

Results of Competition: UKI2S Accelerator Programme for Technology Development Projects: Round 12

Competition Code: 2003_UKI2S_R12

Total available funding for the programme is up to £10,000,000

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
A TELERIX LIMITED	"BloodReady": Cell preservation formats for use in human clinical settings	£199,971	£139,980

Note: you can see all Innovate UK-funded projects here: <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Project description - provided by applicants

Therapies using live cells offer the possibility of treatments for diseases and conditions that cannot be approached by conventional drugs. Cells are being investigated for their abilities to reverse blindness, re-grow bone and nerves, restore the immune system and treat cancers for which there are no effective drugs.

Living cells, however, are fragile and short-lived outside their natural environment. A common approach to address these issues is to freeze the cells for storage but this causes problems when the cells are thawed again for injection into the patient. Many cell therapies simply cannot be frozen and for these products, complicated and expensive logistics are required to ensure their delivery to the hospital and the patient before their shelf life expires.

Our technology enables the storage and transport of unfrozen human cells, thereby preserving and extending their functional viability and potency. The technology has been shown to be effective with a wide variety of cell types and has the potential to make cell therapies widely available to many more patients who need treatment.

At present our technology has only been used in small scale research projects which limits its potential to make cell therapy available to many more patients. To enable use on a larger scale, we need to develop methods which would enable larger volumes of cells to be safely transported while continuing to preserve their viability.

Extending shelf-life is necessary to ensure that hospitals have flexibility to schedule operating theatres to administer these products and therefore enable many more patients to be treated with novel, potentially curative therapies. In this project we will explore scalable methods of cell preservation, transport, and re-presentation for patient administration.

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SILICON MICROGRAVITY LIMITED	Surface microgravimetry on a moving/mobile platform	£679,294	£339,647

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Project description - provided by applicants

Microgravity measurements have enabled a variety of geophysical surveying/monitoring applications including advance warning of natural hazards, slope stability monitoring, discovery of buried tunnels, pipework, and other utilities, identification of sinkholes and other natural voids, buried aquifers and in monitoring groundwater hydrology. In the civil engineering context, microgravity measurements can provide valuable information for construction and road/rail projects or intervention activities by locating buried utilities, solution cavities, hazards, or other features of relevance.

Following development of an extremely small single-axis MEMS surface gravimeter module with a resolution of $<10\mu\text{Gal}$, the project will construct a surface gravimeter for use on a slowly moving/mobile-platform providing entirely new approaches to surveys of the sub-surface and, ultimately, could be mounted on remotely-operated vehicles or drones, integrated into land-based distributed sensor networks, or deployed in shallow borehole configurations. Instruments based on these sensors could enable time-lapse vector gravity measurements as well as full tensor gravity gradiometry.

Particularly applicable to civil engineering where large expanses of area (railways, roads, construction sites) may require one-off or regular monitoring of density, traditional 'stationary' methods are often costly and time consuming (in terms of duration of total survey time). Data would be invaluable for Predictive Maintenance (PDM) surveillance programs. They also pose other safety concerns on busy infrastructure that lead to inadequate surveys, due to time restrictions that leave high levels of uncertainty.

Gravity measurements acquired by/from a slowly moving platform could allow a breakthrough in cost effectiveness and survey density for these (numerous) applications whose associated problems currently cost billions to infrastructure projects if undetected. The UK railway network alone has over 190,000 railway earthworks (embankments and cuttings), buried assets exceeding 6,000 km's length and over 1 million+ drainage assets, the location of just over half being known. Regular surveys would allow improved understanding and avoidance of substantial engineering costs from unidentified subsurface hazards, that currently remain difficult/impossible to characterise with existing technology.

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MICROFLUIDX LTD	Design and manufacture of high-throughput microfluidics for cell culture	£699,986	£349,993

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Project description - provided by applicants

Public description

MicrofluidX's mission is to tackle the problems of process control, scalability, and cost associated with cell bioprocessing, in particular for autologous cell therapy (CT). Its automated, closed technology allows biologists to easily carry out process development by running dozens of cell culture conditions in parallel with extreme process control, and to scale up seamlessly up to several billion cells for manufacturing at a fraction of the current costs. This project is to develop a large-scale microfluidic platform, compatible with a variety of cell research and cell production microfluidic chips, to address the need of high-throughput cell culture in manufacturing and research fields. Microfluidic cell culture has been proven to be superior to conventional cell culture tools with respect to process control and efficiency. So far, these advantages have been exploited successfully for applications requiring small amounts of cells, e.g., cell-based drug screening. By developing a high-throughput platform, MicrofluidX brings microfluidic cell culture to a broad range of new applications in CT and cell-based assays.

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NK:IO LTD	Novel small molecule enhanced NK cell immunotherapy	£599,999	£300,000

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Project description - provided by applicants

Over the past five years, the potential of cancer immunotherapy has entered mainstream oncology. The two main approaches are checkpoint inhibitor therapy and engineering of T cells to target tumour cells (CAR-T cells). Both have shown some success in cancer including melanoma and leukaemia but have limited impact on solid tumours and can cause fatal or highly damaging immune reactions in patients.

Our company has developed a technology to produce human Natural Killer (NK) cells that are very toxic towards cancer cells and can be transferred into patients to treat cancer. Small molecule therapeutics offer many advantages over cellular therapies, including the potential to be taken orally in an outpatient environment. We have developed novel and proprietary small molecules that exploit NK cell biology to clear cancer cells. NK cells have an established role in our bodies, recognising cancer cells and destroying them before they become dangerous. In fact, NK cells are more toxic towards cancer cells and are safer than other existing cell therapies. NK cell therapy is being tested in multiple clinical trials, however current production methods are highly inefficient and result in transfusion of "exhausted" NK cells that have low cytotoxicity.

This project will help us improve the function of these new small molecules as well as test how well they can work in vivo to allow for NK cell based cancer cell killing. We are focused on applying this approach to ovarian cancer, which currently has a poor prognosis for 10-year survival. The presence of NK cells within an ovarian cancer is usually associated with a good prognosis for the patient and the biology of ovarian cancer suggests that it can be highly susceptible to "weaponised" NK cells. This project will encompass testing of how well these novel small molecules work to block cancer progression in models of ovarian cancer.

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SOLASTA BIO LIMITED	Insect Water Taps (IWT's) for Green Crop Protection	£650,140	£325,070

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Project description - provided by applicants

Solasta Bio offers the pesticide industry and consumers a radically new solution to the biggest global challenge of this century -- producing safe and plentiful food for a growing population. Our small protein (peptide)-based approach targets a unique feature of insect physiology to provide safe, effective insect pest control for food crops. These new bioinsecticides do not harm beneficial insect species and if successful in the market, will replace current synthetic chemicals, increasing stewardship of the environment and end-consumer health.

Our platform does away with the costly, inefficient and time-consuming random screening of large libraries of compounds which consumes up to three years in a traditional discovery program.

The project aims to refine and demonstrate the potential of our discovery platform through development of candidate bioinsecticides that address significant market needs.

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