Identification of miRNA biomarkers predictive of clinical outcomes in AA/MDS

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Grant-in-Aid 2016 - 2018

Dr Lynette Chee's research is conducted at the Australian Cancer Research Foundation (ACRF) Translational Laboratory at The Royal Melbourne Hospital, and specifically focusses on the role microRNAs, non-coding molecules that can affect gene expression, play in treatment responses and disease progression in Aplastic Anaemia (AA). Aplastic Anaemia has an incidence of 2-4 per million / year and although two-thirds of patients respond to current treatments, about one-third of responders will experience disease recurrence. Approximately 10-15% of patients with AA progress to myelodysplasia (MDS) and acute myeloid leukaemia (AML). MicroRNAs have been shown to correlate with clinical outcomes in MDS and AML.

Interestingly, in Dr Chee's exploratory cohort, she discovered that AA patients who had progressed to MDS/AML had a similar microRNA expression profile to patients who develop MDS without prior AA. In addition, specific microRNAs at diagnosis and post-treatment were associated with disease progression and treatment response. These findings now need to be validated in a larger cohort of patients and will have implications for identifying mechanisms underlying inferior treatment outcomes in AA and how we can improve these outcomes by targeting these specific pathways.

Dr Chee is particularly fascinated by the way the field of haematology led the way in the concept of 'targeted therapies' with the discovery of tyrosine kinase inhibitors, which specifically target the dysfunctional protein that results from the abnormal fusion gene responsible for the blood cancer chronic myeloid leukaemia. She explains "Following completion of my

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specialist training in haematology, the development of ‘targeted therapies’ piqued my interest in pursuing PhD studies in investigating novel retinoid treatments in acute myeloid leukaemia. As we unravel and understand more about the genetics and molecular mechanisms underpinning AA and related haematological malignancies, we can aim to discover novel ways of targeting aberrant pathways to improve efficacy of current treatments while reducing off-target side effects from the treatment.”