



Bulletin



The scientific case for non-animal research

welcome

This is the second issue of Animal Aid's newsletter designed to help parliamentarians across Europe better appreciate the enormous potential of biomedical research that is conducted without the use of animals.

The long and complex passage of the Directive (the successor to 86/609) that will govern animal research across the EU has been marked by intense lobbying from industry and academic interests. Their message to Europe's law-makers has been: *if you provide additional protection for animals in labs, progress in the field of biomedical research will suffer.* The truth is different. The field of non-animal research technologies is booming, dynamic and highly creative. This is particularly true in relation to safety testing and drug development. This newsletter offers a glimpse at current developments. By comparison, animal systems are slow, expensive and unreliable. I welcome your comments.

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■ Breakthrough in epilepsy treatment

Scientists at Newcastle University have for the first time been able to record spontaneous epileptic activity in brain tissue that has been removed from patients undergoing neurosurgery. This has opened the door to new treatments for the disease. The findings were published in the Proceedings of the National Academy of

Sciences. Project leader Dr Mark Cunningham said: 'Until now we have only been able to mimic epilepsy using experimental animal models but this can never give you a true picture of what is actually going on inside the human brain in epilepsy.'

Reported in *Science Daily*, December 1 2009.

■ Human stomach machine developed

Researchers at the Institute of Food Research in Norwich have developed a machine that functions as an accurate working model of a human stomach. The Dynamic Gastric Model took scientists 15 years to produce and was originally conceived as a tool to study

how food is processed. It can show how drug formulations work when they are taken into the stomach – and, in so doing, replace animal tests.

Various sources including BBC News, December 30 2009.

■ Cell culture advance for Hepatitis C treatment

Scientists at the Howard Hughes Medical Institute, Rockefeller University, have found a new method for growing human liver cells outside the body. They hope that the new cell culture system will enable them to study Hepatitis C virus and boost efforts to develop effective vaccines and treatment for the resulting infection. It is acknowledged that work on Hepatitis C vaccine design has been

undermined, until now, by the lack of an effective animal model or culture system. Scientists involved in the project report that the new system is one of the first to allow the study of the life cycle of Hepatitis C virus – a major public health threat in many parts of the world – over a period of days or weeks.

Proceedings of the National Academy of Sciences, January 25 2010

■ Human tissue breakthrough for cancer development

A non-animal breakthrough by University of Oxford 'spin-off' company Zyoxel involves using bioreactor technology to grow human tissues.

According to Zyoxel CEO Tim Hart, the new technique is superior to traditional animal tests and offers the possibility of greater test accuracy – as well as cutting drug development time and potentially slashing costs by 10%. Hart estimates that failure to detect toxicity early in drug development costs the industry about £8 billion each year – waste that the new technology could cut out. Co-inventor Professor Zhanfeng Cui is equally enthusiastic, stating that 'recent research has shown our technology can be used to culture more realistic cancer tissue for testing, offering a powerful new tool for cancer drug discovery programmes'. Already, interest in the development has been widespread. A Chinese company, keen to exploit the technology, has invested £1 million in the project.

Tim Hart is also convinced that the new method of growing human tissues has important implications for animal testing, stating that: 'I believe the Zyoxel technology also has the potential to reduce the amount of animal testing worldwide by around 10 per cent per year.'

Reported in Oxford Times, July 10 2009.

■ Toxichip development in toxicity testing

Scientists at the Tyndall National Institute in Cork have developed a cell-based system that they say could replace animals in toxicity testing. Toxichip acts as a sensing system that monitors in real time the effects of substances on human and animal cells in culture.

Currently, safety (toxicity) testing uses rodents, dogs and monkeys to screen out candidates in early trials for chemicals and pharmaceutical products. Toxichip would examine the overall toxic effect

not only of individual chemicals but also of combinations. It is particularly relevant in areas such as environmental protection and drug development and design. The development of Toxichip came about with European Commission funding through the Sixth Framework Programme and the work was presented during Nanoweek in Ireland, organised by the Nanoscience Network.

For more details, see the Tyndall National Institute website at: www.tyndall.ie

■ Stem cell innovation for drug trials

A research team at the Gladstone Institutes, University of California, San Francisco is working on a stem cell technique that could soon revolutionise the way new medicines are developed. 'We can actually make heart cells right in a dish that [are] genetically identical to a person, then we can give drugs to those cells and have the heart speed up or slow down and so we're doing clinical trials in a dish right now,' Senior Investigator Dr. Bruce Conklin explained. He added that 'to be able to work directly on human tissue, directly on human heart tissue, directly on human neuronal tissue is a fantastic leap forward.' Conklin's team uses induced pluripotent stem cells (i.e. those which can give rise to any cell type) cultured from the skin of patients. These are then grown into specific human tissue for testing.



Press release from J. David Gladstone Institutes, reported on ab7news.com in San Francisco, November 19 2009.