

To date, via its annual Grants process, the Channel 7 Children's Research Foundation (CRF) has allocated almost \$17 million dollars to more than 700 projects that focus on the cause, prevention, diagnosis and treatment of conditions that may affect the general health, education or welfare of children in South Australia and the Northern Territory.

This document provides details of the successful CRF project grants to commence in 2010. In total, for 2010, **\$1,163,000** in funding has been allocated, supporting 23 projects.

The successful projects are listed below in alphabetical order by Institution.

Charles Darwin University

Chief Investigator: **Associate Professor Tess LEA**

Application No: 10244

Project Title: **How can foundational literacy in regional and remote schools best be improved with ABRACADABRA technology: A case study design**

This project aims to enhance the effectiveness of literacy acquisition in early childhood settings, using an interactive web-based multimedia tool called ABRACADABRA among 4-8 year old Northern Territory school children.

The ABRACADABRA program was originally designed by the Centre for the Study of Learning and Performance in Canada to enhance and enrich existing educational innovations already in place, not to replace or compete with them. It supports teachers' efforts by making scientifically sound teaching methods accessible to early learners. The case study research will draw on school communities that are both urban and remote with large indigenous populations.

Children, Youth & Women's Health Service

Chief Investigator: **Dr Taher OMARI**

Application No: 09174

Project Title: **Upper Gastrointestinal Motility and Gastro-Oesophageal Reflux in Infants with Cow's Milk Protein Allergy - Second Year Funding**

Infants with Cow's Milk Protein Allergy (CMPA) typically present with indistinguishable symptoms of gastro-oesophageal reflux (GOR) such as feeding difficulties, feed refusal, vomiting, crying and irritability. It is not unusual for CMPA infants to be prescribed anti-reflux therapy empirically and then be referred to a paediatric gastroenterologist following failure of this therapy. This program aims to accurately characterise gastrointestinal motility and GOR in infants with CMPA, leading to better diagnosis and more rapid intervention for this increasingly more common paediatric condition.

Chief Investigator: **Dr James RICE**

Application No: 09167

Project Title: **Electrical stimulation in botulinum toxin A use in children with cerebral palsy: a randomised trial - Second Year Funding**

Botulinum toxin type A (botox) is routinely used to treat muscle spasticity, providing an opportunity for physiotherapy to improve walking ability and endurance. Current research suggests the effect of botox can be increased by actively contracting the muscle at time of injection. If correct, strategies that 'activate' the injected muscle may play a vital role in improving botox treatment. This study will test this theory by comparing 2 groups of children who receive botox to their calf; the intervention group will also receive electrical stimulation to the affected calf muscle whereas the control group will only receive the injection.

Chief Investigator: **Dr Cuong TRAN**

Application No: 10227

Project Title: **Zinc supplementation as an adjuvant therapy for children with Coeliac Disease**

The purpose of this study is to learn if zinc supplementation together with the gluten-free diet would more rapidly improve gut health and integrity in children with Coeliac Disease compared to children on the gluten-free diet alone. It will also show whether zinc deficiency is a factor in the delayed clinical improvement in some children with Coeliac Disease. The knowledge gained from this study is expected to benefit the clinical management of Coeliac Disease.

Flinders University of South Australia

Chief Investigator: **Dr Shiwani SHARMA**

Application No: 10237

Project Title: **Molecular and genetic studies of congenital cataract**

Cataracts are caused when the lens in the eye that focuses light loses transparency. They often occur in older people, but can also occur in children and babies. Sometimes in children they occur with a genetic disorder. Cataracts can severely impair vision and cause complete blindness. The only available treatment is invasive surgery, with poor outcomes in children. This research aims to understand how a defect in a particular gene causes cataracts in children. It also aims to discover the defective gene in an Australian family with childhood cataract and a newly described genetic disorder. This work will lead to better management and diagnosis of cataracts in children.

Novita Children's Services

Chief Investigator: **Dr Parimala RAGHAVENDRA**

Application No: 10274

Project Title: **Connective solutions: Facilitating the social participation of children and adolescents with physical disabilities or acquired brain injury using the Web 2.0 social networking and 3D virtual environments**

Children with disabilities have reduced social networks resulting in social isolation and limited opportunities to participate in a variety of activities. This project, the first of its kind in Australia, aims to promote the health and welfare of children and adolescents with physical disabilities or acquired brain injury by investigating the viability of the Internet to facilitate their social networks through providing access, training and support to use Web 2.0 sites and 3D virtual environments. The outcomes will inform the understanding of the opportunities these technologies offer for strengthening the social networks of children and adolescents with disabilities. Strong social networks would enhance their self-esteem and social participation.

SA Pathology (Trading as IMVS)

Chief Investigator: **Professor Antonio FERRANTE**

Application No: 09161

Project Title: **Treating hyperglycemia in diabetes with novel polyunsaturated fatty acids - Second Year Funding**

Diabetes is a life long disease characterised by elevated blood glucose, which has a major impact on affected children, their families and the country's economy. We have preliminary evidence suggesting that a new polyunsaturated fatty acid which we have developed normalises blood glucose levels in an experimental diabetes model. This project emphasizes the likelihood that we have discovered a fat which could be taken orally to treat the elevated blood glucose experienced in diabetes. The project will look for evidence that the fat has insulin-like action and the study will also examine other fats from the panel which we have synthesised, for similar or better activity.

Chief Investigator: **Dr Quenten SCHWARZ**

Application No: 10243

Project Title: **How is vascular endothelial growth factor (VEGF) involved in congenital heart defects?**

Vascular endothelial growth factor (VEGF) is essential for controlling blood vessel development, however, its role in other cell types is currently ill defined. We are investigating how VEGF signalling coordinates formation of the cardiac outflow tract and other neural crest cell-derived structures. These studies underpin our ultimate goal of implementing regenerative and preventative medicine to treat congenital heart defects that arise from neural crest cell deficiencies.

University of Adelaide

Chief Investigator: **Dr Kathryn GATFORD**

Application No: 10287

Project Title: **Testing an intervention to improve insulin secretion and prevent diabetes in individuals who grew poorly before birth**

WITHDRAWN

Chief Investigator: **Dr Rosalie GRIVELL**

Application No: 09180

Project Title: **A randomised trial to limit weight gain in overweight and obese women during pregnancy: Effects on fetal growth - *Second Year Funding***

Overweight and obesity are a common and significant health issue for women during pregnancy and childbirth, affecting 35% of Australian women aged between 25 and 35 years. Obesity in pregnancy is associated with increased risks of large babies, which has implications for short and long term maternal and infant health.

We are currently assessing the role of a dietary and lifestyle intervention to limit weight gain in overweight and obese women during pregnancy and as part of this study; we will also assess the effect of the intervention on fetal growth.

Chief Investigator: **Dr Melinda JASPER**

Application No: 08036

Project Title: **Macrophage-remodelling of the uterine epithelium for pregnancy success - *Second Year Funding***

Infertility, miscarriage, and some other pathologies of pregnancy are known to have their origins at the time of embryo implantation. However the biological process of embryo implantation is not yet elucidated. This project will improve our understanding of the events of embryo implantation, by unravelling the finely tuned communication networks existing between immune cells and the cells lining the uterus. Immune cell-secreted factors will be investigated for their ability to regulate uterine cell expression of receptivity-associated molecules. These molecules act as receptors for the implanting embryo and their reduced expression has been linked with infertility.

Chief Investigator: **Dr Christopher McDEVITT**

Application No: 10203

Project Title: **The role of manganese in the virulence and pathogenicity of *Pseudomonas aeruginosa*.**

Pseudomonas aeruginosa is a clinically important bacterium responsible for a wide range of diseases and remains the leading cause of cystic fibrosis (CF) mortality. *P. aeruginosa* infects CF patients during childhood, and once acquired cannot be removed by current therapies, the consequence of which is the inevitable deterioration of their lungs. Metals are crucial micronutrients and, therefore, their uptake mechanisms offer novel antimicrobial targets. My work has identified the high affinity transporter of a crucial metal directly involved in growth and survival of this microbe. This study will uncover its physiological role and determine its requirement for colonisation within humans.

Chief Investigator: **Professor Jeffery ROBINSON**

Application No: 10292

Project Title: **Do maternal and infant obesity related genotypes influence efficacy of interventions to limit weight gain in obese pregnant women and obesity in their offspring?**

Obesity, the sixth most important risk factor contributing to the overall burden of disease worldwide, is occurring at an increasingly earlier age, and has reached epidemic proportions. A significant and consistently identified risk factor for childhood obesity is maternal overweight and obesity, both of which are increasingly common. We are evaluating whether common obesity-related genetic variants in mothers and their offspring influence efficacy of a package of dietary and lifestyle advice to overweight and obese women during pregnancy to limit weight gain (currently being evaluated in the LIMIT randomised trial) in improving maternal health, perinatal outcomes and infant growth and adiposity.

Chief Investigator: **Professor Michael SAWYER**

Application No: 10258

Project Title: **Does Nurse Home Visiting Improve Infant Development in Rural and Remote Regions?**

Infancy and early childhood are critical periods for lifelong well-being, with increasing evidence that infants and young children exposed to poor quality parenting, poor attachment, and maltreatment are at heightened risk for a range of later developmental problems. This project seeks to evaluate whether the South Australian nurse home-visiting (SA-NHV) program improves the social, emotional, and communicative development of infants and young children living in rural and remote regions of South Australia. The knowledge gained will be of significant value to health services in Australia and overseas.

Chief Investigator: **Dr Linda LINYAN WU**

Application No: 10280

Project Title: **Lipotoxicity mediated endoplasmic reticulum stress and apoptosis cause poor oocyte development during obesity**

Australia has one of the highest obesity rates in the world, with 52% of Australian women being overweight or obese. Infertility is more common in overweight and obese women and our recent research has found that this is due at least in part to alterations in the ability of the egg to form a healthy embryo. This study will determine whether obesity causes lipid accumulation and cellular damage within the egg and its surrounding cells. The results will enable us to have better information about diet and lifestyles that improve fertility and early embryo development.

Chief Investigator: **Professor Andrea YOOL**

Application No: 10257

Project Title: **Role of the brain water channel Aquaporin-4 in development and epilepsy**

Epilepsy results from excessive electrical activity in the brain, causing seizures and damage to sensitive nerve cells, and is a significant health concern in children. The support cells of the brain (astroglia) outnumber the neurons, but their roles in neurological diseases remain understudied. A water-conducting channel (Aquaporin-4) found specifically in astroglia is essential for fluid regulation. We propose that water channel function directly affects the risk of epileptic seizure activity. With new Aquaporin drugs developed in our laboratory, we will test the consequences of Aquaporin-4 blockade, and the benefit of stimulating water channel activity as a potential therapeutic treatment.

University of South Australia

Chief Investigator: **Dr Sheridan GENTILI**

Application No: 10290

Project Title: **Intrauterine growth restriction and the programming of insulin resistance**

A world-wide series of epidemiological and experimental animal studies have demonstrated that babies who are born small and grow rapidly in early childhood are at an increased risk of developing insulin resistance and type 2 diabetes in child and adult life. Before birth, fetal growth restriction due to a failure of placental growth and development, results in an increase in glucose production in the liver. If the change persists after birth, this would contribute to poor glycaemic control in postnatal life. This study proposes that born small results in an inappropriate persistence of an upregulation of hepatic glucose production after birth.

Chief Investigator: **Dr Janna MORRISON**

Application No: 10291

Project Title: **Maternal Obesity and the Pathway to Childhood Obesity**

Currently more than half of all adults in Australia, including women of reproductive age, are overweight or obese. Heavier mothers have heavier babies and these babies are at risk of developing childhood obesity and becoming obese adults. It is not clear, however, how maternal obesity causes later obesity in the offspring and initiates this intergenerational cycle of obesity. It is important to understand the effects of maternal overnutrition on the embryo, placenta and fetus as this will influence recommendations on the timing and nature of nutritional interventions in pregnancy designed to limit the impact of maternal obesity on the intergenerational cycle of obesity

Chief Investigator: **Dr Beverly MÜHLHAÜSLER**

Application No: 10251

Project Title: **Blocking the Programming of Childhood Obesity by Maternal High Fat Feeding: A Role for Omega-3 Fatty Acids?**

Obesity, and in particular childhood obesity, is currently a major health problem in Australia. In this study, we will test a novel strategy for intervention, which aims to reduce the accumulation of body fat in the offspring of obese mothers, by increasing the availability of omega-3 polyunsaturated fatty acids (fish-oil); a substance which is known to inhibit fat cell formation and fat storage in adults during the period of fat development. We will determine whether providing pregnant rats a high-fat diet with a high-dose fish-oil supplement during pregnancy and lactation will reduce body fat mass in their offspring.

Chief Investigator: **Associate Professor Cory XIAN**

Application No: 10255

Project Title: **Nutrient therapies for preserving bone growth and preventing chemotherapy-induced bone loss in early development**

Childhood chemotherapy often causes growth arrest, osteoporosis, and fractures, and there are no preventative treatments. Since dietary omega-3 oil is known to be effective in inhibiting bone loss, in this project, we aim to investigate whether dietary omega-3 oil supplement is effective in preventing chemotherapy-induced bone erosion in an experimental model. This work will potentially lead to the development of a simple, safe and yet effective therapy for preventing bone defects caused by childhood chemotherapy. This therapy potentially will be useful for ensuring bone health and improving quality of life for children during and after cancer chemotherapy

Chief Investigator: **Dr Michael SORICH**

Application No: 10271

Project Title: **Investigating the link between gastrointestinal disturbance and aetiology of autism**

APPLICATION WITHDRAWN

Women's and Children's Health Research Institute

Chief Investigator: **Associate Professor Allison COWIN**

Application No: 09122

Project Title: **To determine the role of Flightless I in the skin blistering disease Epidermolysis Bullosa - Second Year Funding**

WITHDRAWN

Chief Investigator: **Dr Imme PENTTILA**

Application No: 09112

Project Title: **Immunological mechanisms involved in programming the infant immune response toward prevention of food allergy - Second Year Funding**

With the rate of allergic disease increasing, studies which help to define prevention strategies are becoming important. This study addresses from a mechanistic point of view the relevant and controversial issue in infant nutrition : *when to introduce food antigens into the infant diet*. Current practice is to delay solids for 6 months and in allergic individuals avoid specific allergens until 3 years of age. This may not be opportune in terms of priming and regulating immune response development. Early exposure to food antigens in the presence of maternal milk helps promote development of immuno-regulatory mechanisms and tolerance instead of sensitisation.