership, Time management, interpersonal, organisational and presentation skills
- Computer literate and good report writing ability.

Interested persons meeting the requirements are invited to send their CVs, ID, HPCSA registration and qualification, to Ms. Keitumetse Boikanyo on (011) 386 6096 or via e-mail: keitumetse.boikanyo@nhls.ac.za. Please indicate the reference number (CMJAH–0623-001-01 -IMMUNOLOGY), name of the post and the specific discipline.

Post-doctoral Fellowship Opportunity - Sydney Brenner Institute for Molecular Bioscience (SBIMB), Faculty of Health Sciences, University of the Witwatersrand, Johannesburg

The Sydney Brenner Institute for Molecular Bioscience (SBIMB), at the University of Witwatersrand, in collaboration with the Vanderbilt University Medical Center (VUMC), USA, and Aminu Kano Teaching Hospital (AKTH), Nigeria, are pleased to announce the availability of Post-doctoral fellowship to work on a project titled "Childhood Status Epilepticus and Epilepsy (SE) Determinants of Outcome (SEED)" for a period of 2 years. The SEED Fellowship is for two years (full-time) and will include an annual stipend, a computer and an annual return ticket to the fellow's home country, if it is not South Africa. The Fellow will be hosted at the SBIMB and jointly supervised by investigators from the SEED project. The fellowship is on offer for a PhD graduate in genetics or bioinformatics, with at least 2 year's experience in analysing large datasets.

Eligibility Criteria and Attributes

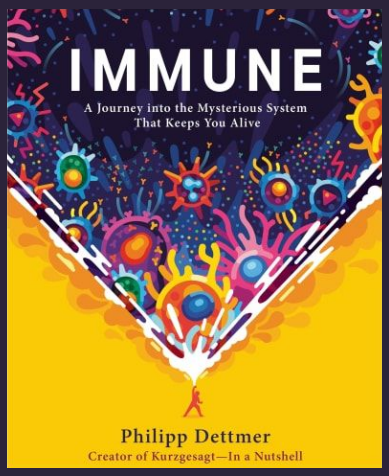
- PhD graduate in Genetics, Bioinformatics, Computer Science or equivalent within the last 5 years
- At least 2 years' experience in data analysis is required and experience in genetic data analysis will be an added advantage
- Interest in applying big data analytics in human genomics
- African national with a commitment to working in and advancing research in Africa (Preference will be given to eligible candidates from Nigeria)
- Highly motivated and committed to biomedical research
- Available to start fellowship within 6 months

Interested persons who meet the requirements are invited to send their CV (max 5 pages), a cover letter (max of 2 pages) indicating how your knowledge and skills would align with the research area, and what your expectations are, should you be successful, academic record/transcript, ID/Passport copy, contact details for three academic referees, please make the subject of the email: APPLICATION-Scholarship-SBIMB SEED-1: Postdoc. Email your application to sbimb@wits.ac.za and jocelyn.gayenga@wits.ac.za

Closing date: 11 August 2023

SURVEY QUESTIONS

THE GRAND PRIZE!



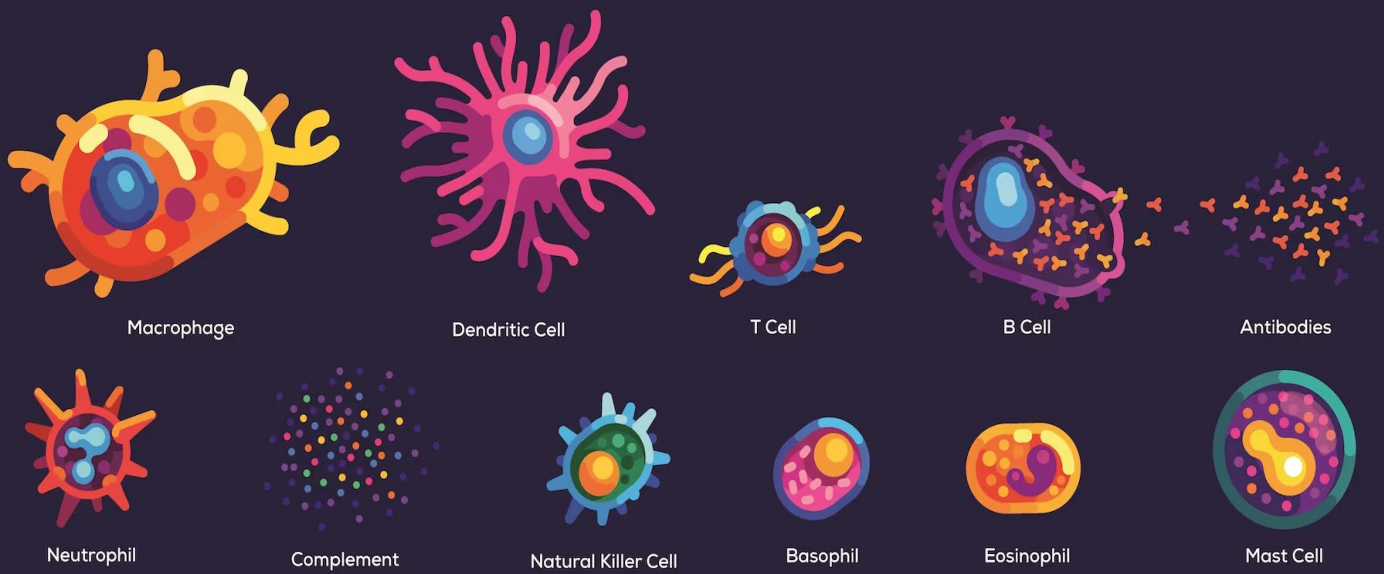
The SAIS Newsletter editorial team has set up a quick survey in every newsletter edition from June to October. We aim to improve the newsletter, and this survey will help us do that. All surveys consist of 3 simple questions that will take you less than 10 minutes of your time.

Please answer all survey questions every month, from the June to the October edition. You could be to be one of two winners for the grand prize- a copy of the beautifully illustrated book "IMMUNE: A journey into the mysterious system that keeps you alive", by Philipp Dettmer.

The two winners will be announced in the November newsletter edition.

Click the "Take Survey" icon to follow the link and answer these 3 easy survey questions.

- ☑ What do you think about the layout of the newsletter?
- ☑ How informative is the newsletter ?
- ☑ What did you think of our feature: Tuberculosis In the Three Spheres Of Life On Land?



SAIS MEMBERSHIP

The SAIS would like to thank all members for their ongoing support! It is highly appreciated. To continue being a part of our growing community, please keep up to date with your membership.

To update your membership and familiarise yourself with the new renewal process, please visit

https://www.saimmunology.org.za/membership.htm

RESOURCES TO FOLLOW

Check out these resources for more immunology-related information:

ALLSA
ALLERGY SOCIETY OF SOUTH AFRICA

FAIS

IUIS
International Union of Immunological Societies

immunopaedia.org
ADVANCING GLOBAL IMMUNOLOGY EDUCATION

SOCIALS TO FOLLOW

Social media is a great way to stay up-to-date with the immunology community! Why not check out/follow these social media handles:

@Johanna_A_Joyce

@jonykipnis

@DrSalinasLab

Grab a hot cup of ImmuniTea and share your thoughts with us. We appreciate your feedback!

The SAIS Newsletter Editorial Team

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