Cancer Council SA

Beat Cancer Project funding 2018/19.

Overview of the research projects awarded Beat Cancer Project funding during 2018/19 financial year.

Contents

Centre for Cancer Biology

Deep live-imaging of tumour biology

Dr Gomez Guillermo – Infrastructure 2018/2019 - $125,000 – Bowel/Brain/Prostate/Skin/Other

"As cancers progress from benign to malignant forms, the normal structure of the tissues is lost, resulting in increased stiffness of the affected organs. It is now well known that such changes in stiffness of cancer-affected organs speeds up cancer progression, resulting in invasion of the tumour cells into surrounding regions and their spread to distant sites within the body. We therefore need sophisticated new methods to understand how the changes in the structure of cancer tissues contributes to this disease, and identify the abnormal aspects that need to be targeted by new cancer therapies.

Three-dimensional (3D) cultures of normal and cancer tissues allows us to not only reproduce the architecture of normal tissues and their cancerous counterparts but also use sophisticated imaging approaches to study cancer in ways that are not possible in research animals or patients. Moreover, this approach is superior to the use of cultured cell lines, which are maintained in a two-dimensional configuration that does not fully reflect their natural environment in real tissues.

Yet, because of their relatively large size, imaging complex 3D tissue structures presents new challenges that can only be resolved by the use of the latest generation of lasers and microscopes that allow live imaging deep into the tissue at a very high resolution. This requested infrastructure is critical to study the processes that drive abnormal proliferation and invasiveness of cancers and to achieve our aims of identifying new targets that can be used to improve personalised therapies against cancer."

Country Health SA

SA Teletrial: Bringing Cancer Clinical Trials to the Country

Dr Dagmara Poprawski - Clinical Trial Enhancement Grant - $280,000 - All cancers

"Trials in cancer care are offered at major centres in metropolitan areas in South Australia. There is currently no trial running outside of Adelaide for cancer patients, making their options of treatment limited by tyranny of distance as commented on by the Cancer Australia Regional Cancer Services Review in 2015/2016. We are hoping to utilise the COSA National Guide for Implementation of the Australian Teletrial model. This will mean that Flinders Medical Centre will act as the primary site, and the Mount Gambier Hospital will act as the satellite site, allowing patients to enter into trials with less travel and less cost. It will also continue the patient - oncologist relationship they have developed at the satellite site.

It is hoped that a pilot project will demonstrate successful implementation, with high standard of governance and quality of care. This will allow a future roll out of other regional and rural cancer centre sites to be inducted into this model. The lessons learnt will ensure that future care can be delivered in a seamless, coordinated, and high standard manner, including conventional and trial therapies. This will utilise the multidisciplinary approach to cancer care, and allow quality of life to be assessed.

The project is hoped to run for 12 months and have 2-3 pilot trials run between the two sites."

Flinders University

Improving gastrointestinal cancer outcomes: prevention, treatment and survivorship

Professor David Watson - Translational Research Grant - $380,000 - Bowel/Stomach

"Gut cancers usually present late in Australia and many patients have a poor outlook. Most research in this field focuses on treatment of advanced cancer, but this has only led to small improvements in overall outcomes. In clinical practice, cancers are generally managed using a 'one size fits all' approach with treatments offered according to cancer type and stage, rather than likely response.

This means that some individuals undergo treatment for little benefit, and quality of life can be adversely impacted by some cancer treatments. Tailoring treatments to individuals most likely to benefit and avoiding "low value care" offers an opportunity to deliver better outcomes at less cost.

This proposal will develop and implement better and more cost-effective ways to treat cancer of the oesophagus and bowel, the two major gut cancers in Australia. We will do this by analysing outcome information collected over a period of 13-20 years to find better ways of delivering care to individuals with these cancers, as well as those at risk of developing these cancers.

We will do this by using the outcomes to develop mathematical models designed to determine whether or not what we currently do is cost-effective, and also to determine if changes to care are likely to be safe and cost-effective. Changes to current treatments that meet these criteria will then be recommended for introduction into clinical practice."

Can a web-based psychological intervention for women with advanced breast cancer improve well-being and reduce health care use? A randomised controlled trial

Dr Lisa Beatty - Project Grant - $75,000 – Breast

"Advanced, or incurable, breast cancer, causes distress, impairs quality of life (QOL), and has a high health-system burden, yet few studies have examined interventions to address this. Our research group developed an online psychological program for people with curable cancer that reduced health-care utilisation and improved QOL. The proposed study will trial an online program for women with advanced breast cancer, to improve well-being (distress and QOL), and reduce health care utilisation."

From Big Data to Precision Medicine: Integrated analysis of clinical trial and electronic health record data in lung cancer

Professor Michael Sorich – Project Grant - $80,000 – Lung

"The project will develop online tools that will help patients and doctors to work through difficult decisions on whether to use an anti-cancer medicine. It will do so by analysing a large amount of data available from previously completed studies of medicines and data from real-world use of the medicines by patients. This analysis will allow predictions to be made regarding a patient's likely risk of benefits and harms from using a medicine."

Flinders Centre for Gastrointestinal Cancer Prevention

Professor David Watson – Hospital Package - $750,000 – Stomach

"In Australia gastrointestinal cancers cause more deaths than any other cancer type. Most individuals are diagnosed with late stage disease and have a poor outlook. Most research focuses on late stage disease, but this has had little impact on the number of deaths. Early cancer and pre-cancer, however, have much higher cure rates, so identifying cancer earlier is more likely and more likely to save lives; and even more should be possible if pre-cancer can be prevented from progressing to cancer. We are already undertaking research to develop new methods for identifying early gastrointestinal cancer or preventing cancer from developing.

We will establish a Centre focused on research to discover ways to diagnose gastrointestinal cancer earlier, or to prevent this cancer from developing, and reduce the number of deaths from gastrointestinal cancer in our community. Importantly, we will develop new research workforce capacity in the areas of clinical science, behavioural science, biostatistics, population health and cost-effectiveness research that will be essential to determine the best ways to move research findings into clinical practice in the wider community."

Queen Elizabeth Hospital

Individualised Risk Assessment and Therapeutic Intervention for Colorectal Cancer in South Australia

Professor Guy Maddern – Hospital Package - $750,000 – Bowel

"This initiative sets out to bring together a group of experienced and practising clinicians together with an experienced translational researcher all working within the Central Adelaide Health region including the Royal Adelaide and The Queen Elizabeth Hospitals to direct research scientists working within the scope of colorectal primary and metastatic disease. It would be hoped that the two research fellows who will be appointed will have experience both in understanding the primary colorectal malignant process as well as an understanding of the implications and research developments in managing metastatic disease. It is only by having a grasp of both ends of the cancer progression that likely improvements in care and outcomes are to be achieved. Focussing purely on the management of primary disease leaves a large number of patients without constructive input but, similarly, to ignore primary disease management is to fail to prevent the disease at an early stage.

This group will be the first in South Australia to focus exclusively on colorectal cancer and its clinical and biological characteristics. As the second largest cause of malignant death in the Australian community, it is an important area of research which has been poorly focused on in South Australia to date."

Royal Adelaide Hospital

Advancing T-cell therapy for leukaemia and glioblastoma

Professor Michael Brown – Hospital Package - $750,000 – Leukaemia

"Both brain cancers and acute and chronic myeloid leukaemias affect Australians throughout their lifespan. These difficult to treat cancers are rarely curable. Standard treatments work for a time and then fail because the cancer becomes resistant. We propose to take an entirely novel approach to treating these resistant cancers by harnessing the power of the patient's immune system against their cancer. We will re-program the patient's immune system by making their own T cells recognise and kill cancer cells more efficiently in the laboratory before returning them to the patient's body. The 'genetically engineered' T cells will then be armed to target the patient's cancer directly. We will do this in a way that reduces the possibility of serious side effects. Once we have shown that this approach works, we can turn to using this T-cell therapy for earlier stages of the cancer as well as for other cancers."

South Australian Health and Medical Research Institute (SAHMRI)

Precision Medicine in Acute Lymphoblastic Leukaemia

Professor Deborah White – Principal Cancer Research Fellowship - $300,000 – Leukaemia

"Acute Lymphoblastic Leukaemia (ALL) is the most common childhood cancer and remains the leading cause of nontraumatic death in children. For adolescents and young adults with ALL the therapeutic outcomes are poor. Most older adults will die of their disease. Genomic analysis has elucidated several new high-risk ALL lesions that may be targetable with rational therapies. This is supported by anecdotal reports of significantly improved outcomes, but to date both druggable target identification and patient access to these therapies is limited. This is a clear un-met need. Importantly, patients with high risk genomic lesions are currently not recognised at diagnosis and are only screened for genomic lesions when they relapse or fail to respond to chemotherapy; for many patients this is too late. The clinical sequelae is then one of high dose, toxic chemotherapy +/- transplantation, both associated with life-long risk of comorbidities and second malignancy. Newer immune based therapies are emerging, but we currently don't know which patients will benefit from these approaches.

This Fellowship is based on Precision Medicine, integrating genomics, metagenomics, bioinformatics and functional analyses, to provide diagnostic screening and therapeutic triage paradigms that are readily accessible and importantly, will transform treatment and outcomes for our most vulnerable ALL patients.

My group is ideally placed to bring real change for ALL patients to ensure they receive the right therapeutic approach early. The aim of this Fellowship is to improve the clinical outcomes for patients with ALL, but the broad paradigms established will be applicable to other cancers.

Preclinical modelling of T-cell Acute Lymphoblastic Leukaemia - defining targeted therapies and preventing treatment resistance

Dr Laura Eadie – Mid-career Research Fellowship - $300,000 – Leukaemia

"T-cell Acute Lymphoblastic Leukaemia (T-ALL) is a genetically complex high-risk disease affecting children and adults for which novel treatments are urgently required. T-ALL is diagnosed at a rate of ~60 patients per year in Australia, most commonly affecting children 0-14 years old (60% of all T-ALL cases) and is universally treated with high dose, multiagent chemotherapy. While effective, these treatments can result in toxicity and long-term side effects. In addition, the primary clinical issue in ALL is treatment resistance with 25% of paediatric T-ALL patients at risk of primary resistance (leukaemic induction failure) or relapse. The outlook is worse for adult T-ALL patients: 40% of patients fail therapy.

Considerable research into alternative treatment options has been performed in the B-cell ALL sphere (BITEs, CAR-T cells). However, innovative therapies for resistant T-ALL patients are currently lacking, highlighting the pressing need for novel therapeutic strategies based on the disease type of individuals. To address this issue, targeted therapies will be assessed in mouse models of T-ALL through ongoing generation of 1) patient derived xenograft models from all T-ALL samples received in our laboratory and 2) production of transgenic models of T-ALL. This will enable the evaluation of novel and combination therapeutic approaches compared with the current standard of care. Because it is expected some of these cases will develop therapy resistance, mouse models of drug resistance will also be developed and pre-emptive intervention in the resistant disease setting investigated.

This research is of immediate clinical relevance and forms the basis of my ongoing objective: to create a repository of cells for experimental evaluation of targeted therapies in order to enhance the survival of Australians with this disease."

Does ageism prevail in access to multidisciplinary cancer care?

Professor Timothy Price – Translational Research Grant - $67,350 – Bowel

"Colorectal (bowel) cancer (CRC) is a disease of older people, with a median age at diagnosis of 70 years. However, CRC survival is decreased for patients > 65 years compared to their younger counterparts. Although older people tend to have other co-morbidities that affect survival, an earlier diagnosis and access to the most appropriate treatment makes a difference to cancer outcomes. However, evidence suggests that many older people are not being offered the optimal treatment. For older people living in regional settings, other factors (e.g. family support, travel) may further influence access to appropriate care.

We will explore whether a patient's age impacts on access to quality CRC treatment, as measured by multidisciplinary team (MDT) care, which is considered best practice in the treatment planning for patients with cancer. A one-year pilot study will focus on access to, and activation of, MDT care in regional settings, where the impact of age may be exaggerated. A mixed methods study will be applied. Clinical audit of an MDT database will be compared with population-level data analysis to explore patterns of CRC care for older people. Quantitative findings will be triangulated with thematic analysis of geriatric oncology decisions made at the Mt Gambier Multidisciplinary Cancer Assessment Team meeting.

This pilot study will identify key variables that influence MDT CRC care and finalise a survey design to establish the preferences of MDTs for alternative treatment regimens for older patients diagnosed with CRC for controlled testing in metropolitan and regional hospital MDTs across South Australia."

(APOLLO2) Australian trial of Peritoneal Organoid guided therapy to Lengthen Life in patients without Opportunity for cure

Dr Dan Worthley – Translational Research Grant - $382,650 – Bowel

"Through developments in laboratory techniques we can now take small samples of patient tumours, collected at keyhole surgery, and grow them in a dish in the laboratory. This makes tumour pathology, usually the study of dead tissues, all of a sudden the study of living tissues. This now allows us to test patient tumours for drug sensitivities in the dish before treating the patient in the clinic. This is, of course, what has happened in crobiology for decades, with an infective organism isolated, cultured and tested for antibiotic sensitivity, before prescribing. This study, hopes to bring an analogous approach to the care of patients with cancer.

Patients with bowel cancer that has spread through to the lining of the abdomen (the peritoneum) have very few treatment options and often have very poor life expectancy.

We hope that by testing living tumour cells from these patients in the laboratory, we can provide precision medical care to select the best drugs for the job and avoid the drugs that are ineffective.

New paradigms in clinical therapy are driven in equal part by innovation in therapeutic compounds "the keys" and improved knowledge of underlying cancer biology, "the locks". But, we also need new ways of identifying which, partners best, with which. The APOLLO2 trial hopes to provide the clinical "fingertips" to help guide our selection of the right therapy for the right patient.

This study is a world first, to test whether this approach is feasible, practical and would be a viable option for high throughput patient care.

Principal aim: To establish the feasibility and safety of drug screening of tumour samples from patients with inoperable peritoneal colorectal cancer metastasis. We will establish how many patients would have treatment change on the basis of this testing. This extended pilot study, would serve as a foundation for future funding to conduct an appropriately powered, nation-wide, randomised-controlled trial."

SAHMRI / Central Adelaide Local Health Network (CALHN)

The South Australian Cancer Research Biobank

Professor To Bik – Infrastructure 2017/18 - $210,750 – Leukaemia

"The South Australian Cancer Research Biobank (SACRB) is a statewide research facility that collects blood, bone marrow, and other tissues from cancer patients, and stores them for future use in research. Biomedical researchers in South Australia can apply to the biobank for the samples that they need in their research projects. Long-term collection and storage of samples is essential to study a cancer at diagnosis, after treatment, and at relapse. It also enables the collection of substantial numbers of samples, even from rare cancers.

SACRB complies with relevant ethics and governance regulations and is recognised by the National Health and Medical Research Council as a public biobank. It is one of the largest biobanks of blood cancers in Australia. Since its inception in 2012 the Biobank has enabled local cancer researchers to obtain twenty four million dollars in research funding, contributed to many high profile international studies, and over one hundred high impact research papers.

The Adelaide Biomed City Precinct funds the running costs of the biobank.

This funding will enable SACRB to move from the old Royal Adelaide Hospital site to its permanent home in the South Australian Health and Medical Research Institute as part of the Adelaide Biomed City Precinct. Beat Cancer funding will also enable SACRB to expand its collections to include a range of solid tumour samples."

SAHMRI / University of Adelaide

A Bioinformatician for the Joint SAHMRI / University of Adelaide

Professor Deborah White – Infrastructure 2018/2019 - $125,000 – Leukaemia

"Both the University of Adelaide and SAHMRI have a critical need to expand bioinformatics services to health and biomedical researchers now based at the west-end precinct, and also to the North Terrace and Waite campuses of the University. Under a new joint initiative these two research entities have agreed upon a joint vision for this moving forward. The first step in the development of this has been the recent appointment of Dr Jimmy Breen to the position of a shared role as head of the SAHMRI/University of Adelaide West-end Bioinformatics Core. This position will be supported by the appointment of a junior Bioinformatician supported by the University of Adelaide with a shared role in this bioinformatics core and University of Adelaide Agriculture research. SAHMRI Cancer Theme will position their Leukaemia Bioinformatician within this core, as well as establish a new position for a Bioinformatician in the specialty area of Epigenetics and broader Cancer Genomics. This position will work closely with the SAHMRI Cancer Theme, within the SAHMRI David Gunn Genomics Facility and will provide services across the precinct in these areas. We are seeking funding for this new Bioinformatician position for a period of 3 years to add value to the research community of South Australia."

University of Adelaide

From bedside to bench to bedside: improving prognosis and treatment of prostate cancer

Dr Lisa Butler - Principal Cancer Research Fellowship - $600,000 – Prostate

"Prostate cancer is a significant health burden in Australian men. Due to advances in early detection of prostate cancer over the past 20 years, most cases of localised disease are now successfully managed by surgery, radiotherapy or active surveillance. However, there are no reliable methods to predict which tumours are likely to progress to more aggressive, lethal phenotypes. Patients who develop advanced prostate cancer are treated with androgen deprivation therapy, but this invariably fails and patients progress with incurable disease. Advances in drug development can improve patient survival, but there is considerable variation in patient response and a lack of markers to rapidly and precisely monitor treatment response and inform clinical decision-making.

My vision over the next 5 years is to improve the clinical management and treatment outcomes for men with prostate cancer. Using cutting-edge technologies and clinically-relevant models, I will:

1. Develop and commercialise novel biomarkers for more accurate disease prognosis
2. Design new strategies to achieve more durable control of advanced disease
3. Initiate innovative patient trials to facilitate clinical translation of novel therapeutics.

My research program encompasses the clinical journey of patients from surgery (bedside), to laboratory research (bench), through to novel clinical trial design (bedside). My goal is to improve treatment choices and outcomes for men with prostate cancer. By developing more sensitive, non-invasive tests to monitor tumour behaviour, new therapies can be tailored to the patients who will benefit from them the most."

Personal and Family History of Type 2 Diabetes and Risk for Colorectal Cancer in Young Adults

Professor Joanne Young - Project Grant -$75,000 - Bowel

"Colorectal cancer is increasingly seen in adults under age 50. Type 2 diabetes is common in the Australian population. Recent findings from our research program has linked colorectal cancer in young adults with having a close relative with type 2 diabetes. Since there are many more people with type 2 diabetes in the population than there are young adults with colorectal cancer, our proposal will investigate the features of such clustering that may allow us to identify young adults most at risk."

Therapeutic targeting of cancer dissemination in multiple myeloma to prevent disease progression and relapse

Dr Kate Van Dyke - Early Career Fellowships - $240,000 - Multiple Myeloma

“Multiple myeloma (MM) is an incurable haematological cancer that is responsible for an estimated 80,000 deaths each year, worldwide. Even with the best available current therapies, almost all MM patients eventually relapse, with only 15% of patients surviving 10 years from diagnosis. The development, progression and relapse of MM tumours is critically dependent on the ability of the MM plasma cells (PC) to disseminate to sites throughout the bone marrow (BM).

In particular, previous studies have identified that those patients that have highly "metastatic" MM tumour cells at diagnosis do particularly poorly, leading to rapid disease progression, relapse after treatment and death. Identification of the factor(s) involved in the recirculation and dissemination process in MM is therefore key in the development of therapeutic strategies that will prevent overt relapse in these patients.

My studies are aimed at investigating why some patients do very poorly, surviving less than 2 years, and identifying tailored treatments for this group of patients. Importantly, my work focuses on the repurposing of existing targeted therapies that have been trialed in other disease settings. This makes translation of the results of these studies to the clinic feasible in the short term, meaning that real improvements in survival outcomes should be rapid for these patients who traditionally have very poor outcomes.”

Improving the management of chemotherapy-induced nausea by assessing and treating nausea as a symptom cluster

Professor Ian Olver – Project Grant - $75,000 – All cancers

Drug therapy can successfully prevent vomiting after chemotherapy but the majority of patients still suffer nausea. Patients differ in what symptoms they label as nausea which appears to be a cluster of several symptoms all of which may need separate treatment. We will develop an App to find what symptoms each patient reports as nausea to see if we can improve it by treating each unique symptom. We will also monitor risk factors for nausea to see if we can prevent it occurring before treatment.

Rehabilitating the Estrogen Receptor to Beat Breast Cancer

Dr Jean Winter - Early Career Fellowships - $240,000 - Breast

"Breast cancer is driven by abnormal activity of the estrogen receptor (ER). Surgery and radiation therapy are effective treatment strategies when the tumour is confined within the breast. However, for cancers that spread out of the breast, the major treatment strategy is to completely eliminate activity of ER. This is called hormone deprivation therapy and has been employed for the past century.

For some, endocrine therapy can be very effective and has led to increased survival rates, but often the side-effects are debilitating and patients feel miserable. For others, this therapy does not work at the outset or their cancer becomes resistant. It is these highly aggressive therapy-resistant tumours that kill patients with breast cancer. The overwhelming evidence indicates that hormone deprivation therapy has run its course in providing a survival advantage to people with breast cancer.

In this application, I propose a ground-breaking new treatment strategy that aims to rehabilitate rather than abolish activity of the ER, which drives breast cancer growth. This approach works by stimulating other hormonal pathways to push ER from "bad" to "good" DNA binding sites. This reverts normal cellular processes to impede ER action and halt tumour growth. I propose this can be achieved by repurposing drugs already used for other medical purposes, vastly increasing the speed of translating findings from the laboratory to the clinic. This strategy has strong potential to increase the lifespan of breast cancer patients who develop resistance to hormone deprivation therapies while improving their quality of life."

Towards eradicating bowel cancer death: better detection, the mucosal microbiome and personalised treatment

Dr Susan Woods – Mid-career Research Fellowship - $300,000 – Bowel

"Bowel cancer is a preventable disease, if early bowel cancers are detected they can be removed and >95% of patients are cured. Yet over 4000 Australians still die from this cancer each year. We need to do better to prevent, find and treat these cancers. This project focuses on finding the hidden, early cancers that are not found by current population bowel cancer screening tests. We combine recent technological advances to develop new tests to better detect these lesions and predict which will become killers. We will rapidly move our best candidates to existing clinical cohorts for evaluation, to expedite translation to the clinic. Together with our Australian research and US-based corporate partners, we also assess personalised treatment regimes for advanced disease using patient samples grown in a dish. If it works, this will guide therapy choice for patients, reducing unwarranted side-effects and picking the treatment that will work most effectively for each patient. We also investigate how the bacterial community in our gut is changed in cancer, and the role this plays in promoting this disease. This may lead to a probiotic supplement for high risk people to assist with bowel cancer prevention in the future."

University of South Australia

Germline and somatic genetic variation in cancer

Professor Hamish Scott - Principal Cancer Research Fellowship - $600,000 – All cancers/Breast/Leukaemia/Pancreatic

"All disease processes in humans have a genetic component, either inherited or acquired by somatic mutation during cell division. It is important to identify genes and mutations that cause disease, predispose families to diseases, or are acquired during disease progression as these are important diagnostic and prognostic markers. They also provide direct targets and biological pathways for therapeutic intervention.

We are interested in how and why these genetic mutations occur, how these changes cause cancer or cancer predisposition, and ways of better treating and monitoring these diseases. Our model diseases are typically, blood cell diseases, such as leukaemias, and lymphomas. Our work on rare inherited cancers with unmet clinical needs has immediate effect such as genetic diagnoses for family planning or selection of bone marrow donors.

My laboratory focuses on disease gene discovery and confirmation utilizing latest genomic technologies such as Next Generation Sequencing. We have accrued samples from over 100 families with predisposition to haematological malignancy (HM = leukaemia and lymphoma), which are invaluable resource for the identification of genetic and epigenetic changes leading to these and other cancers. We have found additional genes that segregate with diseased individuals in some of these families and/or are mutated in sporadic samples. We continue to hunt for additional genes/mutations in families and sporadic samples. Functional studies on potential and identified genes in vitro, ex vivo and in vivo in mice continue to expose mechanisms for predisposition and progression to HM.

FANC gene mutations in Acute Myeloid Leukaemia biology and treatment

Professor Richard D'Andrea - Project Grant - $75,000 - Leukaemia

"The role of FANC gene variants in AML. We have found mutations in DNA repair genes in AML patients, and associated the presence of these with increased risk of developing AML. Our hypothesis is that the presence of these mutations leads to reduced efficiency of DNA repair, and increased risk of additional mutations and leukaemic transformation. Our aim is therefore to determine the changes associated with these mutations in blood cell precursors, and to investigate the potential of targeted therapies for this group of patients."

Biological characterisation and therapeutic options for high risk, DDX41 mutated, haematological malignancies

Dr Anna Brown - Project Grant - $155,000 - Leukaemia

"Some families carry inherited genetic mutations that greatly increase their risk of developing blood cancers like leukaemia and lymphoma. Through the Australian Familial Haematological Cancer Study, coordinated by our research group at the Centre for Cancer Biology, we have used the latest DNA sequencing technologies to identify new mutations a gene called DDX41. Already mutations in this gene are the most common known inherited genetic factor associated with development of blood cancer, however the way in which these gene mutations cause blood cancer is currently unknown. In this project we will examine several functions of this gene in blood cells to determine how it works. Importantly, we will also use state-of-the-art genetic technologies to develop tests for monitoring mutation carriers at risk of developing leukaemia and investigate candidate drugs with the aim of establishing personalised medicine to treat, or even prevent, leukaemia development in these high risk patients."

Towards a new genomic classification of risk for patients with chronic myeloid leukaemia

Associate Professor Susan Branford – Project Grant - $80,000 – Leukaemia

"Survival for patients with chronic myeloid leukaemia has improved but a proportion fail therapy. Failure is related to poorly defined genetic abnormalities that may already be present at diagnosis. We will detect these abnormalities using state-of-the art sequencing technologies. Our aim is to develop new ways to stratify patients at diagnosis according to their risk of treatment failure. These patients may receive more potent drugs to reduce the risk of treatment failure and death."

Structure-based design of novel IL-3 variants with selective function in cancer therapy

Dr Timothy Hercus – Project Grant - $$75,000 – Leukaemia/all cancers

"Developing variants of hormones that act on blood cells for use in cancer therapy. Cancer patients often have insufficient white blood cells and as a result are vulnerable to a range of fatal infections. Interleukin-3 (IL-3) and granulocyte-macrophage colony-stimulating factor (GM-CSF) are proteins that regulate the production and function of white blood cells that protect our body from infections but can have undesirable side-effects. Through understanding how IL-3 and GM-CSF function, we will develop selective variants that better stimulate white blood cell production."

Establishing the South Australian Cancer Trials Network

Professor Ian Olver - Clinical Trial Enhancement Grant - $400,000 – All cancers

"This project will establish a best-practice cancer clinical trials network (CTN) across all sites providing cancer treatment and care in South Australia. This includes regional sites which are currently limited in their capacity to support a CTN, but where commitment, funding, using the COSA teletrials model and current technology can overcome these barriers.

As part of establishing the SACTN, an appropriate governance structure, statistical and technical expertise, sophisticated IT platform inclusive of mobile technology integration, funding model, communication and trial promotion strategy, and measures to track process, outcome and impact of SACTN success (or otherwise) will be identified. Stakeholders including consumers will be engaged throughout to ensure acceptability, feasibility and long-term sustainability of the system design. A formal evaluation will be undertaken and data will be used to produce a final report.

A demonstration trial project will be devised, implemented and reviewed to test the operating model of the SACTN. This project will support other state-wide initiatives (e.g. Optimal Care Pathways implementation).

The impact of this project will be:

- Increased attraction of funding external to SA by creating a marketable focal point for SA-based clinical trials
- Better access to clinical trial information for all stakeholders (which trial is running where)
- State-wide coordination of data to free up site-based managers to focus on site-specific trial management
- Leadership and technical support for PhD and clinical research projects
- An advanced clinical trials IT platform including website and mobile device technology
- Standardised, integrated reporting system (e.g. number of patients reviewed in clinic versus patients on trials)."

Direct transcriptional regulation by microRNAs

Professor Gregory Goodall – Project Grant - $80,000 - Breast

"MicroRNAs are vital regulators of all cellular processes, including cancer. Up until now, almost all reports of microRNAs exclusively look at their role within the cytoplasm. New information however suggests there may also be far more extensive roles for microRNAs within the nucleus. Thus, important roles may have gone un-noticed. We are seeking to understand this new role for microRNAs in the nucleus in order to better understand how they act to both promote and inhibit cancer progression."

A unifying approach to Non-small cell lung cancer therapy

Dr Joanna Woodcock – Project Grant - $80,000 – Lung

"Lung cancer is the leading cause of cancer death and survival rates are poor. Non-small cell lung cancers (NSCLC), which account for 80% of lung cancers, comprise many different subtypes restricting treatment options. Drugs that are more broadly effective are needed. 14-3-3 proteins are involved in the development of NSCLC and are a suitable target for drug development. We already have compounds that target 14-3-3 and will confirm NSCLC's dependence on 14-3-3 and identify new drug candidates."

Discovery of optimal targets to better diagnose and treat metastatic cancer

Dr Phillip Gregory – Principal Cancer Research Fellowship - $600,000 – Breast and Prostate

"Breast and prostate cancer are among the most diagnosed cancers in women and men and are a significant health burden globally. Although advances in early detection of these diseases have improved survival rates, there are still no effective treatments once they progress to an aggressive disease where they spread (or metastasise) to other parts of the body. In order to find more optimal treatments, we need a better understanding of what causes a tumour cell to gain aggressive properties and become resistant to current therapies.

My vision over the next 5 years is to use the latest technological advances in gene sequencing to identify factors which predispose breast and prostate cancer cells to become more aggressive and resistant to treatment. My research aims to:

1. Discover new strategies to treat therapy-resistant, metastatic prostate cancer

2. Identify factors that cause specific breast cancer cells to gain aggressive properties.

My research will lead to new strategies to detect and treat cancers cells before they become aggressive and spread. This will ultimately lead to earlier diagnosis of cancers most likely to spread, as well as more effective treatments for advanced breast and prostate cancer."

Immune therapy to treat solid cancers

Dr Tessa Gargett – Early Career Fellowship - $240,000 – Brain/Skin

"The immune system contains cells that have the unique capacity to destroy cancer, however tumours often develop ways to turn off these cells and escape destruction. The most successful new immunotherapies (trade names Keytruda, Opdivo and Yervoy) work by blocking the tumour's method of escaping and allowing the immune system to kill cancerous cells. These therapies can be highly effective and around 40% of patients with melanoma will respond to therapy, with some patients even achieving a complete response where their tumours are eradicated. However, despite these promising results, approximately 60% of melanoma patients do not respond. Other forms of solid cancers like brain cancer also fail to respond, and so these patients are completely missing out on these breakthrough treatments. Our lab wants to extend the promise of immunotherapy to all patients. That's why we're testing brand new immune-based therapies specifically designed to boost the immune system in solid cancer patients. We have one clinical trial currently running at the Royal Adelaide Hospital which tests a personalised cell therapy in patients with melanoma. We will soon commence two new cell therapy clinical trials in patients with brain cancer. This project will help develop these trials and also follow patients receiving the new treatment to see how they respond."

Ongoing Beat Cancer Project funding

Flinders University

Optimising drug therapy in solid tumours

Professor Ross McKinnon - Research Chair - $1,000,000 - All cancers

University of Adelaide

Improving our understanding of cancer biology, diagnostics and therapies

Professor Timothy Hughes - Research Chair - $750,000 - All cancers

University of South Australia

Turning research into life-saving reality

Professor David Roder - Research Chair - $1,000,000 - All cancers

SANT DataLink

Mr Andrew Stanley - Infrastructure grant - $800,000 - All cancers

SAHMRI and University of South Australia

Clinical Cancer Registry

A/Professor Caroline Miller (SAHMRI) & Professor David Roder (UniSA) - $1,340,000 - All cancers Infrastructure Grant