Identifying therapeutics which can be repurposed for the treatment of Myelodysplastic Syndrome and other Bone Marrow Failure Disorders

Dr Amee George

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Dr Amee George is situated at the Australian National University, Canberra. Her specific research interest is understanding the molecular basis of bone marrow failure (BMF) disorders, in particular, rare congenital BMF disorders such as Diamond-Blackfan Anaemia (DBA), as well as myelodysplastic syndrome (MDS), with a view to finding alternative treatment strategies.

The identification, discovery and development of drugs can be a long process. Dr George is utilising high-throughput screening technologies, which include cutting-edge robotics and instrumentation, to screen many thousands of known drugs and gene candidates simultaneously and rapidly. Conducting these screens provides lists of potential drugs and genes which influence the biology of the disease. Possible candidates are further tested in preclinical

models of BMF diseases. The final steps aim to move appropriate candidates that pass pre-clinical validation into clinical trials to assess how effective they are in patients, hopefully providing further therapeutic options for patients

Dr George has completed screens for DBA, and is currently conducting screens for MDS. She explains "It takes quite a bit of time to optimise screening experiments first before we venture into conducting the full large-scale screens. Ironically, the actual screens themselves are usually the quickest part! Whilst bone marrow transplantation is currently the only definitive cure, not all patients have this option, and alternative therapeutic options are limited. Our research aims to identify therapeutics that could be used for the treatment of these diseases, potentially reducing the burden of disease and enhancing quality of life."

Dr George became interested in BMF research in 2013, when she met an extraordinary family in Australia whose child was diagnosed with DBA. The family had set up a foundation, the Captain Courageous Foundation, to raise research funding to identify new therapies to treat DBA. She elaborates. "After hearing their story, and the medical treatments their young child had to endure, it immediately inspired me to work in this area, aware that the research I was undertaking could make a difference. Since then, I have met many other incredible families (including the Riewoldt family) who are passionate advocates for research and are a continuous source of inspiration; this along with my interest in understanding the molecular basis of these diseases drives me to continue working in this field."

Dr George believes that one of the greatest challenges faced by researchers in the field is access to funding for 'high risk' projects. "Whilst there are always obstacles to obtaining adequate patient samples, by far the most difficult problem faced by those working in an academic setting is obtaining research funding from traditional sources for 'blue-sky' discovery projects – particularly screening projects - because these approaches can be seen as too risky. I remind myself of the Thomas Jefferson quote, "With great risk comes great reward" and the potential to identify the next drug or next cure will likely come from taking these calculated risks. Therefore, many of us rely on funds from foundations such as Maddie Riewoldt's Vision in order to continue this vital and potentially ground breaking research into BMF."

Dr George completed her BSc (Hons) and then went on to complete a PhD within the Faculty of Medicine, Dentistry and Health at the University of Melbourne in 2007. She has worked across multiple research

Dr Amee George in the laboratory at the Australian National University

institutions (University of Melbourne, University of Queensland, Peter MacCallum Cancer Centre) before moving to the Australian National University in Canberra in 2015. As an academic, she works within Professor Ross Hannan's team at the John Curtin School of Medical Research. She also leads a small team which manages the ANU Centre for Therapeutic Discovery, a purpose built high-throughput screening facility. Within the Hannan laboratory, research focusses on the process of making ribosomes, the protein factories contained within cells. This process is called ribosome biogenesis. The laboratory is specifically researching avenues for how to target ribosome biogenesis for the treatment of cancer and other diseases including ribosomopathies and BMFS disorders. Intriguingly, while these diseases are different and present differently in patients, there are common elements. Much of the work performed in the laboratory helps to piece together the molecular puzzle across a number of disease types.

Outside of research, she enjoys photography, baking, coaching her daughters' basketball team and of course, being from Victoria, loves watching the footy!

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