Centre for Molecular Therapeutics

April News Update

"Harnessing the power of the tropics to develop innovative solutions to global public health"

The Centre for Molecular Therapeutics is based at James Cook University, adjacent to the World Heritage- listed Daintree Rainforest and the iconic Great Barrier Reef. North Queensland also harbours many parasites and other microorganisms that are restricted to tropical environments. This enormous biodiversity provides a unique opportunity to explore and test new medicines derived from these natural resources as novel therapeutics for a range of infectious diseases and non-infectious human illnesses, including chronic disorders, allergies and autoimmune diseases as well as envenomation's.

The world's tropical regions also have special significance as home to a number of major global health pathogens as well as important emerging or re-emerging infectious disease threats. Immunotherapeutic's, vaccines and diagnostics to manage these diseases are urgently needed. The Centre for Molecular Therapeutics provide a unique framework for researchers with diverse expertise to collaborate on innovative cross-disciplinary research to develop novel therapeutics, vaccines and diagnostics from the tropics and for the tropics. Research is carried out under four key programs of Biodiscovery, Molecular Characterisation and Design, Molecular Immunology and Clinical Translation.

CMT WEBSITE: *https://www.jcu.edu.au/cmt*

FACEBOOK:
https://www.facebook.com/Centre-For-Molecular-Therapeutics-1511726859066532/

TWITTER: *https://twitter.com/CMTJCU*

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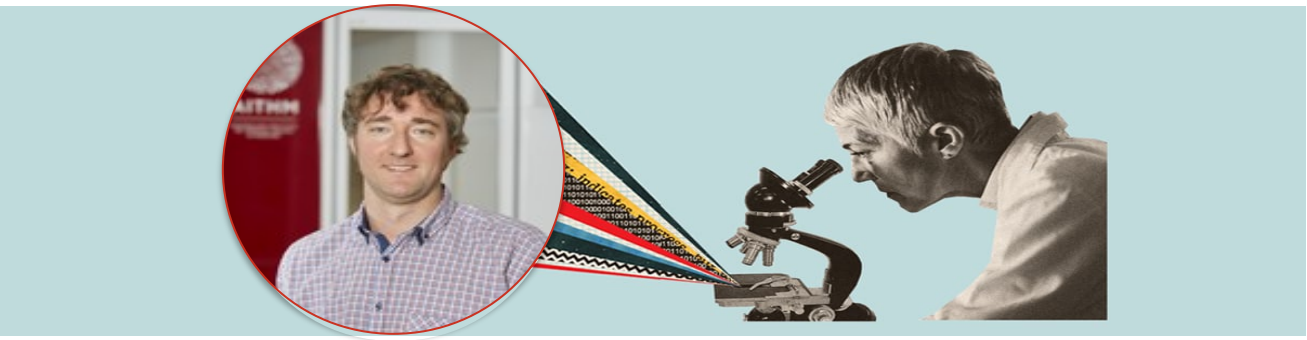

Under the Microscope – Andreas Kupz

7. **Tell me about your area of research?**
   My research focuses on host-pathogen interactions, in particular the development of vaccines for intracellular bacterial pathogens. About 70 percent of my research focuses on *Mycobacterium tuberculosis*, the causative agent of tuberculosis. The remaining time and energy is directed towards *Toxoplasma gondii* and *Salmonella enterica*. I am most interested in live attenuated vaccines, and how we can develop new vaccine strains or make existing ones better.

8. **What interests you about working in this area?**
   I am fascinated by the sophisticated mechanisms that bacteria and parasites have developed to interfere with their host cell biology. This arms race between pathogen and host is incredible interesting, and it is amazing how such tiny organisms can control and manipulate something of the size of a human or animal.

9. **How do you see your research developing in the future?**
   I am hoping to develop a new vaccine against tuberculosis within the next five years, and would be very happy to see it entering clinical trials.

10. **What are the 5 most important techniques you use in your research?**
    Animal models of vaccination/infection, Gene technology, Bacterial culture, Flow cytometry, Multiplex and histology

1. **What advice do you have for science students who are considering medical research as a career?**
   Be prepared for an enormous workload, uncertainty and the fact that your job will shift more and more towards managerial and administrative tasks, the further you come along in your caree

2. **What do you see as the benefits of being part of the Centre for Molecular Therapeutics (CMT)?**
   Being connected with other researchers with similar and complimentary interests.

3. **Tell me about the highlights of your professional career so far?**
   Having been awarded two NHMRC fellowships certainly ranks very high, but I also consider my publications in Nature Immunology and Immunity as a highlight.

4. **What would you like to do in the future?**
   Own a fishing shop in a small beachside village and live a peaceful life without stress.

5. **Tell me 5 things you dislike?**
   Not being punctual, Disorganised people, Unnecessary meetings, Money-hungry individuals, Stress

6. **Tell me 5 things that make you happy?**
   Spending time with my family, Fishing, Visiting new places, Camping, Going home at the end of the day without a long list of outstanding things to do

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Dr Thimo Ruethers

Molecular of Evolution of Food Allergens –from Sharks and Barra to Crocs and Chicken

Dr Thimo Ruethers Molecular Allergy Research Laboratory, James Cook University

Abstract:
Thimo will take you on a journey of tackling fish allergy in the Asia Pacific. Fish allergy is a serious, often life threatening, life long disease and thousands of edible species complicate its diagnosis and management. Currently available diagnostic methods are of fishy quality and are poorly suitable for Australian patients. Over 100 Asia-Pacific fish and other vertebrates were analysed for their comprehensive allergen repertoire, contributing to improved diagnostics and an advanced understanding of species and patient-specific allergenicity. Advanced *insilico* analyses give us an inside to our recently discovered Fish-Reptile syndrome: Fish allergy sufferers are more likely to have an allergic reaction to amphibians and reptiles than to rays and sharks.

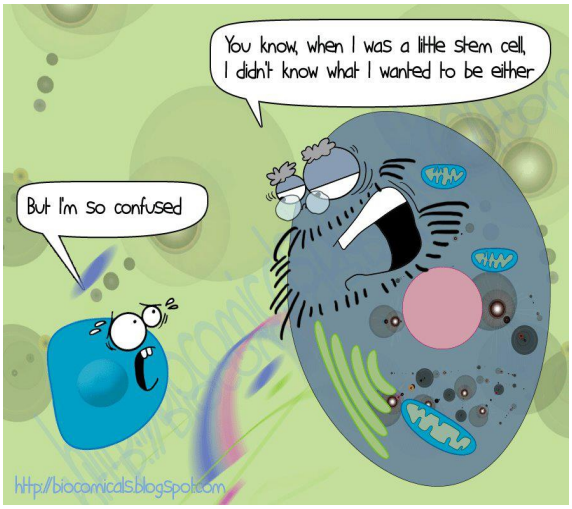
Tropical Landscape Joint Venture Science with Sushi Seminar

Date: Tuesday 14 May 2019 @12 Noon

Venue: James Cook University, Townsville ATSIP, Building 145 Seminar Room 030

Video Link: JCU Cairns Institute Building D003-003
(Ground Floor Meeting Room)

Seafood allergy skin prick tests 'unreliable', researchers warn



Newspaper Article:
https://www.abc.net.au/news/2019-04-12/seafood-allergy-skin-prick-test-unreliable/10998002

News Article:
https://flashstream1.jcu.edu.au/camrelay/Thimo_Ruethers/Fishy_diagnostics/Fishy_diagnostics_-_20190416_182129_7.html

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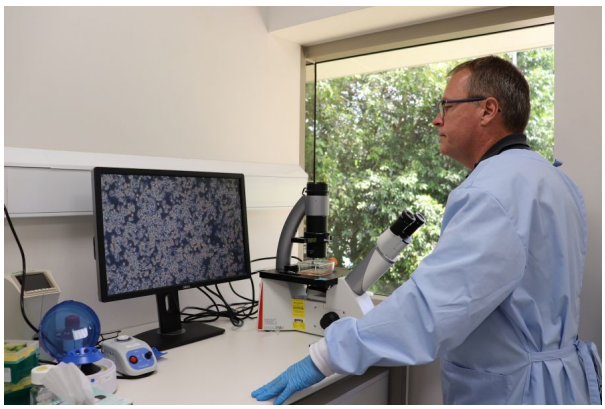
Pint of science events happening in Cairns in May 20/21/22.
Tickets are now on sale, $6 per person.
Pint of Science are not for profit so the entrance fee helps covers the costs of running the events.
https://pintofscience.com.au



Dr David Pattinson

Former police prosecutor turned scientist, Dr David Pattinson, is now a key member of Professor Doolan's research team involved in a major international mission to eliminate malaria, which claims nearly half a million lives each year.

https://www.aithm.jcu.edu.au/aithm-joins-international-push-to-find-a-new-vaccine/

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Dr Sandip Kamath- Allergy answers about Australian people and Australian seafood

https://www.aithm.jcu.edu.au/world-allergy-week-allergy-answers-about-australian-people-and-australian-seafood/

AITHM research fellow Dr Sandip Kamath has a three-part plan to improve diagnosis and treatment of potentially deadly seafood allergy for people in Northern Australia. Part one of his plan involves building a biobank of local seafood samples. Part two includes the analysis of human and allergen samples to gauge the severity and frequency of allergic reactions in hundreds of people. Finally, he plans to develop a simple pinprick allergy-testing device, and a vaccine.

Professor Alex Loukas – Tiny hookworms' giant medical uses.

IT'S an insidious parasite with an uncanny ability to manipulate our immune response, but the hookworm could be exactly what we need to fight chronic conditions such as coeliac disease, asthma, type 2 diabetes, and inflammatory bowel disease. For decades, evidence has been building around the ability of hookworms to reduce the incidence of inflammatory disease, and researchers are now figuring out how to turn that into viable treatments for some of the most persistent human diseases.
The secret to the hookworm's success is its ability to suppress its host's immune system just enough to avoid being rejected but not so much that it threatens the overall health of its host. "It's an example of the coevolution of a host and a parasite, the worm manipulates the immune responses just enough to protect itself, but not to the detriment of the human host," said Dr Paul Giacomin, a senior research fellow at the Australian Institute of Tropical Health and Medicine at JCU.

In 2015, Dr Giacomin and colleagues Professor Alex Loukas and Professor John Croese published the results of a high-profile human trial run by JCU and the Prince Charles Hospital in Brisbane involving 12 participants with coeliac disease. Each participant was given a safe dose of hookworms (species necator americanus) by placing a gauze patch on their arm containing 20 microscopic larvae. These young worms penetrated the skin, and made their way to the participants' guts over several weeks. Once the infection was established, the participants were gradually asked to introduce small amounts of gluten to their diet, enough that in one sitting it would have usually caused reactions such as diarrhea, cramps, and vomiting. However, no adverse effects were observed. "One of the reasons that this trial was so encouraging is that the worms turned out to be a really effective preventive treatment," Prof Loukas said. "We found that over the course of the nine months, the participants were eating much more gluten. They were terrified about eating gluten, but the effects we saw were really quite striking." The potential of this research is enormous, because it's not just about coeliac disease – all kinds of auto-immune diseases characterized by chronic inflammation could respond similarly.

Townsville Bulletin, Townsville QLD, General News, JCU News 5 April, 2019 ID1103592185

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Publications

Characterization of Tapeworm Metabolites and Their Reported Biological Activities.
Authors: Wangchuk, P., Constantinoiu, C., Eichenberger, R.M., Field, M., Loukas,A
Molecules. 2019 Apr 15;24(8). pii: E1480. doi: 10.3390/molecules24081480.

The longitudinal association between natural outdoor environments and mortality in 9218 older men from Perth, Western Australia
Authors: Wilma L Zijlema, Ania Stasinska, David Blake, Mila Dirgawati, Leon Flicker, Bu B Yeap, Jonathan Golledge, Greame J Hankey, Mark Nieuwenhuijsen, Jane Heyworth.
Environ Int. 2019 Apr;125:430-436. doi: 10.1016/j.envint.2019.01.075. Epub 2019 Feb 10.

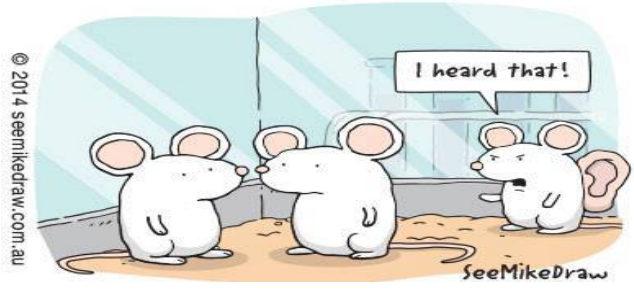
Abdominal aortic aneurysm: update on pathogenesis and medical treatments
Author: J Golledge
Nar Rev Cardiol. 2019 Apr;16(4):225-242. doi: 10.1038/s41569-018-0114-9.

Cross-sectional associations of sex hormones with leucocyte telomere length, a marker of biological age, in a community-based cohort of older men
Authors: Bu B Yeap, Jennie Hui, Matthew W Knuiman, David J Handelsman,Leon Flicker, Mark L Divitini, Gillian M Arscott, Susan V McLennan, Steven M Twigg, Osvaldo P Almeida, Graeme J Henky, Jonathan Golledge, Paul E Norman, John p Beilby
Clin Endocrinol (Oxf). 2019 Apr;90(4):562-569. doi: 10.1111/cen.13918. Epub 2019 Jan 20.

Cohort study examining the association between blood pressure and cardiovascular events in patients with peripheral artery disease.
Authors: Diana Thomas Manapurathe, Joseph Vaughan Moxon, Smriti Murali Krishna, Sophie Rowbotham, Frank Quigley, Jason Jenkins, Michael Bourke, Bernard Bourke, Rhondda E. Jones and Jonathan Golledge
J Am Heart Assoc. 2019 Mar 19;8(6):e010748. doi: 10.1161/JAHA.118.010748.

Semi-Supervised Salient Object Detection Using a Linear Feedback Control System Model
Authors: Yuan Zhou, Shuwei Hou, Wei Xiang, Chunping Hou, Sun-Yuan Kung
IEEE Trans Cybern. 2019 Apr;49(4):1173-1185. doi: 10.1109/TCYB.2018.2793278. Epub 2018 Apr 10.

Jokes



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