Innovate UK

Results of Competition: Biomedical Catalyst Round 1 - Early Stage Award

Competition Code: 1701_CRD_HEAL_BMC2017_R1

Total available funding is £8m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
PhoreMost Ltd	A novel small molecule approach to enhance cancer immunotherapy	£1,456,824	£1,019,777

Project description - provided by applicants

A new approach to cancer therapy called 'immuno-therapy' has recently emerged that is now providing unheralded responses in certain cancer types. It is based on the concept that as tumours arise through sequential mutations in their genomes, this also creates 'foreign' antigens that can be recognised and attacked by the immune system. However, tumours also find ways to hide from immune-surveillance and a key advance has been to define, and now reverse, these mechanisms using immuno-therapies. While this is a significant step forward, unfortunately, only a few tumour types, such as melanoma and lung cancer, which possess hyper-mutated genomes (due to high levels of UV or cigarette smoke, respectively) are inherently sensitive to novel drugs that augment immune recognition. Removing the 'cloak of invisibility' is therefore not enough alone in most cancers to be effective. However, if one can find a way to accelerate or boost mutation levels in these non-sensitive cancer types, for example using a second drug that targets a DNA repair mechanism, all cancers could become hyper-responsive to immuno-therapy. To this end, we are developing small-molecule drugs that block a well validated, yet safe to inhibit, DNA repair mechanism. Genetic knock-out studies have shown that inhibiting this specific repair mechanism makes a wide range of cancer types sensitive to immuno-therapies. In this project, we will be optimising these drugs and performing key in vivo tumour response studies to facilitate their rapid progression into further clinical development with a Pharma company.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
SIRAKOSS Ltd	Development of a synthetic alternative to autograft bone - osteo3	£1,305,906	£914,134

Project description - provided by applicants

The major outcome of this project will be the development by SIRAKOSS Ltd of a bone graft substitute product that will replace the need for surgeons to harvest bone from a patient to act as a graft to repair diseased or damaged bone. Currently surgeons who are repairing fractured bones after traumatic injury, or filling a bone defect after removal of diseased bone, or fusing vertebrae in the spine to alleviate back pain have limited options for obtaining a bone graft to aid effective and fast bone repair in these surgeries. The clinical '˜standard'™ has been to harvest bone from the patient'™s own body (an autograft) but this needs a second operation, results in significant pain at the harvest site, has a limited supply, and may not be possible in some patients. The reasons that a patient'™s own bone is the clinical '˜standard'™ is that it offers a unique combination of bone forming properties that supports bone to repair. A number of synthetic materials have been produced as bone graft substitutes but these do not provide the range of bone forming properties that autograft does. INNOVATE UK Biomedical Catalyst funding of 70% of a total project cost of approximately £1,300,000 gives SIRAKOSS the opportunity to develop, approximately 2 years ahead of current timescales, a new synthetic bone graft substitute that combines SIRAKOSS'™ patented technology with collagen to form an implant that the surgeon can use straight from a sterile package, offering the properties of autograft but without the disadvantages to the patient that the use of autograft brings.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Biomoti Limited	Immunomodulation and sustained treatment of CD95L stratified tumours by precision targeting	£211,717	£148,202
Pharmidex Pharmaceutical Services Ltd		£544,181	£380,927
Queen Mary University Of London		£133,094	£133,094

Project description - provided by applicants

Cancer is the second leading cause of global mortality with over 8,000,000 deaths worldwide (WHO, 2015) and 163,444 in the UK (CRUK, 2014). Interventions that leverage the immune system, including antibodies and cell-based therapies, promise to revolutionise cancer treatment with cures seen in previously untreatable patients. However, many obstacles remain such as difficulties penetrating solid tumours, depleted immunity, serious side effects, logistics and high costs. Consequently, there is large unmet clinical need for patients with certain cancers, especially ovarian and pancreatic, where improvement in 5-year survival rates has been very limited. BioMoti, in a new alliance with Pharmidex, is developing the Oncojan platform to overcome current limitations. Oncojans are a new class of precision sustained therapeutics that target CD95L on tumours. CD95L is overexpressed on cells of the tumour bulk and vasculature (but not on healthy tissue) where it promotes proliferation, metastasis and immune evasion. This proposal aims to build on exciting pilot data showing that Oncojan formulation results in remarkable preclinical activity; 65-fold reduction in tumour burden, doubling of median survival and loss of toxicity compared to the Taxol® standard-of-care in ovarian cancer. Our main focus will be on the seriously unmet medical need in ovarian cancer with complimentary studies in the deadly triple negative breast and pancreatic cancer indications. This will enable commercial investment to support formal development.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
MiNA Alpha Limited Link Technologies Ltd	Development of liver targeted gene activation for liver disease	£311,206 £271,446	£217,844 £190,012
Project description - provided by applicants			
The project is developing an innovative drug for advanced liver disease including non-alcoholic steatohepatitis (NASH) where there are limited existing treatment options. The drug is designed to be administered subcutaneously, selectively target to the liver and increase the expression of a protein in the liver which is down-regulated in disease. Increasing expression of the target protein should both improve the function of normal liver cells impacted by the disease and inhibit the disease itself and thus restore normal liver function. The outcome of the proposed work, if successful, will be a clinical candidate that can be progressed to testing in liver diseases such as NASH as well as a selective delivery platform that can be used with chemically related drugs to treat a range of liver diseases.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
JRI Orthopaedics Ltd	SWIFT: Innovative Arthroscopic Approach for Regenerative Treatment of the Hip	£616,631	£369,979
Salthaus Limited		£193,409	£135,386
University of Sheffield		£101,534	£101,534

Project description - provided by applicants

This exciting business-led project brings together industry and academia, with two commercial partners, JRI Orthopaedics (lead) and Salthaus, and the University of Sheffield. They will open new opportunities to treat hip diseases. Today there are treatments that can regrow the joint surface (known as regenerative medicine); these are only used in the knee because accessing the hip is surgically more difficult. Using a technology that JRI has patented, a surgeon can use a key-hole approach to access the hip; prepare the joint surface accurately (critical to final success of the treatment) and then rapidly inject the implant directly into the prepared area. This is part of a larger programme of work in which JRI is developing implants specifically for this approach as many existing implants would not survive the delivery process. This project will validate the technology and ensure that it can be manufactured at a price that makes it viable in today'™s healthcare market. JRI has many years'™ experience of getting regulatory approval for similar products and then taking to the clinic through a full market launch. JRI will take this to its major markets, which currently include: Europe, Brazil, Australia and China. This technology will enable treatments for hip diseases at an early-stage that will delay (or even remove) the need for total hip replacement, resulting in cartilage being regenerated or regrown rather than replaced. This will reduce costs much needed by modern health systems as well as diminishing the suffering of the individual patient.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Centauri Therapeutics Ltd	Optimisation of Antibody Recruiting Molecules as Immunotherapeutics	£1,350,055	£945,039

Project description - provided by applicants

Antibiotics have revolutionised healthcare but bacteria continually evolve to resist new medicines. The lack of new antibiotics combined with increasing incidence of resistance in the clinic has been termed '˜the perfect storm'™ and there is an urgent need for new therapies. Our project will deliver a novel treatment for patients suffering from infections caused by resistant bacterial strains. Our 'Alphamer' drug mechanism elicits an immune response to the bacteria by coating the outside of the bug and attracting pre-existing antibodies present in everyone. These antibodies then mediate rapid and effective killing of bacteria. This approach will work immediately in patients already infected (unlike a traditional vaccine) and has the potential to elicit a broader immune response than a monoclonal antibody. With a distinct mechanism of action, the Alphamer will help clear the infection rapidly, work in conjunction with existing antibiotics to reduce the dose and duration of therapy and demonstrate efficacy against resistant strains.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
F2G Ltd	Development of a broad spectrum antifungal series	£1,014,109	£709,876
Project description - provided by applicants			
Invasive fungal infections kill 1.5 million people worldwide per year. New antifungal drugs are urgently needed to combat the increasing mortality from these diseases and to supplement the limited therapeutic options. In particular new antifungals with novel mechanisms of action are required to address the worrying rise in resistance to current therapies. This project will continue the development of a broad spectrum antifungal series discovered by F2G - named the F6-series. This series has a mechanism of action different to current drugs and has been shown to be active against strains of fungi that are resistant to the leading azole class of antifungals together with certain hard to treat fungi such as Scedosporium prolificans which is resistant to all known classes of antifungal. Innovative approaches will be taken in this project, including structure based drug design employing newly developed models of the protein target of the F6-series. As the potency and efficacy of the series improves we aim to identify a preclinical drug candidate ready for final toxicological assessment prior to clinical studies.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Chromition Limited	Automated Cancer Prognosis and Diagnosis Using MultiColoured Luminspheres™	£251,307	£175,915
University of Manchester		£202,735	£202,735
Project description - provided by applicants			
The project will develop and validate a method for automatically analysing cellular patterns, labelled by immunohistochemistry. Currently, pathologists visually assess tissue samples in order to diagnose diseases such as cancer and provide a prognosis. Currently a maximum of three biomarkers can be analysed at one time. Analysing multiple biomarkers provides a more detailed picture of disease status and progression and enables physicians to provide personalised and more effective treatments. The method that will be developed and validated through this project will facilitate the analysis of multiple biomarkers in a shortened space of time by using innovative software to complete the analysis. Initial testing has shown the method to be successful. Further development through this project will result in a method which has been validated for the prognosis and diagnosis of cancer. The success of the project will enable a reduction in the economic cost of disease, eliminating human subjectivity, enabling rigorous cross-validation to minimise the chance of identifying erroneous patterns via more precise diagnosis and treatment selection, better patient outcome, and improved service efficiency via automation.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
GyroGear Ltd	GyroGlove for Parkinson's: Improving consistency and usability; testing disease tracking potential	£684,319	£479,023

Project description - provided by applicants

GyroGlove is a wearable active device based on miniaturised gyroscopes, designed to suppress the hand tremor commonly seen in people suffering from Parkinson'™s Disease (PD) or Essential Tremor (ET). With the help of a Smart Proof of Concept (PoC) grant we have taken the idea from very early lab simulators through to functional prototypes. These were tested on PD and ET patients in lab conditions. We were able to demonstrate a 50% reduction in tremor in half of the tests and as much as 95% in one case. However, in these tests we found that the prototypes gave inconsistent results. The reasons for this variability were investigated to a limited extent during the PoC by modelling. We now know the general source of the inconsistencies, and we have devised a programme for addressing them in this project. This entails further systematic study and modelling of tremor suppression across a sample of individuals so we can scientifically understand the full range of variabilities and address these causes through engineering. The GyroGear user panel (named 'GyroCircle'), combined with our analysis of the competitive landscape, has shown that GyroGlove has to address tremor suppression in combination with 1) a well-designed user experience based on a understanding of disease-specific user and carer interactions with the product, and 2) the capability to be used for disease tracking and proactive management. This will create a sustainable product. The outputs from the project should enable us to commence design for manufacture, testing and clinical evaluation with the objective of launching in early 2019.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Locate Therapeutics Limited	CellFuse: A Regenerative Medicine Product for Enhanced Spinal Fusion in Diabetic Patients	£878,503	£614,952

Project description - provided by applicants

This project aims to develop a new surgical product that will cure diabetic patients of a specific type of severe back pain. When the backbone is damaged or deteriorates due to disease and aging, chronic pain can result due to a loss of elasticity and protection in the disc structure. One clincial treatment that is offered is to fuse the affected segments of the backbone to restrict movement and stop the pain. This fusion requires the surgeon to implant a material close to the main back bone. The material encourages new bone to form, and that bone creates a permanent bridge that stabilises the backbone in one specific segment. The most common treatment option is to move living bone from the patient's own hip into the area next to the backbone. This is called autografting. This is a very successful procedure for most patients but is far less successful for patients with diabetes (both insulin dependent and independent). The process appears to be less successful for diabetics because the bone tissue forming stem cells are less active. Our company has technologies to overcome these problems. The product is called CellFuse and it includes a method of priming the stem cells to grow faster and to create bone more quickly. This is combined with a simple to use adminsitration system that ensures these primed cells stay at the site of action. We will aim to prove that our new concept works for diabetic patient cells and within 2 years we will be ready for clinical trials in humans using a medicine manufactured in the UK.

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Medical Wireless Sensing Ltd King's College London	A compact portable non-invasive glucose sensor	£841,200 £431,662	£588,840 £431,662
Project description - provided by applicants			
We are developing GlucoWise: the first accurate, non-invasive, wireless glucose monitoring system. The device comprises a wearable sensor which can be pressed against the ear lobe or the hand (between the index and thumb fingers), a mobile unit for receiving and displaying the glucose data, and a cloud-based software platform which interfaces with existing electronic health systems to store and provide data access to patients, carers, or medical professionals. The sensor includes a transceiver system with integrated wearable nano-composite metamaterial films. These films enable the transparency of the skin tissue to the radio waves, therefore improving the overall accuracy of the sensor. An integrated environmental sensor system will be incorporated to read temperature, pressure, and motion during readings. In addition, a calibration mechanism will be integrated with the transceiver that will detect the environmental factors and skin conditions. The main objectives of this system are to provide a pain-free, more affordable and more hygienic option to the current blood glucose monitors, while at the same time providing the users with the additional tools they need to effectively manage their diabetes condition.			

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