Project Title: Development of broad spectrum, non-genotoxic cancer treatments for acute myeloid leukaemias and multiple myeloma.
Grant Awarded: $340,000 over 3 years: $113,333 in 2017-18
Principal Investigators: Prof Ross Hannan and A/Prof Anneke Blackburn, John Curtin School of Medical Research, The Australian National University.

Final Report July 2018-December 2018

New therapeutic approaches for cancer are urgently needed. This project has investigated a new combination of existing drugs with two novel therapeutic approaches that have been developed by our team. The novel agents target processes that are fundamental to cancer cell growth – the making of proteins, and controlling metabolism. We are studying the impact of these treatments in models of two different blood cancers, multiple myeloma (MM) and acute myeloid leukaemia (AML), which are both considered incurable with current standard therapies.

Since submitting our annual report in July 2018, our team have continued to conduct experiments on the two supported projects. PhD student Laura Ferguson has been focusing on treatment of AML with CX-5461 combined with chloroquine, an agent that acts synergistically with CX-5461. The latest experiments suggest that the combination may be working differently to the way we expected, yet in vivo the combination is still significantly better than either agent alone. Further research will be needed to fully understand this drug combination and how best to use this combination for the benefit of patients. Laura has almost completed experiments for her thesis and is moving on to writing. She is on track to submit in the first half of 2019, and thesis submission will be accompanied by submission of this work for publication.

In the second part of this project, we have been studying the treatment of MM with the novel metabolism-modifying agent dichloroacetate (DCA). PhD student Dan Dan Tian has continued working in vitro to examine the impact of DCA when used in combination with current MM chemotherapy drugs. This work is complementary to the clinical trial continuing at The Canberra Hospital (TCH) which has demonstrated the safety of using DCA in MM patients. This work has found that the effects of DCA against cancer cells were additive with other chemotherapy and that a benefit was seen for most chemotherapies when the dose was low. This is different to the way the chloroquine / CX-5461 combination works, but may still have a place in the management of myeloma patients. Dandan has successfully completed her PhD and graduated last week. She will remain with us for a few more months to complete the writing for two publications.

Overall, this grant has made a significant contribution to the work of two PhD theses, from which 3 publications will arise in 2019. This work has greatly increased our understanding of the anti-cancer drugs DCA and CX-5461, which are both broad spectrum drugs. As such, the supported research has relevance to many cancer types against which these drugs may be used in the future, and we thank the Cancer Council ACT for their support of this work.