

24<sup>th</sup> June, 2018

## Report on research activities facilitated by Lions Club donations

Donations from the Lions Club have funded the purchase of a *Tecan HydoFlex* plate washer (pictured below). This equipment allows us to automate washing of tissue culture plates for a wide variety of applications, including many currently performed using the *Tecan Infinite M1000 PRO* multifunction plate reader that was purchased thanks to a previous donation from the Lions club. Ultimately, these machines improve efficiency and accuracy in many of the assays we run on a daily basis, making much of our lab work more effective and productive. The plate reader purchased previously has, in particular, helped with all studies that have come out of our lab in the past 2 years, including highly novel work on the regulation of inflammation and a number of published research papers from the past year (listed below). In addition, we have a number of other research papers currently in preparation which have benefitted from these valuable pieces of equipment. Hopefully, these important outcomes will improve our chances of attracting further funding from governmental, philanthropic and industry sources in the near future. Included with this report are some news articles from our internal newsletter describing some of the success stories and research conducted using the equipment that we have purchased thanks to the generosity of the Lions Club.

Both machines are currently used on a daily basis. In addition, they are used by other groups here at the Monash Health Translation Precinct means that the benefits extend much further work. Importantly, they are also used to undergraduate students and have allowed us collaborative networks across the country, enhancing the potential of our work. They both basic scientific research (which is for making new discoveries with therapeutic publication 1 below) and for more directly in particular allowing us to measure specific patient samples (see publications 2 and 3



(MHTP), which than our own help train to extend our greatly are used for absolutely key potential, see clinical studies, markers in below).

We would again like to take this opportunity to thank the Lions Club for their continued support of our research activities. This support makes a very real difference to us and hopefully, in the future, will lead to better outcomes for society.

## Recent research publications assisted by Lions Club donations

1. Lang, T., Lee, J. P. W., Elgass, K., Pinar, A. A., Tate, M. D., Aitken, E. H., Fan, H., Creed, S. J., Deen, N. S., Traore, D. A. K., Mueller, I., Stanicic, D., Baiwog, F. S., Skene, C., Wilce, M. C. J., Mansell, A., Morand, E. F. & **Harris, J.** (2018). Macrophage migration inhibitory factor is required for NLRP3 inflammasome activation. *Nature Communications* **9**, 2223.
2. Vincent, F. B., Nim, H. T., Thomas, J. P. W., Morand, E. F.\* & **Harris, J.\*** (2018). Effect of storage duration on cytokine stability in human serum and plasma. *Cytokine* accepted 06/2018. \*Joint senior authors.
3. Mende, R., Vincent, F. B., Kandane-Rathnayake, R., Koelmeyer, R., Lin, E., Chang, J., Hoi, A. Y., Morand, E. F., **Harris, J.\*** & Lang, T.\* (2018). Analysis of serum interleukin(IL)-1 $\beta$  and IL-18 in systemic lupus erythematosus. *Frontiers in Immunology* **9**, 1250. \*Joint senior authors

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Success stories from our lab facilitated by Lions Club Donations

## Monash medical students' research paves the way for improved treatments for lupus



*Rachel Mende*

Latest research at Monash University reveals a particular protein found in the blood of lupus patients may be a potential biomarker of kidney disease.

Co-authored by final year Monash medical students Rachel Mende and Emily Lin, both supervised by Dr Tali Lang, the study was published last week in *Frontiers in Immunology*.

Systemic lupus erythematosus (SLE), or lupus, is an incurable systemic autoimmune illness, which predominantly affects women of child-bearing age.

“This study is the largest to date which examines clinical associations between SLE disease parameters and two particular blood proteins: IL-18 and IL-1 $\beta$ ,” said first author Rachel, who undertook the research as a BMedSc(Hons) student at the School of Clinical Sciences at Monash Health (SCS).

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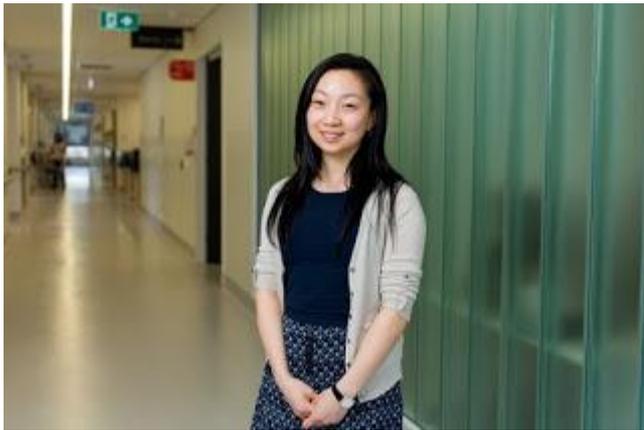
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*Emily Lin*

“We measured these two proteins in the blood of lupus patients and found that increased serum IL-18 was associated with the presence of kidney disease and irreversible organ damage while there was no association between serum IL-1 $\beta$  and SLE clinical outcomes.”

Postdoctoral Research Fellow from the Rheumatology Research Group, Dr Fabien Vincent said the data suggests that serum IL-18 and IL-1 $\beta$  have different clinical implications in lupus.

“Future research investigating whether lupus patients with kidney disease may benefit from a drug targeting IL-18 would be of value,” said Dr Vincent, co-lead author on the paper.

The research team thanks all the patients involved in the study, and acknowledges the Australian Lupus Registry and Biobank for providing the clinical data sets and patient samples.

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[World-first discovery reveals another piece in the puzzle of how inflammation is controlled](#)



*Dr Jim Harris*

In a world-first, Monash University researchers have discovered a new role that a specific protein plays in the control of inflammation, potentially paving the way for improved treatments for a range of conditions, including gout and arthritis.

Published in [Nature Communications](#), the research shows how macrophage migration inhibitory factor (MIF)—a protein that effects the behaviour of cells—could specifically control a wide variety of immune and inflammatory responses.

Study author Dr Jim Harris said the discovery shows that MIF plays a very specific role in regulating particular interleukins, a group of proteins expressed by white blood cells.

“We’ve known for some time that MIF is involved in a number of autoimmune and inflammatory diseases, including arthritis, lupus, Crohn’s disease and some cancers,” said Dr Harris from the [Rheumatology Research Group](#), School of Clinical Sciences at Monash Health.

“Yet, despite over 50 years of research, exactly how MIF exerts its many reported effects has been something of a mystery.”

“Our research suggests MIF regulates specific interleukins that are highly inflammatory and are known to contribute to many inflammatory diseases including gout, inflammatory bowel disease, juvenile idiopathic arthritis and some rare cryopyrin-associated autoinflammatory syndromes.”

Dr Harris said this discovery has the potential to not only help us understand how MIF controls inflammation, but also enables us to reliably test potential MIF-targeting therapies, an issue that has previously hampered attempts to develop effective and safe MIF-targeting drugs.

The study also demonstrates the effectiveness of a novel small molecule MIF inhibitor developed by Professor Eric Morand through previous Monash spinoff company Cortical Pty Ltd. The work was a collaborative effort involving researchers from Monash, the Hudson Institute of Medical Research and the University of Melbourne.

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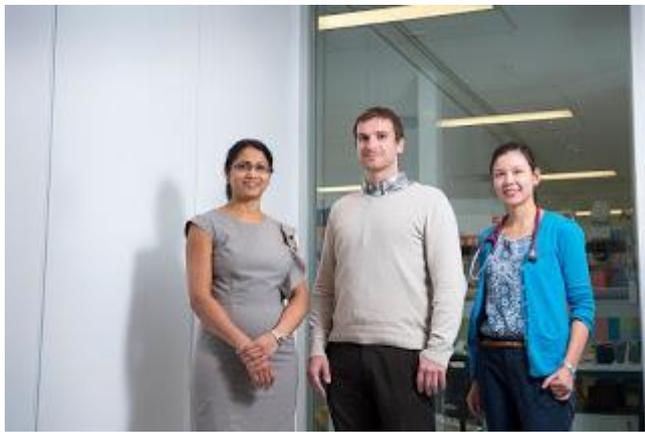
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## Monash recognised as leader in lupus research



*Dr Champa Nataraja, Dr Fabien Vincent,  
Dr Kathryn Connelly*

Monash confirmed its position as a national leader in research at the recent Australian Rheumatology Association (ARA) Annual Scientific Meeting.

Monash University and Monash Health researchers scooped the basic science free paper, poster, and trainee awards at the Meeting, representing 100 per cent of the annual basic science awards given by the ARA nationally.

Monash Health Rheumatology Fellow and Monash University PhD student Dr Champa Nataraja received the basic science poster award for 2018, and was also nominated for the new investigator award.

Dr Nataraja is investigating a protein called glucocorticoid induced leucine zipper (GILZ) as a potential treatment option for lupus.

“Systemic Lupus Erythematosus (SLE) or lupus is a multi-system autoimmune disease that predominantly affects younger women,” Dr Nataraja said.

“The treatment of lupus has scarcely changed over the last six decades—glucocorticoids or steroids remain the most prescribed treatment in lupus.”

“As a ‘double edged sword’, the use of these drugs is accompanied by litany of adverse effects that contribute to morbidity and mortality in these patients,” Dr Nataraja said.

Dr Nataraja said there is an urgent need for a drug that mimics the anti-inflammatory effects of steroids but without the negative metabolic effects.

“GILZ may represent such an alternative, potentially leading to improved outcomes for lupus patients,” she said.

Monash Health colleague, rheumatology registrar Dr Kathryn Connelly, received the prestigious Roche Travelling Scholarship for best Basic Science Presentation by a trainee at the conference.

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# MONASH University

## Medicine, Nursing and Health Sciences

### School of Clinical Sciences at Monash Health

The former BMedSc(Hons) student at the School of Clinical Sciences at Monash Health (SCS) is investigating how levels of different biological markers vary between patients with lupus, and how these variations relate to changes in their disease activity over time.

“This research will be a platform for better understanding biological pathways in patients with lupus, with the ultimate future goal being the ability to personalise disease monitoring and treatment,” Dr Connelly said.

Meanwhile, Dr Fabien Vincent, a research fellow in the Rheumatology Research Group, Centre for Inflammatory Diseases, was awarded the Best Basic Science Free Paper for 2018.

“My research focuses on a protein called BAFF, which we showed predicts the presence of kidney disease in some patients suffering from lupus,” Dr Vincent said.

“Unfortunately, no tool is currently available that enables physicians to select patients who could benefit from anti-BAFF therapy”.

Dr Vincent said future research would evaluate whether patients with lupus nephritis might benefit from a drug targeting BAFF.

In further recognition, the Australian Scleroderma Interest Group (ASIG)—whose Monash Health members include Dr Joanne Sahhar, Ms. Kathleen Elford, Dr Gene-Siew Ngian, and Dr Lucy Croyle— was awarded the ARA President’s Collaborative Research Prize.

“This highly prestigious prize, awarded triennially, is in recognition of national and international collaborative research efforts spanning not only our own discipline but also those of several other disciplines in medicine,” said Professor Eric Morand, Head of the Monash University Rheumatology Research Group.

“It’s also noteworthy that in the Basic Science award category, three of the six shortlisted papers were from Monash, including that of SCS PhD candidate Dr Melissa Northcott.”

“All these lean to some extent on the Monash Lupus research framework lead by Dr Alberta Hoi and supported by Dr Rangi Kandane and Monash Health nurse Ms Sue Morton,” Professor Morand said.

Professor Morand extends his sincere congratulations to all on this national level achievement.

“This is a very proud achievement for the team, and a proud day for me,” he said.

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