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Stem cell bank for drug testing may cut animal experiments

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Plans to build a bank of stem cells that can be used to test the safety of new medicines were announced yesterday by a government-backed consortium of scientists and drug companies.

The initiative, Stem Cells for Safer Medicine, will invest more than £1m in projects aimed at turning human embryonic stem cells into liver tissue. This could then be used early during drug development to weed out harmful compounds. The research could also help reduce the number of animals used to test drugs.

It takes more than a decade to research, develop and trial a new drug before it is made available to patients. Many drugs do not make it through this process because at some stage they are found to be harmful - the single biggest reason for the failure of a drug during development is that it proves toxic to the human liver.

"The liver is a key organ for toxicity because it's the dustbin of the body, it's where all of the compounds we put into our mouths are [processed]," said Ian Cotgreave, a toxicologist at the Karolinska Institute in Sweden who also works at AstraZeneca. "In doing that, it is also the place where a lot of this stuff accumulates and starts to cause problems."

Current regulations require that all experimental drugs go through animal studies before they are tested in humans. But predicting the effects of a chemical compound on humans using results from rats or monkeys can be difficult. "It's a problem area where things can be totally silent pre-clinically in an animal and then, as soon as you go into a patient, you get a reaction," said Professor Cotgreave.

Research on AstraZeneca's anticoagulant drug Extanta, touted as a replacement for warfarin, was stopped after years of development because scientists became concerned that it could damage the livers of those taking it on clinical trials. At that stage the drug had successfully passed animal tests - a test on human liver cells in the laboratory might have flagged up the potential dangers at a much earlier stage.

In addition to improving drug development, lab-based tissue cultures could have an impact on the use of animals in research. Routinely using liver cells to test new compounds means that fewer go on to be subsequently tested on animals. "It will be a complementary tool that sharpens up what is put through the regulatory package," said Prof Cotgreave.

To begin with the project will focus on generic embryonic stem cells that are representative of the population at large. But eventually its goal includes banking stem cells with genetic differences that predispose people to particular conditions, to test whether certain drugs behave differently in those genetic profiles.

Partners in the consortium include the Medical Research Council, the Department for Universities, Innovation and Skills, and the drug companies AstraZeneca and Glaxo SmithKline.