

2021 Report on research activities facilitated by Lions Club donations Past donations from the Lions Club have funded the purchase of a Tecan Infinite M1000 PRO multifunction plate reader and a Tecan Hydro-Flex plate washer, both of which are used for multiple different experimental assays within the lab, daily. This equipment has contributed to multiple projects within the lab, as well as being used by other members of the School/Department.

More recently, funding from the Lions Rheumatism and Arthritis Medical Research Foundation Australia has been used to support two PhD candidates in the lab. Hasnat and Mehnaz have now both submitted their PhD Theses for examination, which will hopefully be complete later this year. Both Mehnaz and Hasnat were impacted by COVID-19 and the numerous lockdowns over the past year, but both have worked very hard to get their work completed and submitted. They have also both contributed to research publications from the lab (1, 2). Both Mehnaz and Hasnat would like to thank the Lions Rheumatism and Arthritis Medical Research Foundation Australia for helping them through their studies and training, especially in these difficult times.

The pandemic and the associated lockdowns have also affected lab activities, although we have been fortunate to be able to continue our research throughout. A lot of time and effort has been spent trying to raise research funding from various sources, including the Australian and US governments, as well as many philanthropic organisations. We are currently waiting on the outcomes of these. In the meantime, our research continues to grow, with exciting projects looking at potential alternatives to steroids for the treatment of autoimmune diseases, including RA and related diseases like lupus, and discovering new understanding of how inflammation and autoimmunity : in all the rheumatic diseases. These studies have garnered interest from Industrial partners that we hope may lead to fruitful collaborations in the near future. On this subject, we have also instigated new collaborations with colleagues at Monash and RMIT that are generating some very exciting new data.



Mehnaz Pervin

Md Abul Hasnat

In particular, we have found new biology for the pro-inflammatory molecule MIF (macrophage migration inhibitory) and the anti-inflammatory molecule GILZ (glucocorticoid-induced leucine zipper) that have potential for future therapeutic development in a range of diseases, including arthritis and lupus. We are also investigating a new compound (derived from a common dietary ingredient) that inhibits MIF and working with a company based in Belgium to test some of their new MIF-targeting drugs in our assays, based on new biology for MIF that we discovered.

In addition, our clinical teams have continued their important work, publishing a number of articles, including some on the impacts of COVID-19 on patients with rheumatic diseases (3-7). In addition, the connections between the lab and clinical teams continue to grow, with a number of large research proposals submitted to study patients, as well as children with inflammatory diseases.

The most recent donation from the Lions Rheumatism and Arthritis Medical Research Foundation Australia will help us to purchase specialist kits for measuring levels of type I IFNs in biological tissues, including blood and cell culture supernatants from lab experiments. Type I IFNs are a group of molecules that regulate immune responses, particularly to viral infections, but also have pathological roles to play in autoimmune diseases. Studies in our lab have shown that our two favourite molecules, GILZ and MIF, can both regulate levels of type I IFNs, which may represent critical mechanisms of inflammation that could be targeted therapeutically. Thus, this kind donation will benefit a number of studies directly and help us to work out exactly how GILZ and MIF influence type I IFNs and how we might then use that to develop new therapies

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