BIRMINGHAM WOMEN'S AND CHILDREN'S HOSPITAL RESEARCH FOUNDATION

Project Lay Summaries

BCHRF Awards – 2009

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
1. Drs A Olson, A Peet, P Gissen, C Hendriksz, Prof Z Kourtzi	**Project Title:** Non-invasive investigation of brain metabolism and function in children with neurodegenerative diseases. **Lay Summary:** Our research will measure activity in the brains of children with neurodegenerative diseases so we can detect early signs of the disease and understand changes that occur as the disease progresses. At the moment, most of these devastating diseases cannot be cured. Understanding the early signs is critical for diagnosis and for measuring the success of promising new treatments. Treatments that replace genes, for example, are now starting to become a real possibility. We will measure brain chemistry and brain connections. We will also measure brain activity during tasks that exercise vulnerable areas. We want learn to detect reliable changes in chemistry or activity that signal problems before the changes in brain structure become clear and advanced.	£62,224.00	RP	BCHRF230

BCHRF Awards 2010

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
1. Dr Wolfgang Högler, Dr Nick Shaw, Dr Nicola Crabtree, Ms Lindsay Rae, Dr Paul Davis	**Project Title:** Whole body vibration as an osteogenic treatment for mild osteogenesis imperfecta. **Lay Summary:** Children with osteogenesis imperfecta (OI, brittle bone disease) have weak bones, weak muscles, fractures and immobility. Milder forms of OI (type 1,4) may not require drug therapy but would benefit from bone-forming treatment. Whole body vibration with side-alternating platforms uses the body's neuromotor reflex system to train muscles. Recent studies in children with cerebral palsy but also OI suggest that this muscle strengthening therapy also improves bone strength. No study in OI children has compared vibration training effects to a control group. Our randomized controlled study assesses the effect of 6 months whole body vibration training (2x10min/day) on muscle strength, mobility, bone structure and density. 20 children older than 5 years with mild OI will be randomized into a vibration group and a control group. Patients will be equipped with vibration platforms for home use.	£68,044.94	RP	BCHRF252

BCHRF Awards 2011

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
1. Professor Tauny Southwood, Dr François-Xavier Li, Dr Clive Ryder, Dr Penny Davis, Dr Kathy Bailey, Ms Janis Scott, Ms Rosanne Wilshire, Nigel Jones, Ms Kate Cotter and	**Project Title:** Assessing the influence of custom moulded foot orthotics on the gait characteristics of hypermobile children and young people. **Lay Summary:** Children with flexible joints and flat feet may develop musculoskeletal pain. Treatment with shoe orthotics reduces pain in some children. We want to understand if wearing orthotics changes walking patterns, and if those changes are associated with improvement in pain. In this small pilot project, we will ask 40 children and young people (20 controls and 20 with flat feet and musculoskeletal pain) to have their walking patterns analysed before and during the use of shoe	£9,968.00	SP	BCHRF272

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
	orthotics. We will also ask them to fill out a simple pain questionnaire to see if their pain is reduced when they use orthotics. We will use the information from this project to apply for a larger, externally funded research grant.			
2. Aaron Ranasinghe, Shiao-Yng Chan, Robert Bonser, Timothy Jones, Christopher McCabe, Jayne Franklyn	**Project Title:** Tissue specific hypothyroidism and the heart. **Lay Summary:** Children born with complex heart conditions may have reduced circulating levels of oxygen. Surgical repair of these conditions is complex and after such surgery children will be looked after on an intensive care unit with drugs and machines helping both their heart and breathing functions. One potential reason for the heart needing support after surgery could be a reduction in levels of crucial hormones (thyroid hormone) that influence the function of the heart. We aim to study the hormonal deficiencies that occur within the heart of babies undergoing cardiac surgery with the aim of understanding why some have poorly functioning hearts and how it may be possible to best direct treatments to make the heart function better after such operations.	£69,807.00	RP	BCHRF281
3. Andrew Peet, Martin Wilson, Nigel Davies, Theo Arvanitis, Dominic Carlin	**Project Title:** Novel metabolite biomarkers of prognosis in childhood tumours. **Lay Summary:** Brain tumours are an important cause of death in childhood and new strategies are required to improve their treatment. MRI scans are used extensively for diagnosis and monitoring response to treatment. Recent advances have allowed these scans to measure the chemical composition of tumours and we have established that four chemicals are linked to tumour aggressiveness. Measuring these chemicals is very challenging but a new research scanner gives us the opportunity to measure them accurately enough to be used clinically in tailoring treatment to the individual. In this project we will optimise the measurement of these chemicals in children with brain tumours and investigate why they are important by performing experiments on tumour cells grown in the laboratory.	£68,276.00	PhD	BCHRF287

BCHRF Awards 2012

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
1. Profs. Mark D. Kilby & Paul Moss, Dr David Lissauer & Mr Philip Cox	**Project Title:** Villitis of unknown aetiology: A potential process of fetal allograft rejection. **Lay Summary:** Babies not growing properly in the womb are born too small and too soon. This can have long term health consequences for that child, which even last into adulthood. A relatively common problem called "Villitis of Unknown Aetiology" is associated with poor fetal growth and complications. In this condition white blood cells invade the placenta and cause damage but we don't understand why. We propose that these cells are recognising the baby as foreign and are trying to 'reject' the baby. This project aims to identify in detail the processes occurring in this disease and understand exactly what the role of these white cells are and what attracts them to the placenta. We hope this knowledge will help explain why this problem occurs and suggest ways it can be prevented or treated.	£70,214.00	PhD	BCHRF298
2. Dr A K Ewer, Prof N Hall, Prof C Probert,	**Project Title:** Faecal microbiota in preterm infants developing Necrotising Enterocolitis (NEC). **Lay Summary:** NEC damages the bowel of premature babies. NEC is a serious condition; a lot of	£69,150.00	RP	BCHRF304

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
	babies die from it and may need emergency surgery. Babies who survive after serious NEC often have long-term health problems. The main difficulty with NEC is that we are not sure what causes it and therefore we don't have an effective treatment. Bacteria are thought to be involved but they are difficult to identify and we don't know which ones are harmful. We are proposing to use new, state of the art techniques to see if we can identify differences in the bacteria in the faeces of babies who get NEC compared to those who don't. If we can identify differences then we may be able to target treatment to reduce the risk of them developing NEC.			
3. Dr Girish Gupte, Prof David Adams, Sister Lindsay Hogg, Mrs Lisa Morris.	**Project Title:** Immunological markers in liver and small bowel transplantation. **Lay Summary:** Long term survival of liver and intestinal transplant grafts are adversely affected by rejection and opportunistic infection. Differentiating between rejection and infection (usually by invasive procedures done in hospital) is important as treatment is exactly opposite and if not treated at an early stage can lead to graft loss & death . In other inflammatory conditions involving the intestine and liver, key players of the body's immune system are activated and we propose that the same markers can be identified in blood/stomal fluid after transplantation. These tests may enable us to detect rejection/infection at an early stage on blood /stomal fluid tests avoiding hospital admission for invasive procedures, disruption of family life and improve long-term survival.	£10,000.00	SP	BCHRF311
4. Drs Reinout J Mildner, Hari Krishnan, Jim Gray.	**Project Title:** Can a procalcitonin guided algorithm reduce antibiotic exposure in children admitted to Paediatric Intensive Care Unit? **Lay Summary:** When children are treated with antibiotics for severe infections the duration of treatment is usually determined empirically, which may cause antibiotic overuse. This increases the risk of bacteria becoming resistant, risk of complications and overall costs. During severe bacterial infections the levels of procalcitonin (PCT, a naturally occurring hormone) rise sharply. Measuring PCT levels to guide antibiotic treatment has been shown to reduce antibiotic exposure in adults. We want to study 50 children undergoing treatment for severe bacterial infections in PICU. By measuring the PCT level daily and looking back, we will assess how many days of antibiotic treatment could have been avoided had the clinical team known the PCT level and what the potential cost saving would be.	£9,600.00	SP	BCHRF323
5. Scholefield B, Duncan H, Morris K, Wassemer E, Gupta R, Notghi L, Bill P, Matam R.	**Project Title:** Optimising the detection of seizures on the paediatric intensive care unit (PICU) using cerebral function monitoring (CFAM) (The CFAM-PIC Study). **Lay Summary:** Critically ill children in intensive care are at risk of developing seizures. If seizures occur and are not quickly treated, brain injury and eventually death can occur. Identification of these seizures is often difficult due to administration of medication which stops muscle movement and therefore masks the seizure. We plan to evaluate the use of a continuous brainwave monitoring system (CFAM) which can identify seizures in intensive care patients. We will be assessing if CFAM allows bed-side clinical staff to quickly and accurately identify seizures and in addition whether automatic computer software can be helpful. We hope that by understanding any problems with these two methods, we can improve identification rates, potentially reducing brain injury and death in children.	£37,621.34	ER	BCHRF329

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BCHRF Awards 2013

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
1. Dr F Mussai, Dr C DeSanto	**Project Title:** The role of myeloid-derived suppressor cells (MDSCs) in Neuroblastoma. **Lay Summary:** Neuroblastoma is the common extracranial solid cancer of childhood and patients with metastases (spread) have an extremely poor survival. The immune system is a powerful way in which the body can remove abnormal cells. We have preliminary evidence that neuroblastoma tumours can switch off the immune system, preventing them being attacked and killed. This occurs due to a group of cells, called MDSCs, found in the blood and tumours of patients. This study will investigate how MDSCs in neuroblastoma tumours switch off the immune response. In addition we will identify whether molecules released can predict which patients will respond to therapy. The Mussai laboratory is leading the research, in collaboration with Great Ormond Street, Children's Hospital Oxford, and international partners.	£68,287.00	RP	BCHRF330
2. Prof S Seri, Dr G Woodhall	**Project Title:** A translational study of neural mechanisms of drug resistance in paediatric epilepsy. **Lay Summary:** Advances in understanding why certain people with epilepsy don't respond to medications have relied on creating small lesions in animals' brains to study the mechanisms of generation of the attack and how specific chemicals modify these. These models cannot capture what happens in the human brain and what brain changes underlie drug-resistant epilepsy in children. We propose to study the electrical activity of the brain in children before surgery and from brain tissue taken during surgery to record the activity from individual brain cells and networks of cells to understand what leads to seizures and how these respond to new and old anti-seizure drugs. This will enable us to elucidate the mechanisms of seizure generation in paediatric epilepsy.	£45,726.21	PhD	BCHRF349

BCHRF Awards 2014

Applicant(s)	Project Title & Lay Summary	Amount Awarded	*Category of Award	Ref No.
1. Dr Evangeline Wassmer, Dr S. John Curnow	**Project Title:** Do free light chains in cerebrospinal fluid predict chronic Multiple Sclerosis in Childhood? **Lay Summary:** Acute childhood demyelination presents with a range of symptoms including blindness, limb weakness and decreased consciousness. Some children will develop recurrent episodes, Multiple Sclerosis (MS). It is important to diagnose MS as early treatment can be offered. However it remains difficult to predict MS at first presentation, as there is no established test. Recent data suggests that free light chain (part of the antibody molecule) in spinal fluid may predict MS. As spinal fluid is collected routinely when a child presents with demyelination, we propose to use the leftover samples for free light chains testing. 100 children each year present with demyelination across the UK. Early identification of MS will optimise their treatment to reduce disease burden and long-term disability.	£5,600	Small Project	BCHRF364
2. Dr Francis Mussai, Dr Carmela De Santo, Professor Pamela Kearns	**Project Title:** An in vivo co-clinical trial of BCT-100, Recombinant PEG-Arginase, as a novel therapeutic approach for paediatric Acute Myeloid Leukaemia.	£69,406	Research Project	BCHRF365

Applicant(s)	Project Title & Lay Summary	Amount Awarded	*Category of Award	Ref No.
	Lay Summary: Arginine is an essential nutrient that is taken in as part of our everyday diet. We have previously demonstrated that AML blasts consume arginine from the body, for key cell processes and to promote cancer cell survival. A clinical grade drug called BCT-100, has been developed by collaborators at Bio-Cancer Treatment International and can significantly lower arginine levels in the blood. BCT-100 is already under clinical evaluation in clinical trials for adult solid cancers. We have shown that BCT-100 can reduce the numbers of AML cells and make them more sensitive to chemotherapy in the laboratory. In this study we will test if BCT-100 is effective AML cells in combination with chemotherapy in a mouse model – a key step to bringing a drug for clinical use. This work will provide the foundation for early phase clinical trials of the drug in children with AML.			
3. Dr Adrian Plunkett, Dr Sarah Mitchell, Prof Jeremy Dale, Prof Jane Coad	**Project Title:** End-of-Life Care for children and young people with life-limiting conditions who die in the Paediatric Intensive Care Unit: The experience of parents. **Lay Summary:** The death of a child is the most devastating experience a parent can face. Currently in England, most children and young people who die have complex, life-limiting conditions, and are cared for at the time of death in hospital. The commonest place of death is the Paediatric Intensive Care Unit (PICU) despite increasing evidence that home is the preferred place of death for most CYP and their families. This study will investigate the experiences of parents around end-of-life decision-making in the PICU. A detailed investigation of this nature in PICU has not been completed previously. The study will provide valuable information and a human perspective that will contribute to improving care for others in the same situation in the future.	£22,791.76	Research Project	BCHRF369
4. Dr David Milford, Dr Kevin Morris, Dr Federica Merella, Dr Prabh Nayak	**Project Title:** A pilot study to test the feasibility of undertaking serial creatinine clearances in PICU as a measure of glomerular filtration rate (GFR), and to compare measured GFR_{CrCl} with estimated GFR. **Lay Summary:** We want to find out if it is possible to use an accurate way of measuring how well a very ill child's kidneys are working. We will only study children who already have, or who are very likely to have, kidney damage. We will also only study children who have a tube in the bladder and who have drips for taking blood as part of their normal care. The study will require two extra blood tests and will last 48 hours. This study will help us to decide if kidney function can be accurately measured using blood and urine collection and is helpful in looking after ill children who have kidney damage.	£8,603	Small Project	BCHRF376
5. Dr Samantha Lissauer, Ms Ditte Hedegaard, Professor Jane McKeating, Professor Deirdre Kelly	**Project Title:** Understanding paediatric innate immune responses in the pathogenesis of viral hepatitis and response to interferon therapy. **Lay Summary:** Liver disease is on the rise in the UK. Children who are infected with hepatitis C or B virus have liver inflammation that can progress to cirrhosis and liver cancer. These viruses can be treated with an anti-viral drug, called interferon, which can be toxic and does not cure all children who are given it. It is possible to predict in adults which patients will respond to interferon treatment by looking at genes in the liver that are stimulated by the virus, but no-one has looked at these genes in children.	£9,600	Small Project	BCHRF378

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	We will measure the amount of these genes expressed in the liver of children with hepatitis C and B and compare these to treatment response and the levels of virus in the liver and blood. Being able to tell which children will respond to interferon will allow us to target those that will benefit and reduce toxicity.			
6. Dr Nigel P Davies, Prof Andrew Peet, Dr Lesley MacPherson, Mr Manoj V Parulekar, Dr Martin Wilson, Prof Theodoros Arvanitis, Mrs Lara Worthington	**Project Title:** The Fusion of MRI, Magnetic Resonance Spectroscopic Imaging (MRSI) and Diffusion Tensor Imaging (DTI) of the optic pathway as an aid to the management of Optic Pathway Glioma (OPG). **Lay Summary:** Brain tumours are the most common form of solid cancer in children. These are often located near the optic nerves in the brain and can lead to significant visual problems. This type of tumour is usually slow growing but changes unpredictably over time. This makes decisions about intervention and treatment very challenging. Patients are monitored every three months using Magnetic Resonance Imaging (MRI) and sight tests. However, conventional MRI scans do not always relate closely to the results of the sight tests, and performing these tests in young children is difficult. This project aims to apply new MRI techniques sensitive to optic nerve function to improve assessment of eyesight problems in children with brain tumours, enabling better treatment decisions.	£50,993	Research Project	BCHRF380
7. Dr Yvonne Wallis, Dr Jenny Morton, Mr Dominic McMullan	**Project Title:** An evaluation study of a targeted "clinical" exome sequencing in clinical practice to investigate the cause of multiple congenital abnormality syndromes and developmental disorders of childhood. **Lay Summary:** Between 2 and 3% of babies are born with a significant abnormality such as a heart or brain defect and another 2-3% will have problems with learning or general development. Collectively, these are known as developmental disorders. Confirming a clinical diagnosis, essential for delivering the best possible care to both the patient and their family, is only possible in 15-20% of cases using current genetic testing strategies. Research using new genetic techniques has shown that tiny genetic changes (gene mutations) are the cause of developmental disorders in 25% of cases. We will use the new technique to investigate patients with developmental disorders to improve the diagnosis and management of children with these conditions which may in the future lead to new treatments and preventative measures.	£68,363	Research Project	BCHRF384
8. Mr Manoj Parulekar, Prof Ela Claridge, Dr Isabel Colmenero Collaborators: Mr J R Ainsworth, Dr Helen Jenkinson, Dr Jacky Allotey, Dr Andrew Peet	**Project Title:** Spectral imaging of retinoblastoma tumours for differentiating between of persistent/recurrent disease and potential application for treatment. **Lay Summary:** Retinoblastoma is a treatable form of eye cancer affecting children. Recurrences are common and early detection of recurrences is crucial to success. These tumours can be visualized in the eye and photographed. We are evaluating the use of light of certain wavelengths to differentiate between active and inactive tumours, thus enabling early detection and treatment. This might also allow use of laser light of those wavelengths to treat the tumours more effectively.	£9,976	Small Project	BCHRF385
9. Mr I Jester, Mr JM Wells, Dr AK Ewer, Mr J Hulscher	**Project Title:** Predictive value of urinary Intestinal fatty acid binding protein (iFABP) in preterm infants at risk of developing Necrotising Enterocolitis (NEC). **Lay Summary:** NEC is a serious disease that affects the bowel of premature babies; a lot of babies	£33,222	Research Project	BCHRF388

Applicant(s)	Project Title & Lay Summary	Amount Awarded	*Category of Award	Ref No.
	die, many need emergency surgery and those who survive can have significant long term health problems. Identifying this disease earlier would allow more timely and effective treatment. We plan to measure a protein called iFABP, which is released from the bowel when it is damaged. This protein can be measured quite easily from a small sample of urine taken from a cotton wool ball in the nappy. The results of this study may allow earlier identification of NEC in the future leading to earlier treatment and fewer complications in babies who develop NEC.			

BCHRF Awards 2015

	Applicant(s)	Project Title & Lay Summary	Amount Awarded	*Category of Award	Ref No.
1.	Dr Joseph Hardwicke, Prof Paul Cooper, Dr Richard Shelton, Prof Gabriel Landini, Miss Rona Slator	**Project Title:** 3D printing of hydrogel scaffolds to support an *in vitro* model of the human cleft palate. **Lay Summary:** Clefts (gaps) affecting the palate (roof of the mouth) and/or lip are one of the most common birth defects and affect around 1000 new-born babies each year in the UK. Without a normally functioning palate, speech development can be impaired. Palate repair is performed within the first six months of life to help normal speech development, but in some patients a hole (fistula) can form in the palate as a complication of surgery. This leads to scarring and the need for repeated palatal surgery during childhood. The aim of this preliminary study is to investigate whether an "artificial palate" model can be developed in the laboratory using 3D printing technology, with cells of the patient included to investigate palatal healing.	£24,000.00	Research Project	BCHRF393
2.	Dr Simon McGuirk, Dr Ashish Chikermane, Dr Kiran Gulia, Professor Moataz Attallah	**Project Title:** MR heart: Development of an MR-compatible mock cardiovascular circuit. **Lay Summary:** This study aims to develop a mock circulatory system (MSC) to model blood flow through the systemic and pulmonary circulations. This MCS will include an anatomical model of the aorta or pulmonary artery. The development of this MCS will allow us to simulate and measure flow in the major arteries in both health and disease; which are produced using images from MRI and CT scans conducted at BCH to assess patient suitability for specific procedures, and model what is expected to happen once these procedures are performed. All of this could be done in vitro without placing the patient at any additional risk.	£54,568.00	Research Project	BCHRF398
3.	Prof. Grant Stewart, Prof. Malcolm Taylor, Prof. Andrew Jackson, Dr Renuka Dias	**Project Title:** Investigating the pathogenic impact of mutations in *C21orf60* as the genetic cause of a novel developmental disorder in children. **Lay Summary:** Developmental problems (such as short stature and a small head/brain) are common clinical features of a wide variety of childhood disorders. The underlying genetic cause of these is extremely variable and more often than not, a genetic diagnosis is not found. Here we have identified a novel gene (called *C21orf60*) mutated in 19 patients exhibiting delayed growth and a small head/brain. Nothing is currently known about the cellular function of the protein produced from the *C21orf60* gene or how a deficiency of C21orf60 causes disease. This research proposal aims to uncover the cellular pathways regulated by C21orf60 and investigate how patient-associated mutations disrupt the function of this protein.	£89,995.00	PhD	BCHRF400
4.	Mrs Sharon Evans, Professor	**Project Title:** Dietary pattern analysis in children with phenylketonuria (PKU).	£9,045.00	Small Project	BCHRF407

	Applicant(s)	Project Title & Lay Summary	Amount Awarded	*Category of Award	Ref No.
	Anita MacDonald	**Lay Summary:** Phenylketonuria (PKU), a genetic condition causing inability to breakdown the protein phenylalanine, causes brain damage if untreated. A strict low-protein diet is essential. Obesity is an increasing concern in PKU but little is known about children's dietary intake. We aim to develop and validate a food frequency questionnaire (FFQ) to measure what children with PKU (n=50) eat compared with non-PKU children (n=50). Children/caregivers will complete the FFQ twice, 4-weeks apart to check consistency. Results will then be compared with another dietary method, 24-hour dietary recall, to check accuracy. Once validated the FFQ will be used to study dietary patterns in PKU to tailor dietary advice. It is also planned to extend this work to other countries in Europe.			
5.	Dr Elizabeth Baranowski Supervisors: Dr Nils Krone, Dr Ruth Krone, Professor Wiebke Arlt, Professor Peter Hindmarsh	**Project Title:** Implementing non-invasive biochemical disease monitoring in children and young people with congenital adrenal hyperplasia. **Lay Summary:** We aim to establish a new method for monitoring treatment effectiveness in patients with congenital adrenal hyperplasia (CAH). Treatment involves replacing deficient and life saving steroid hormones which are responsible for salt and sugar balance and gender appearances. Under and over treatment can have significant effects on health, growth and development; and sadly many patients suffer long-lasting side effects when we do not achieve this balance well. Currently, monitoring consists of yearly blood tests which provide us with very limited information with which to adjust treatment. Urine testing, as well as being pain free and more convenient, can provide us with more information about how each individual's body uses steroid hormones so that we can adjust treatment more effectively.	£60,036.00	Springboard Paediatric Research Fellowship	BCHRF408
6.	Dr Suzan Warner, Professor Deirdre Kelly, Dr Ye Oo	**Project Title:** The role of mucosal invariant T-cells (MAITs) and gut micro-biota in the pathogenesis of paediatric autoimmune liver disease (AILD). **Lay Summary:** Autoimmune liver diseases (AILD) affect hundreds of UK children. The disease develops when a faulty immune system attacks the liver and sometimes the bowel (PSC and IBD), occasionally leading to liver scarring (cirrhosis) and the need for liver transplantation. These children need life-long treatment, which may not be successful and has difficult side effects. I intend to study children with these diseases, by looking at the immune system of affected children. We are particularly interested in immune cells called MAITs, and plan to study their activity in the blood and liver of children with AILD. By identifying how these immune cells attack the liver, we hope to find out why children develop this disease and how best to treat them.	£69,989.00	Springboard Paediatric Research Fellowship	BCHRF410
7.	Dr Melanie Kershaw, Dr Ruth Krone, Sr Lesley Drummond	**Project Title:** Evaluation of CGMS for motivated adolescents and children on multiple daily insulin, with poor diabetes control. **Lay Summary:** Type 1 Diabetes is a life-long condition requiring careful balance of insulin, food and activity daily to achieve good diabetes control. When diabetes control is poor the risks of disabling long term complications such as loss of vision and kidney failure are very high. Managing diabetes depends on using numeracy skills to interpret glucose readings and decide on insulin doses. The Dexcom continuous glucose monitor uses arrows and a waveform, which are potentially an easier visual prompt to guide treatment. We aim to use an education package combined with the Dexcom monitor to improve understanding and diabetes control in those interested patients with the worst	£21,308.21	Research Project	BCHRF414

Applicant(s)	Project Title & Lay Summary	Amount Awarded	*Category of Award	Ref No.
	diabetes control, and greatest risk of future complications in order to improve long-term outcomes.			
8. Dr Emma A Webb, Professor Andrew Peet, Dr Amanda Wood, Dr Nils Krone, Dr Julie Reed, Dr Katharine Foster, Dr Satish Rao	**Project Title:** Improving outcomes in boys exposed to excess steroid hormones. **Lay Summary:** Steroids are widely used to treat children with chronic asthma, hormone dysfunction and other conditions. A major challenge in providing the best care to these children is the limited evidence regarding the effect of steroids on the child's developing brain. This study will examine the effect of chronic excess steroid hormone exposure brain structure learning and behaviour in children with different medical conditions requiring long-term treatment with steroids. The evidence from this study will support the drive to improve current treatment regimens and to minimize long-term complications. As a result of this work we will improve personalized care provision to children exposed to excess steroids, enabling them to live healthier lives and preventing disability associated with steroid hormone exposure.	£69,970.00	Research Project	BCHRF423

BCHRF Awards 2016

Applicant(s)	Project Title	Amount Awarded	*Category of Award	Ref No.
1. Dr Francis Mussai, Dr Carmela De Santo, Dr Steve Lee, Professor Louis Chesler	**Project Title:** Engineering arginine-depletion resistant CAR-T cells for neuroblastoma. **Lay Summary:** Neuroblastoma is the most common solid cancer of childhood. Prognosis for patients with widespread disease or those that relapse is poor. In this project we will enhance immune cells to become resistant to the cancer, and test their ability to kill neuroblastoma in our laboratory models. If successful these studies would provide key biological information supporting the rationale for a clinical trial.	£22,000	Research Project	BCHRF428
2. Dr Claire Farrow, Dr Gemma Heath, Professor Helen Pattison, Teresa Evans, Dr Chris Chiswell, Lesley Barrett	**Project Title:** Treating comorbid obesity in children with asthma. **Lay Summary:** Children with asthma are much more likely to be obese than other children, and this can significantly worsen their symptoms. Treatments for childhood obesity tend to not work for asthmatic children because they are not tailored to the unique needs and anxieties that are related to having asthma, or parenting a child who has asthma. This study will examine differences in attitudes towards eating and exercise in children and families where children have asthma and are obese. It will also explore child, family and hospital staff views on the best ways to manage obesity in children with asthma. Bringing the findings together we will develop a tailored intervention for families to address obesity in children with asthma.	£34,665	PhD (50% of)	BCHRF430
3. Dr Sarah Carrington, Dr Ashley Liew, Dr Dawn Simons, Katy Robson, Professor Klaus Kessler, Professor Gina Rippon, Prof Stefano Seri	**Project Title:** Exploring sex differences in the clinical, cognitive, and neurobiological profiles of adolescents with autism spectrum disorder (ASD). **Lay Summary:** There is growing recognition that females with ASD are underdiagnosed. Recent theories suggest that being female may confer protection against ASD; that is, females may have a higher number of behavioural and biological features before exhibiting clinical levels of impairment. Our understanding, however, is limited by the potential bias toward the traditional, 'male' ASD profile. Our research will address this issue by collecting detailed clinical and brain imaging information for male and female adolescents with ASD. In addition to a clinical battery	£70,176.35	PhD	BCHRF440

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	supplementing standard diagnostic protocol, emotion regulation behaviours will be examined, given their potential impact on mental health. Brain imaging will elucidate possible mechanisms of observed sex differences. This research may have implications for improved diagnosis and individualised interventions.			
4. Dr David Lissauer, Dr Carmen De Santo, Professor Mark Kilby	**Project Title:** Myeloid derived suppressor cells (MDSCs) during pregnancy: their role in maintaining fetal-maternal tolerance and preventing pregnancy complications. **Lay Summary:** The mother's immune system must adapt to allow the successful growth of a baby inside her body, without it being rejected. There is a type of immune cell called myeloid derived suppressor cells (MDSCs) that have a critical role in dampening the immune systems actions in cancer and infection. We found high levels of these cells are also found in pregnancy. This project will determine if our theory that these cells have an important role controlling the maternal immune system at the site of the baby is correct. We will also find out if they are a culprit in pregnancies where the mother has suffered early loss of the baby or the placenta is no longer working properly.	£54,799	Research Project	BCHRF446
5. A Daly, J Hattersley, A MacDonald	**Project Title:** A pilot randomised, crossover study in PKU investigating the exhaled breath and urine profile of organic compounds, comparing glycomacropeptide with phenylalanine-free l-amino acid supplements. **Lay Summary:** PKU is treated with a low protein diet, equivalent to 1slice/day of normal bread. To prevent nutritional deficiency, a special amino acid supplement (Phe-free L-AA) is taken 3 times daily. The Phe-free L-AA contain 100% free amino acids are unpleasant to take and rich in cysteine, an amino acid that smells like bad eggs. Caregivers complain children have bad breath, which may be linked to this protein substitute. An alternative protein substitute called cGMP, containing less free cysteine may cause less bad breath. We aim to study by questionnaire and chemical analysis (by collecting breath and urine samples) the effect of a Phe-free L-AA vs. cGMP on bad breath. We also will collect information in control children.	£10,000	Small Project	BCHRF451
6. Dr Navta Masand, Professor Pamela Kearns, Dr Graham Taylor, Professor Paul Murray	**Project Title:** Targeting GPNMB in Hodgkin Lymphoma. **Lay Summary:** We will explore how a protein known as GPNMB is involved in the development of Hodgkin lymphoma (HL) in children. Lymphomas are one of the commonest forms of cancer in childhood, and although chemotherapy is effective for most, a significant proportion (approximately 10%) of children will die from their disease. We have shown that the tumours of children with HL produce excessive amounts of GPNMB. This could be important because in other studies GPNMB has been shown to prevent the immune system from recognising and destroying cancer cells. Therefore, by inhibiting the function of GPNMB we believe we can unleash a pre-existing immune response that could dramatically improve treatments for children with lymphoma.	£64,967	Springboard Paediatric Research Fellowship	BCHRF457
7. Yvonne Wilson, Frederica D'Asta, Clare Thomas, Sarah Payne, Kate Whiting	**Project Title:** The 'Hamlet' Study: To graft or not to graft? A longitudinal prospective case series in children with mixed depth burns to correlate different treatment options to patient outcomes. **Lay Summary:** The Hamlet study is designed to look at the way we treat children that have had a	£68,837	Research Project	BCHRF461

Applicant(s)	Project Title	Amount Awarded	*Category of Award	Ref No.
	mid-depth bum. There is currently two treatment options for treating a mid-depth burns, with surgery where patients have an operation to apply a skin graft, or conservative treatment. Conservative treatment means dressings are applied to the burn and it is allowed to heal naturally, although this can take a few weeks. Following mid-depth burn patients may be left with scars and this may cause some physical and psychological problems for both the child and their family. We would like to look at the differences between the outcomes of patients treated with surgery or conservative management.			
8. Dr S M Siew, Professor D A Kelly, Dr A L Fletcher, Professor P N Newsome	**Project Title:** Harnessing the therapeutic potential of human fibroblastic reticular cells for immune-mediated paediatric liver diseases. **Lay Summary:** Inflammation causes serious liver disease in children leading to liver scarring and need for liver transplantation. Cell therapies are innovative treatment against liver inflammation. Fibroblastic reticular cells (FRC) are specialised cells that suppress inflammation and may have therapeutic benefit. FRC successfully treated animals with severe acute inflammation and may similarly reduce liver inflammation in paediatric diseases like autoimmune sclerosing cholangitis. We will explore whether FRC are safe and effective in animals with similar liver diseases to those that affect children. These studies will then form the basis for clinical trials of these cells in paediatric liver diseases. This project is a joint collaboration between Birmingham Children's Hospital and the University of Birmingham. With internationally-recognised expertise in childhood liver diseases at BCH and cell therapy at University of Birmingham, we are well-placed to conduct this research.	£61,075.73	Research Project	BCHRF467

BCHRF Awards 2017

Applicant(s)	Project Title	Amount Requested	*Category of Award	Ref No
1. Dr Christopher Chiswell, Dr Laura Jones, Dr Carole Cummins	**Project Title:** What role can hospitals play in protecting children and young people from exposure to secondhand tabacco smoke? Developing a novel intervention to support families to change their smoking behaviours. **Lay Summary:** Secondhand tobacco smoke harms children in many ways. It increases their risk of conditions such as ear disease and meningitis, and makes existing conditions such as asthma worse. At the moment, we don't know how best to help smoking families to change their behaviour to protect children from secondhand smoke. We think that when a child who lives with smokers comes into contact with a hospital that this might be a really good time to offer help. This project will look at and summarise what we already know on this topic, talk to families and healthcare professionals, and use our learning to develop a support package for use in hospitals to help families to protect children from secondhand smoke.	£72,812.00	PhD	BCHRF519

Applicant(s)	Project Title	Amount Requested	*Category of Award	Ref No
2. Dr Eleni Syrimi, Dr Graham Taylor, Prof Paul Murray, Prof Pamela Kearns	**Project Title:** Tracking the Impact of Chemotherapy on the Immune System in Children with Cancer. **Lay Summary:** We now understand much more about the biology of cancers and how they interact with the body's immune system. New treatments that enable the body's immune system to target cancer are being added to conventional chemotherapies or radiotherapy. We also know that standard chemotherapy drugs routinely used to treat most childhood cancers modify the immune system but we do not know how this impacts on their anti-cancer effects. Using state-of-the-art technology called 'Cytometry by Time of Flight (CyTOF), we will extensively profile the immune system of children with cancer during chemotherapy. This will allow us to understand changes in the immune system that are caused by treatment and may provide new opportunities to more effectively combine immunotherapy and chemotherapy in the future.	£69,856.00	SPRF	BCHRF479
3. Dr Jane Waite, Dr Ashley Liew, Prof Chris Oliver, Dr Hayley Crawford, Dr Loraine Ruddick	**Project Title:** Developing the **Cl**inical **A**nxiety **S**creen for children with **S**evere to **P**rofound **I**ntellectual **D**isabilities (ClASP-ID) **Lay Summary:** Children with intellectual disability are often non-verbal or cannot easily report on internal experiences. Signs of anxiety in children with intellectual disability often overlap with other difficulties, such as pain, which complicates the diagnostic process. This study will design a practical and effective assessment tool to enable clinicians to identify anxiety, and differentiate it from pain, in non-verbal and minimally verbal children with intellectual disability. The assessment will be quick to complete for parents or carers and will focus on recording specific behaviours that aid diagnosis. The tool will be piloted to evaluate its potential impact in clinical services. It is anticipated that the tool will streamline care pathways, improving the efficiency of services.	£41,227.84	RP	BCHRF512
4. Prof Andrew Peet, Dr Niloufar Zarinabad, Dr Katharine Foster, Dr Lesley MacPherson, Dr Ian Williams	**Project Title:** Developing and Testing a Clinical Decision Support System for Advanced Magnetic Resonance Imaging in Cancer. **Lay Summary:** Medical imaging is the cornerstone of evaluation for tumours in children. We have developed a number of imaging methods which help us to diagnose tumours, work out how aggressive they are and whether they will respond to treatment. We want to make these tests routinely available to the doctors who need them and intend to do this by building a computer "app" which displays the images and helps the doctors interpret them. We will then evaluate the impact that they make.	£45,738.14	RP	BCHRF513
5. Dr. Daniel Tennant, Professor Andrew Peet, Dr Ina Nicklaus	**Project Title:** Assessment of the role of Yes-associated protein (YAP) in paediatric high grade glioma. **Lay Summary:** High grade gliomas (HGG) are a type of brain tumour found in both children and adults. These cancers are often difficult to operate on due to their position in the brain, and can be highly treatment resistant, meaning the prognosis is poor. One significant feature of HGG that causes therapy resistance is the lack of a good blood supply, which leads to areas with poor oxygenation, known as hypoxia. We have found a way of specifically killing hypoxic HGG cells from adult patients with a drug already in use for other diseases. This project will investigate whether the same approach could be used to kill HGG cells from children, which if successful could lead to improved treatment success and survival.	£50,840.53	RP	BCHRF514

Applicant(s)	Project Title	Amount Requested	*Category of Award	Ref No
6. Mrs Sharon Evans, Professor Anita MacDonald	**Project Title:** A low protein food application (APP) for inherited metabolic disorders (IMD) of amino acid metabolism. **Lay Summary:** Severe protein restriction is essential in children with PKU and all sources of protein eaten must be calculated each day. Access to reliable media information that has been written and validated by dietitians on the protein content of foods is limited. We aim to develop and study the effectiveness of an APP providing information on low protein food suitability and protein labelling interpretation. Agreed dietetic professional consensus on UK labelling interpretation will guide content. An initial pilot study will be conducted to test 'usability', followed by randomised controlled research in 80 patients/caregivers to study if the APP can improve accuracy of 'protein' counting in low protein diets.	£60,020.00	RPNAHP	BCHRF477
7. Bryony Carr, Mr Peter Bill, Professor Stefano Seri, Dr Antonio Fratini	**Project Title:** Development of an automated Gaze Tracking System for Visual Evoked Potentials (VEP). **Lay Summary:** Visual evoked potentials are used to test the ability of the brain to process visual information. This test requires prolonged fixation on a screen, which is not always achievable in paediatric age. New eye gaze tracking systems can calculate accurately the direction of gaze and track movement over time. We will develop a tracking system that can be integrated with vision diagnostic equipment and produce an automatic measure of patients' ability to maintain focus. We propose to test the feasibility of this new technology in children as its adoption in paediatric clinical practice could lead to improvement in data quality, reduction in testing time for the patient and an overall reduction in staffing time.	£7,978.00	SP	BCHRF487
8. Miss Caroline Scott,Mr Peter Bill, Professor Stefano Seri, Dr Marc Rayan	**Project Title:** Feasibility of Electrical Source Imaging technique in the localisation of the epileptogenic focus in children eligible for epilepsy surgery. **Lay Summary:** Before surgery for epilepsy, we need to know which part of the brain is causing the attacks and whether that part can be removed without causing any damage. Recording electrical activity from the head gives a good idea of the side of the brain in which seizures start and some information on what parts are involved. Studies in adults suggest that that recording activity from many more points on the scalp and performing Electrical Source Imaging (ESI) analysis with specialised software improves identification of where abnormal signals originate within the brain. We hope to see if ESI is tolerated well by children and whether it provides additional information to that available from the tests currently used in the assessment.	£9,786.00	SP	BCHRF492
9. Dr Z. Stamataki, Dr G. Reynolds, Professor D Kelly	**Project Title:** Evaluation of liver B-cell populations in children with Biliary Artesia for novel therapeutic intervention. **Lay Summary:** Biliary Artesia (BA) occurs in infants when inflammation from various causes leads to liver damage. There is no treatment beyond surgery to restore bile flow from the liver to the gut, and later liver transplantation. There is a pressing need to discover therapeutics to protect infants' bile ducts from immune-mediated damage. Recent experiments showed that mice lacking B cells were protected against infection-induced BA. This points towards an injurious role for B cells, and we seek to identify if this is the case in humans. We will look for harmful B cell subsets in archived biopsies from children with BA taken early (initial diagnosis) and late in disease (transplant), to answer if B cells should be targeted to relieve BA.	£9,600.00	SP	BCHRF497

Applicant(s)	Project Title	Amount Requested	*Category of Award	Ref No
10. Mr HS Ghattaura, Mr I Jester, Dr M Borooah, Prof AK. Ewer	**Project Title:** Failure to establish 'Recycling' (Mucous Fistula Refeeding) in Neonates. **Lay Summary:** Babies often need life-saving surgery, in which their bowel is stitched to the skin as two openings called 'stoma' and 'mucous fistula'. After the operation, difficulties absorbing milk and poor growth can occur because nutrient-rich stool in the stoma is thrown away. One treatment for this takes the stoma content and refeeds this back into the other end of the bowel (mucous fistula). This is called 'Mucous Fistula Refeeding (MFR)'. MFR works by restoring the normal bowel pathway and helping nutrient absorption. However, this treatment is associated with complications such as severe infection and even death. By testing bacteria and chemicals in babies' stool and urine, we hope to predict these complications and stop MFR before harm occurs.	£9,820.00	SP	BCHRF505

BWCHRF Awards 2018

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
1. Dr Z. Stamataki, Dr G. Reynolds, Dr R. Brown, Professor D. Kelly,	**Project Title:** Defining the role of liver B-cells in Biliary Atresia pathogenesis. **Lay Summary:** Acquired Biliary Atresia (BA) is the most common reason for transplantation in children and can occur when inflammation from various causes leads to liver damage. There is no treatment beyond surgery to restore harmful bile flow from the liver to the gut and often this is not sufficient to prevent transplantation. Mice lacking B cells were protected against infection-induced BA. We detected B cells in liver tissue at diagnosis (biopsy) and at end-stage disease (transplantation), and identified five types of patients based on B cell subset distribution. It is unknown how B cell subsets may contribute to the progression of BA; are they beneficial or detrimental? B cell profiling will aid patient stratification and suggest new targets for treatment.	£89,947.50	PhD	BCHRF546
2. Dr Zhuo Wang Co-I: Dr Maya Desai, Prof Martin Griffin	**Project Title:** Development of a novel therapeutic and prognostic strategy for Cystic Fibrosis (CF) by targeting Transglutaminase 2 (TG2). **Lay Summary:** Cystic Fibrosis (CF) is a life limiting genetic disorder occurring in 1in 2500-3500 people in the UK. Children with CF develop lung fibrosis for which there is no therapy. Currently disease modifying treatments are limited and treatment is generally focused on prevention and symptomatic management of complications. Our previous work demonstrated the importance of a multifunctional protein called Transglutaminase 2 (TG2) in CF using airway epithelial cells from adult CF patients. This project aims to establish this relationship between TG2 and CF at the early stages of CF development by using nasal cell samples from CF children to confirm TG2 both as a potential therapeutic target and prognostic marker.	£69,784.00	RP	BCHRF542

BIRMINGHAM WOMEN'S AND CHILDREN'S HOSPITAL RESEARCH FOUNDATION

Project Lay Summaries

Applicant(s)	Project Title & Lay Summary	Amount Requested	*Category of Award	Ref No.
3. Dr Stephanie Allen, Dr Amy Gerrish, Dr Trevor Cole, Mr Manoj Parulekar, Dr Samuel Clokie	**Project Title:** Clinical Implementation of non-invasive testing in Retinoblastoma. **Lay Summary:** Retinoblastoma is the most common eye cancer in childhood, caused by changes in the RB1 gene. The success of chemotherapy treatment has reduced the need for removal of the affected eye, and therefore tumour tissue is not always available to look for RB1 changes to predict recurrence in family members. By analysis of a sample of eye fluid from children with retinoblastoma, we have developed a test capable of detecting RB1 changes that have happened in the tumour. We aim to further validate this test for clinical use, to explore the possibility of using it as a monitoring tool during chemotherapy, and to develop non-invasive prenatal diagnosis for couples where there is a risk of recurrence in future pregnancies.	£55,399.00	RP	BCHRF521
4. Marette Ambler, Dr Amanda Hall, Rebecca Lawrence, Audiology Manager, Dr Konstance Tzifa	**Project Title:** Exploration of the barriers and facilitators to early cochlear implantation for children born with severe/profound hearing loss. **Lay Summary:** Early fitting of cochlear implants (surgically implanted hearing aids) help children born deaf to develop age-appropriate spoken language. If fitted after age 2, a child is unlikely to reach their language potential. The process from referral to implantation is lengthy and involves detailed hearing and medical assessments, which can be burdensome for families. In the Midlands, approximately 50% of children receive their cochlear implant after age 2 and we aim to investigate reasons for this. We will interview parents and clinicians, observe clinic sessions and examine children's clinical records to understand decision making processes and identify reasons for late cochlear implantation. We will then plan a study to give every child the opportunity to benefit from early cochlear implantation.	£41,085.00	RPN&AHP	BCHRF548
5. Dr Antonio Fratini, Dr Tecla Bonci, Dr Andrea Jester, Dr Nicola Crabtree, Dr Wolfgang Högler	**Project Title:** Vibratory stimulation for neuromuscular rehabilitation: a feasibility study on healthy and cerebral palsy children. **Lay Summary:** Cerebral palsy is a permanent condition that significantly impairs patient's quality of life. Clinical signs develop in early childhood causing chronic disabilities and physical impairment. Available treatments can alleviate the symptoms; however, they need a number of staff specialists dedicated to patient's rehabilitation, drugs and eventually surgery. Recent studies have shown that local or whole-body mechanical stimulations can positively affect muscle tone, spasticity and motor coordination but various stimulation parameters and delivery methods produced contradictory results. With this research, we want to find the most feasible vibratory stimulation delivery method and parameters, to obtain a reproducible and meaningful neuromuscular outcome variable for a future trial in healthy and CP children.	£ 8,588.00	SP	BCHRF552

KEY: * **Category of Award:**

SPRF = Springboard Paediatric Research Fellowship (Max. £70,000)	**RPNAHP** = Research Project: Nursing & Allied Healthcare Professionals
SNAHCPRF = Springboard Nursing & Allied Healthcare Professional Research Fellowship (Max. £70,000)	**SP** = Small Project Grant (Max. £10,000)
PhD = PhD Studentship (Max. £90,000 – increased in 2015 from £70,000)	**NP** = Nursing Project (Max. £10,000)
RP = Research Project (Max. £70,000)	**ER** = **Epilepsy Research** (Max. £50,000 or small project grants up to £10,000) *(Not available after 2012)*