Results of Competition:Health & Life Sciences - Round 2 - 12-24 MonthsCompetition Code:1702 HLS R2 24M

Total available funding is £10m

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
Bio-flex Yarns Limited	Non-Invasive Telemetric Sensing	£342,015	£239,411
PST Sensors Europe Limited	for Lower Leg Amputee Surface Skin Management	£387,026	£270,918

Project description - provided by applicants

Lower limb amputations not only occur following accidents or war, but now predominantly occur as a complication of diabetes, following ulceration and gangrene. Wearing a prosthesis following amputation facilitates social and economic activity and inclusion, but nearly 75% of leg amputees experience skin complications, which can result in abandoning the prostheses, and may in turn lead to secondary amputation, and even death. With the world-wide increase in diabetes, there is an increasing burden for the individual and for society, but early recognition of skin changes could trigger preventative action. To address this problem, Bioflex Yarns and PST Sensors Europe have joined forces to develop a limb monitoring system to alert for skin complications, to be based on 'cutting-edge' technologies in passive thermal regulation, non-invasive monitoring of physiological parameters, and IoT based data analysis. At the centre of the technology is the smart prosthesis sock, which is as comfortable to wear as a traditional prosthesis sock. An app on the amputee's mobile phone alerts when problems commence. The individual amputee will have personal information, direct involvement in care, and a transformed daily living experience. Furthermore, with the clinical information directly accessible to the designated medical team, any appropriate intervention can be timely and cost effective. The multi-patient amputee database platform can allow the NHS to allocate resources to provide targeted care to amputees, for reduced health care costs.

Note: you can see all Innovate UK-funded projects here

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Competition Code: 1702_HLS_R2_24M

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Genedrive PLC	Centrifuge-free plasma separation	£807,154	£484,292
University of Dundee Tayside Health Board	consumable for global point of care viral diagnostics	£97,322 £17,000	£97,322 £17,000

Project description - provided by applicants

Currently there are no suitable independent PoC methods for processing patient blood samples to provide plasma for medical diagnostic tests. This means analysis is restricted to centralised laboratory facilities and this significantly impacts time to result and subsequent treatment, and cost to the healthcare provider. This project seeks to capitalise on development of a single-use cartridge that can simply process whole blood from a patient finger-prick blood sample to provide plasma for downstream blood borne virus testing. Plasma can be used with Genedrive® diagnostic tests for hepatitis C (HCV), or any other vendor platforms and diagnostic tests that use plasma as a starting sample. Providing a cartridge that can process blood without relying on clinical laboratory equipment, will significantly impact the provision of many molecular diagnostic tests in low resource settings, where the vast majority of infectious disease diagnostics are required. We have established a working prototype for plasma virus separation based on size exclusion where blood cells are trapped and smaller viral particles (eg. HCV) move through a membrane with the plasma. The sensitivity of the single use device is within the ranges required for clinical use. This technology has the opportunity to change the way blood borne viral diagnostics are conducted in decentralised settings in resource limited countries, providing improved patient care and more timely therapy, and ultimately positively impacting on global health challenges in infectious diseases.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Emteq Limited	SEEM: Sensor-Enabled Emotion	£143,323	£100,326
University of Portsmouth	Monitoring Eyewear	£35,450	£35,450

Project description - provided by applicants

Parkinson's Disease affects 30 million people worldwide (Frederico et al 2012) and is the second commonest neurodegenerative disorder. Symptoms include tremors, loss of facial expressivity, loss of vocal projection, muscle rigidity, dropping posture, walking difficulty. There are 10,000 new cases of Parkinson's disease (PD) each year in the UK. One reason why a cure for Parkinson's is elusive is because the movement symptoms (e.g. tremor) only appear many years after the nerve cells start dying (70-80% of the nerve cells are already been lost by then). We do not know enough yet about these early stages, although it is clear that some symptoms may occur up to 20 years before the movement problems of Parkinson's appear. A clinician will only ever see a 'thin slice' of a patient's daily life and therefore is making important decisions about management with very limited information. We are developing a wearable technology to identify a subset of patients who might merit further investigation and treatment. Currently, the inability to objectively and remotely monitor treatment response or deterioration does not enabled personalised treatments and leads to unnecessary complications due to over-dosing, inadequate treatment and poor quality of life.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Aseptika Limited	BuddyWOTCH, a wearable Class	£585,161	£409,613
Spirit Healthcare Ltd	IIa medical device for stratification of long-term conditions	£29,260	£20,482
Triquettra Limited		£322,896	£226,027
Sheffield Hallam University		£234,913	£234,913

Project description - provided by applicants

17.5 million people in UK have long-term conditions, that through enhanced monitoring, could be better stratified to the correct treatment pathway, with resulting savings to the NHS and better patient outcomes. This project finalises development of a wristband medical device that enables constant monitoring and detection of exacerbation warning signs in people with long-term conditions, with the aim of preventing unplanned hospital admissions and helping keep people well at home.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Psyomics Ltd	Development of diagnostic device	£224,902	£157,431
Cambridge Centre for Neuropsychiatric	to differentiate between bipolar and unipolar depression	£26,292	£26,292

Project description - provided by applicants

Bipolar disorder affects 2.4m people in the UK alone and has an estimated prevalence of around 2% globally, yet 40% of patients with bipolar disorder are misdiagnosed with depression and it takes an average of 7.5 years for the correct diagnosis to be reached. This leads to ineffective treatments, increased suicide risk, antidepressant-induced mania and higher healthcare costs, as well decreased quality of life for patients and their families. The long-term mission for Psyomics is improved prevention, diagnosis and treatment of mental health conditions. Our initial focus is on improved diagnosis of bipolar disorder and depression in primary careRecent research conducted by Psyomics and the Cambridge Centre for Neuropsychiatric Research has identified key biomarkers, assessed in dried blood spots and via a digital-screening approach that can differentiate these conditions with a strong predictive performance. This project will enable Psyomics to build on these results with the aim of launching a digital-only tool to support stratification in 2019 and a two-stage digital and biological diagnostic device to improve diagnosis and clinical outcomes for patients and their families in 2020.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
PCR Bio Systems Limited	Development of Novel Hot Start	£244,200	£170,940
MIP Diagnostics Limited	(HS) Reverse Transcriptase Technology	£250,000	£175,000

Project description - provided by applicants

The Polymerase Chain Reaction (PCR) combined with reverse transcription (RT-PCR and qRT-PCR) is a sensitive method to detect RNA and a crucial technique within bioscience and healthcare research, for example in detecting RNA viruses that exist in very low levels in blood and body fluids of infected individuals. However the sensitivity of the technique can be affected by the enzyme used in the process, Reverse Transcriptase (RTase), forming 'primer dimer' and non specific products at lower temperatures during reaction set up. Our research has shown that the current methods used to improve the sensitivity and specificity of the reaction by inhibiting RTase activity at lower temperatures ('hot start') are inferior and do not inhibit RTase activity sufficiently for ultrasensitive RNA detection. We intend to take an innovative approach to RTase inhibition and develop a novel RTase inhibitor and a range of hot start RTase products for cDNA synthesis, RT-PCR and RT-qPCR to dramatically increase the sensitivity and specificity of RNA detection.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Stemnovate Limited	Liver on a chip' an advanced	£1,065,012	£745,508
ANB Sensors Ltd	microfluidic in vitro model for liver toxicity & safety screening.	£123,248	£86,274

Project description - provided by applicants

One of the biggest challenge in drug discovery is figuring out which drug candidates are likely to harm the liver before testing the agents in humans. Owing to species specific differences in liver pathways, and limited physiologically relevant information from in vitro models silent hepatotoxic drugs get introduced into clinical trials, garnering huge financial losses for drug companies through withdrawals and late stage clinical failures. Stemnovate and partner ANB sensors supported by leading pharmaceutical company Johnson's and Johnson's pharmaceuticals aims to deliver 'Liver on a chip' an in vitro testing platform that could recapitulate liver response to evaluate predictable and unpredictable hepatotoxins over the breadth of genetically diverse human population. Our 'Liver on a chip' will be a bioinspired cell culture and assay system designed on a microfluidic chip with sensors for monitoring microenvironment allowing long term mechanistic studies. This physiologically relevant drug screening platform will counteract disadvantages associated with current practices that use primary hepatocytes, cell lines and animal models through use of functional and stable cells (hepatocytes) generated from patient specific and genomically diverse induced pluripotent stem cells. The system will allow spatiotemporal control of various chemical and physical culture conditions that are unavialable with other methods. The 'fast failing' can reduce the average R& D cost per product launch by \$ 30 Million, and also increase launch rate by 25% while reducing animal research and improving drug safety.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Entomics Biosystems Limited	Metamorphosis: a bioprocessing	£628,430	£439,901
University of Reading	platform for functional insect meals	£149,380	£149,380
University of Stirling		£120,013	£120,013

Project description - provided by applicants

There is increasing concern around the sustainability of the salmon aquaculture feed supply chain, with a growing industry trend of moving away from fishmeal, which is four times as expensive as plant-based proteins like soy. Insect meal has been demonstrated to be a promising nutritional alternative to fishmeal, yet there are concerns that it lacks some of the added functional benefits naturally found in fishmeal. Entomics' solution is to introduce functional insect-derived protein feeds to the UK aquaculture market, using a novel insect post-processing technology. Overall, project outcomes will expedite and de-risk platform and product development pipelines, bringing them closer to commercial readiness whilst consolidating Entomics' position as a biotechnology leader in the growing insect industry.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Freeline Therapeutics Limited	Establishing Freeline Commercial	£1,399,837	£979,886
Cell Therapy Catapult Limited	Scale Viral Gene Therapy Manufacture for Fabry Disease	£600,012	£600,012

Project description - provided by applicants

The rapid development of novel treatments called Advanced Therapies, such as gene therapies that provide the correct proteins, have required new, manufacturing facilities worldwide. Freeline Therapeutics Limited (Freeline), a UK company that makes gene therapies to treat bleeding and metabolic disorders, will work with the Cell and Gene Therapy Catapult (CGTC) to set up Freeline's UK manufacturing site at the CGTC, at the same time establishing an operating model for virus processes applicable to other gene therapies companies joining the CGTC. This has many advantages: 1. It will help Freeline to make new treatments more quickly so that patients can be treated sooner, the first of these will be for Fabry disease, a rare disease affecting 2.56 in 10,000 people, with diagnosed prevalent cases expected to double in the 7 major markets (GlobalData epidemiologist). 2. Removing Freeline's reliance on availability of severely restricted European CMO capacity (few capable of clinical & commercial supply), gaining control of its manufacture to support the full product lifecycle. 3. Freeline will be able to make its own approved new therapies in the UK for delivery to patients worldwide, the first of these is anticipated to be for haemophila B a rare bleeding disorder affecting 1 in 30,000 males worldwide. 4. Establishing CGTC as a centre of excellence for large scale manufacture of viral vectors and cell therapies, for UK & International companies to its quality managed, self-contained units, creating employment opportunities for the skilled UK workforce.

Note: you can see all Innovate UK-funded projects here

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Martec of Whitwell Limited	Safe CIP (clean-in-place)	£254,085	£111,638
Synatel Instrumentation Limited		£243,581	£109,611
Hazelwood Foods Limited		£145,000	£0
University of Nottingham		£117,951	£117,951
Loughborough University		£115,619	£115,619

Project description - provided by applicants

Hygiene is essential in all food manufacturing with cleaning clearly a safety critical process. To address increasing risks, for example from allergens, cross contamination, evolving microbiological resilience, etc., the industry needs new capability which is not as highly dependent on error-prone manual procedures. Automation of cleaning needs suitable sensors to directly measure fouling real-time within process equipment. Following on from a successful feasibility study this project will progress through to the creation of industrially robust sensors and control equipment, install these on a functional production plant at a major UK-based food manufacturer and gather scientific data to hygienically validate the new disruptive innovation approach. We will develop algorithms to use the sensor output thereby creating a solution to autonomously self-optimise the industry standard clean-in-place (CIP) process. Not only will Self-Optimising Clean-in-Place (SOCIP) technology address safety risks and gaps in hygienic 'due diligence' within food manufacturing but it will also reduce time, waste and the environmental impact associated with one of the most common processes while creating a world leading capability for the UK food process equipment industry.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Neuronostics	BioEP: Proof of Concept	£491,626	£344,138
University of Exeter		£159,710	£159,710

Project description - provided by applicants

Epilepsy is a serious neurological condition that affects almost 1% of the population at some stage in their lives. It is a condition with high economic (£15bn annually across Europe) and social (>1000 deaths annually in the UK) costs. In this project, Neuronostics seeks to demonstrate proof of concept for its lead product, BioEP. BioEP is a novel precision medicine tool that can identify whether or not someone has epilepsy and whether or not they are responding to treatment. In contrast to current clinical practice, which can only answer these questions if seizures occur whilst being monitored clinically, BioEP uses advanced mathematical and computational algorithms to interrogate the electrical activity of the brain and reveal susceptibility to epilepsy. BioEP additionally offers the potential to determine whether or not someone is responding effectively to treatment. For the millions of people with epilepsy worldwide BioEP offers the opportunity for fast, effective and objective clinical decision making.

Note: you can see all Innovate UK-funded projects here
<u>https://www.gov.uk/government/publications/innovate-uk-funded-projects</u> Use the Competition Code given above to search for this competition's results

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
B-Hive Innovations Limited	A novel ultrafiltration process to	£438,907	£307,235
Tickhill Engineering Company Limited	potato peelings and waste	£360,478	£216,287
Cambridge Commodities Limited		£60,104	£36,062
The Technology Research Centre Limited		£97,352	£68,146
University of York		£178,554	£178,554
The Biorenewables Development Centre Limited		£149,742	£149,742

Project description - provided by applicants

This project aims to develop a new process to extract valuable complete undenatured proteins from potato waste (whole stockfeed grade potatoes and peel), for use as high quality food grade vegan/vegetarian protein supplements, sport protein sources and as functional food processing ingredients. B-Hive Innovations Ltd are set to be first to market with this UK-sourced process and material. Our novel extraction process promises a step change in simplicity and cost effectiveness for handling complex waste compared to industrial chromatography, the only currently available technique. The project will build upon our existing proof-of-concept work and will solve the challenges we have identified in our initial scale-up investigations - dealing with variability of the complex input materials, eliminating the flow and membrane fouling problems, and optimising the balance between the two innovative modes at the extraction stage. The consortium members, who carried out parts ot the initial work, have come together to provide an integrated end-to-end group, with partners who own the waste problem, can scientifically progress the scale-up work, can build and operate at pilot scale, and who can take the final products and use them in New Product Developments.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Oxford BioMedica UK Limited	Industrial Viral Vector	£978,348	£489,174
Cell Therapy Catapult Limited	Manufacturing Using Advanced Process Analytical Technologies	£419,067	£419,067
Stratophase Ltd		£278,077	£194,654
Synthace Limited		£322,852	£225,996

Project description - provided by applicants

Cell and gene therapies offer unprecedented promise for the cure, treatment or long term management of disease. However, the challenge facing the industry is the need for viral vectors which can be consistently manufactured to commercial scale with rigorous tolerances for purity, potency and safety. This collaboration to support advanced therapies is led by Oxford BioMedica (OXB) and includes 2 UK SME's; using OXB's existing leadership position in the development and manufacture of lentiviral vectors to meet in-house and partner organisation needs. Our aim is the development and application of novel advanced technologies to further evolve the current manufacturing platform, leading to an increase in the ability to deliver high quality vector for clinical and commercial applications. The project has the real potential to deliver tangible benefits to patients in shortening time-to-clinic and time-to-market as well as to improve the cost and access of bringing these novel therapies to patients. Each partner holds proprietary technology and know-how which will be leveraged to develop this innovative approach to viral vector manufacturing. The partners will look to access new market opportunities in cell and gene therapy resulting in economic growth and increased employment of highly skilled staff. The exploitable outcomes of this innovative project are closely aligned with the current government national priorities to make the UK a global hub for manufacturing advanced therapies.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant	
Arecor Limited University of Manchester	Validation of a novel preclinical development platform to enable high value therapeutic co- formulations	£966,655 £238,530	£676,659 £238,530	
Project description provided by applicants				

Project description - provided by applicants

There is an unmet need to develop advanced therapies that combine two or more therapeutic products in one dose to improve patient convenience. This leads to better compliance, improved health outcomes and a better patient experience. However, it is often impossible to develop these co-formulations due to very different formulation conditions required to stabilise individual pharmaceutical ingredients in the same aqueous environment. Highly innovative formulation platforms are therefore essential to enable many of these commercially attractive combination products. Arecor has developed and successfully commercialised a proprietary formulation technology that delivers superior stability of therapeutic proteins compared with coventional formulation optimisation. To date the technology has only been successfully applied to single pharmaceutical ingredients, and the purpose of this project is to adapt the technology to overcome additional issues associated with co-formulations. Issues such as drug-drug interactions, in-vivo bioequivalence, stabilisation under non-optimal conditions, device compatibility and toxicological safety will all be evaluated under this preclinical platform. To ensure efficiency a validated state-of-the-art robotic liquid handling and multivariate design combined with high throughput analytics will be employed. Whilst the primary objective is to adapt and validate an innovative pre-clinical platform, co-formulations with high commercial potential will be a secondary output.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Medical Wireless Sensing Ltd	Monitoring stroke using microwave	£645,545	£451,882
King's College London	technologies	£253,249	£253,249

Project description - provided by applicants

This project will contribute towards the development of a portable and low-cost system which can detect the occurrence, and monitor the evolution of stroke and its treatment using microwave technology. The impact of stroke incidents is immense: five million people die and another five million are permanently disabled every year due to stroke incidents, and stroke is placed third among reasons for acute death and first among reasons for neurological dysfunction in the western world. Moreover, the incidence of stroke in patients below 65 years of age is increasing and presently constitutes 20% of all strokes. Its treatment relies to a great extent on the information provided by diagnostic methodologies, which are necessary to guide medical experts in choosing a treatment strategy and to assess its efficiency. The proposed approach relies on microwave imaging (MWI), which uses harmless, low-power, non-ionizing radio frequency microwaves to obtain clinically meaningful images in a way that addresses the patient's needs for speed, safety and comfort. The system can be used inside an ambulance to determine the type of stroke much earlier than CT scanners inside a hospital. This is particularly important for ischemic stroke patients (which account for over 80% of total cases), for which early detection is crucial for thrombolytic treatment. Moreover, by serving as a point of care diagnostic tool for patients at their homes, the proposed approach can lead to more precise, personalised management of stroke in the post-acute stage, thereby improving the potential recovery of the patient.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Milkalyser Limited	Milkalyser2Farm (M2Farm)	£617,605	£420,000
Ridgeway Research Limited		£127,106	£88,974

Project description - provided by applicants

We aim to increase the longevity of dairy cows with a biosensing technology to improve the fertility management with an automated system for measuring progesterone in milk. It will allow better detection of ovulation for optimal insemination and pregnancy and allow cows to have longer more productive lives. It will reduce the number of animals kept as replacements and thereby reduce greenhouse gas emissions from agriculture. It will improve the farmer's margins for milk production and reduce the number of veterinary interventions needed.

Note: you can see all Innovate UK-funded projects here