Project Title: Targeting cancer metabolism to reduce metastases
Grant Awarded: $65,000 over one year (2018-19)
Principal Investigator: A/Prof Anneke Blackburn, John Curtin School of Medical Research, The Australian National University.

New therapeutic approaches for cancer are urgently needed. Our laboratory has been investigating the drug dichloroacetate (DCA) for over 10 years now, with regular support from Cancer Council ACT. Our previous grant from CCACT was focused on the blood cancers, multiple myeloma and acute myeloid leukaemia. With the CCACT support, we performed laboratory studies on the effect of DCA on the growth and survival of these cancers, particularly myeloma, for which we were also conducting a clinical trial of DCA in myeloma patients. Our results from this pilot trial are now published, indicating that DCA treatment can be tolerated by myeloma patients, and that some patients showed a positive response. Testing in additional patients is planned, with more laboratory studies, to confirm the best effective dose to use.

Our current focus for taking DCA forward for cancer patients is trying to predict which cancer cells are most likely to respond to DCA, and examining if DCA can change not only the growth and death of cancer cells, but also the behaviour of cancer cells. For both of these investigations, we are examining the gene expression patterns of cancer cells before and after treatment with DCA in the laboratory. We will focus on breast cancers and bone cancers (osteosarcomas), where metastatic disease can be very difficult to treat. We are currently examining the effect of DCA on the ability of these cancer cells to migrate and invade in laboratory models, and will then choose the most informative cells for the intense analysis of thousands of genes that may influence these processes.

We expect that these studies will show how DCA can reduce metastatic behaviour in a range of cancers, and provide a rationale for developing clinical trials in patients suffering from metastatic cancers such as breast, prostate and sarcoma, for whom therapeutic options are limited.

Publication:
GSTZ1 genotypes correlate with dichloroacetate pharmacokinetics and chronic side effects in multiple myeloma patients in a pilot phase 2 clinical trial.
Dan Dan Tian, Samuel K. Bennett, Lucy A. Coupland, Kathryn Forwood, Yadanar Lwin, Niloofar Pooryousef, Illa Tea, Thy T. Truong, Teresa Neeman, Philip Crispin, and James D'Rozario, Anneke C. Blackburn
Pharmacology Research & Perspectives (2019). In press.