Artificial liver cells win their creator prize for their potential to reduce animal experiments

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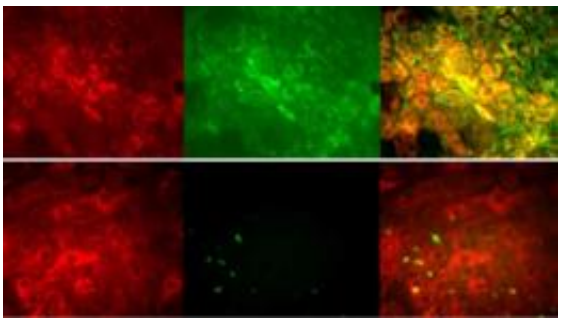

Top images diseased liver cells, bottom images healthy liver cells. Credit: Tamir-Rashid

Cambridge research that created liver cells from stem cells has today been recognised with a national prize by the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs).

Producing liver cells that demonstrate inherited liver diseases from human skin cells has earned Dr. Ludovic Vallier from the University of Cambridge a major prize from the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs). These cells, known as human induced pluripotent stem cells (hIPSCs), have already attracted attention for the possibilities they offer to regenerate

damaged tissues and organs. But it is their potential to reduce the number of animals used for screening potential drug treatments that led to Dr. Vallier receiving the Centre's 3Rs prize for 2011.

The prize, sponsored by GlaxoSmithKline, of a £2,000 personal award and a £18,000 research grant, is for the scientific paper published in the last three years that contributes most to the advancement of the 3Rs (Replacement, Reduction and Refinement). Dr Vallier's winning paper was published in *The Journal of Clinical Investigation* in 2010. He received his prize from Professor Paul Matthews OBE of GlaxoSmithKline at the NC3Rs Annual Science Review Meeting in London on 28 February.

Human liver cells (hepatocytes) cannot be grown in the laboratory and differences between rodents and humans mean that it is rarely possible to recreate the human disease completely in mice or rats or to use cultures of rat or mouse liver cells. Dr Vallier's team took skin cells (dermal fibroblasts) from seven patients with a variety of inherited liver diseases and three healthy individuals (the controls). They then reprogrammed cells from the skin samples back into stem cells. These stem cells were then used to generate liver cells which mimicked a broad range of liver diseases – and to create 'healthy' liver cells from the control group.

These hIPSC-generated liver cells can provide in vitro models for basic research and drug discovery. Their use has already reduced the use of animals needed for the production of liver cells in the laboratories that have adopted this technology. The cells could also transform the investigation of chemical/drug-induced liver injury, a major concern for the chemical and pharmaceutical industries, by reducing dependence on animal testing.

Sharmila Nebhrajani, chief executive of the Association of Medical

Research Charities (AMRC) said: "Charities invest over £1bn in health research each year, money raised by patients, their families and carers to understand the causes of disease and search for possible cures. Using 3Rs techniques, these prize winning researchers are bringing real hope to people with liver disease. What's more – they are developing new methods for medical research which should benefit patients with all kinds of conditions."

On presenting Dr. Vallier with his prize, Professor Paul Matthews, Vice-President for Imaging at GlaxoSmithKline, commented: "Ludovic Vallier's innovative study describes the development and validation of a method to produce cells similar to those in a human liver. Such cells could replace animals for some types of early drug testing and could also help us to predict adverse clinical reactions. Using these cells for drug testing could be transformative. Ludovic and his colleagues have well illustrated how addressing the 3Rs converges with improving the quality of science!"

Provided by University of Cambridge