



**EMARGOED UNTIL 00:00 GMT 27 FEBRUARY 2015**

## **Novel technologies to overcome challenges faced by the pharmaceutical and chemical industries**

Industry, small and medium sized enterprises and academia are coming together, through the NC3Rs CRACK IT programme, to solve three challenges faced by the pharmaceutical and chemical industries; all of which should reduce the number of animals used in scientific research.

Nine research and development consortia have been awarded up to £100,000 each, as part of the CRACK IT Challenge competition, to carry out initial work to develop innovative technology solutions that will impact on the replacement, refinement and reduction of animals in research (3Rs).

Two of the Challenges include better predicting the off-target effects of chemicals on cells, tissues and organs (Targeting Off-Targets) and finding an *in vitro* human tissue approach to model neurotoxicity (Neuratect). For these Challenges, proof-of-concept funding has been awarded.

In six months' time, the project teams participating in the Neuratect and Targeting Off-Targets Challenges will attend an NC3Rs panel to report on their progress, and to be in with a chance to secure the £1million three-year funding contract on offer to complete each Challenge. Only one team for each Challenge will receive funding for the second stage of the competition.

The CRACK IT programme has also awarded funding to KREATiS and CEHTRA in the QSARs Mix Challenge – using computational models to predict the skin and eye irritation of a mixture of chemicals based on their structure. As a smaller, shorter Challenge, the winning team for QSARs Mix has been granted £100,000 to achieve the project deliverables within 12 months.

Shell, Dow AgroSciences, Unilever, Abbvie, BASF, GlaxoSmithKline and Sanofi helped to devise the Challenges and will act as 'sponsors' by providing in-kind support throughout the process, in return for gaining early access to these novel technological approaches as well as the opportunity to inform their development.

### **Dr Vicky Robinson CBE, Chief Executive at the NC3Rs, said:**

“These three Challenges are the most recent in a much wider programme to deliver measurable 3Rs impacts, new marketable products and more efficient business processes. Over the last four years CRACK IT has evolved and expanded to become an essential part of the NC3Rs portfolio. Since its conception, there have been 19 Challenges, with 17 sponsoring organisations from the UK, Europe and the USA. The first products emerging from the competition are now ready for the market.”

The NC3Rs CRACK IT Challenge competition is run with Innovate UK, as part of the Small Business Research Initiative.

**ENDS**



## Contact the NC3Rs media office:

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## Notes for Editors:

### Details of the three CRACK IT Challenges

#### Targeting Off-Targets:

The effects of many chemicals on the body – including those used widely in the consumer product industry – are less well understood than for pharmaceutical molecules, as they are not necessarily designed to interact with human biological systems. Historically, ‘off target’, or unwanted, effects of these chemicals have been detected in animal toxicology studies with often little understanding of the molecular pathways involved. The Challenge will bring together computational and lab-based scientists to build a comprehensive screening tool. This tool will improve the identification of the events caused by chemicals of interest that initiate the activation or deactivation of the molecular pathways that are known to result in adverse effects. In industry sectors where animal studies are still required, the prediction of off-target toxicity of these substances prior to testing them on animals will better inform the dosing levels and regimen used for the mandatory *in vivo* regulatory toxicology studies. This will enable early elimination of candidate molecules, and so reduce both the numbers of unnecessary studies and animals used.

- Dr Jonathan Mullins, Moleculomics Ltd
- Dr Jean Sathish, University of Liverpool
- Dr James Sidaway, Phenotox

#### Neuratect:

Before approval for use, chemicals and pharmaceuticals must be tested to predict the likelihood that they will cause toxicity to the nervous system. Owing to the complexity of the human central nervous system, predicting neurotoxicity can be difficult. At present animal research is often used to determine neurotoxic effects, but research indicates that a human tissue approach carried out *in vitro* might more closely model neurotoxicity in humans. Rapid progress in the use of human induced pluripotent stem cells and innovation in technologies that allow scientists to grow 3D cell cultures provide the opportunity to develop human-relevant *in vitro* approaches to screening for neurotoxicity and seizure likelihood. Not only could these approaches be more predictive of the human response, they could also replace a significant number of animals currently used in this research area.

- Dr Angela Bithell, University of Reading
- Dr Paolo Cesare, Natural and Medical Sciences Institute at the University of Tübingen
- Dr Jos Joore, MIMETAS BV
- Professor Andrew Randall, University of Bristol
- Dr Alexandra Voss, NeuroProof GmbH

#### QSARs\* Mix:

As a part of the toxicological information required by the regulators, the skin or eye irritation potential needs to be determined for all chemical substances being manufactured. Improving the predictive ability of the computational models for gathering this information would bolster the scientific merit of these *in*



*in silico* approaches and progress them towards direct use in regulatory studies, where in future they could replace animal testing. Currently available *in silico* tools can predict the skin and eye irritation of a novel chemical using its structure, by comparing the new chemical to a large number of known chemical structures and drawing inferences about its biological effects. However, their applicability is mostly limited to screening purposes and they cannot be used reliably when multiple chemical substances are present in mixtures. The Challenge is to develop a more predictive and relevant tool to quantitatively predict the skin and eye irritation of chemical mixtures, without the use of animals. The approach should be reliable and accurate, quicker to carry out and therefore should reduce time-to-market.

\*QSARs = Quantitative Structural Activity Relationships; these are relationships made using computer models between chemical structures and biological activity

- Dr Paul Thomas, KREATiS and Dr Peter Jenkinson, CEHTRA

#### **About the NC3Rs:**

The National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) leads the discovery and application of new technologies and approaches to minimise the use of animals and improve animal welfare (the 3Rs). It funds research, supports training and development, and stimulates changes in regulations and practice. Primarily funded by Government, the NC3Rs is also supported by the charitable and private sectors. It works with scientists in universities and industry in the UK and internationally.

Further information can be found at: [www.nc3rs.org.uk](http://www.nc3rs.org.uk).

#### **About CRACK IT Challenges:**

CRACK IT Challenges is a collaborative funding competition from the NC3Rs designed to address scientific or business needs with a 3Rs theme by connecting industrial, academic and small and medium-sized enterprise (SME) sectors. The focus is on developing marketable products or processes. Challenges are posed by sponsors and are put to the scientific community for solving. Funding is provided by the NC3Rs with sponsors committing co-funding and /or in-kind contributions such as access to compounds and equipment. Awards take the form of milestone-driven contracts rather than grants. [www.crackit.org.uk](http://www.crackit.org.uk)

#### **About the Innovate UK:**

Innovate UK is the new name for the Technology Strategy Board – the UK's innovation agency. Taking a new idea to market is a challenge. Innovate UK funds, supports and connects innovative businesses through a unique mix of people and programmes to accelerate sustainable economic growth. For further information visit [www.innovateuk.org](http://www.innovateuk.org)

#### **About the SBRI:**

The Small Business Research Initiative (SBRI) is a well-established process to connect public sector challenges with innovative ideas from industry, supporting companies to generate economic growth and enabling improvement in achieving government objectives. For further information visit <https://sbri.innovateuk.org/>