Cloning of pigs bring xenotransplants closer

Roger Dobson *Abergavenny*

Five piglets have been cloned from an adult female in a significant milestone on the road to successful organ transplants from pigs to humans. The cloning paves the way for the next step towards pig derived xenotransplants—the production of modified or so-called knock-out pigs, whereby a specific gene linked to hyperacute rejection in humans has been inactivated.

PPL Therapeutics, which cloned the piglets, predict that the market for solid organs alone could be worth \$6bn (£3.75bn), with as much again from cellular therapies like transplantable cells for insulin production in diabetic patients.

The next step for PPL, which carried out its pig cloning work at Blacksburg, Virginia, is to repeat the experiment but this time producing knock-out pigs. The gene to be inactivated is for α -1,3 galactosyltransferase, which is responsible for adding to pig cells a sugar group recognised by the human immune system as foreign, triggering an immune response leading to rejection

in humans of the transplanted organ.

"PPL has built up the technical expertise to be the first to produce the type of pig which should become the industry standard for xenotransplantation—a pig lacking the α -1,3 galactosyltransferase gene, said Alan Colman, PPL's research director.

The company said it has also made considerable progress in other areas of its xenograft programme and that potential solutions for all four known causes of rejection have been devised and shown to work in cell based experiments

In addition to the gene knock-out technology designed to prevent hyperacute rejection, three more genes will need to be introduced into pigs or pig cells to control the causes of delayed xenograft rejection.

About 180 000 people around the world are estimated to be currently waiting for an organ transplant, but fewer than 1 in 3 will receive a transplant because of the ever widening gap between supply and demand. Many see organs

A New York state wildlife pathologist examines a dead crow for traces of the West Nile encephalitis virus. Public health doctors are worried that the virus, which killed seven people in New York City last year, will re-appear there this summer. A dead, red tailed hawk, discovered in Bronxville, a suburb of the city, was last week found to be carrying the virus, which is spread by mosquitoes from birds to humans.

AP PHOTO/DAVID JENNINGS

derived from pigs as a solution to the problem.

Imutran, based in Cambridge, United Kingdom, which has also been working on overcoming hyperactive rejection (but by breeding transgenic pigs), described the PPL result as interesting. "It is potentially a useful technology to develop new lines of pigs for xenotransplantation. However, the next step is to see if the technology can be applied to developing

genetically modified animals whose organs can be transplanted into humans without being rejected," said a spokesman.

Mark Walport, professor of medicine at Imperial College, London, said, "The ability to clone pigs is a significant advance, but it is only one of a number of steps that need to be taken. We are still a long way from successful xenotransplants because there are so many potential barriers." □

Canada turns to France for staff to treat cancer patients

David Spurgeon *Quebec*

Five radiation technicians from Paris will arrive in Quebec in April to help to reduce the number of Canadian patients with cancer who have had to be sent to the United States for treatment. The technicians will spend six months to a year treating patients in Montreal, Quebec, and Chicoutimi.

Several radiation oncologists have also been recruited by the province and a new cancer treatment centre at Trois-Rivières will begin taking patients shortly. The Quebec health ministry has so far spent \$C6.5m (£2.8m; \$4.5m) sending patients to the United States for treatment because of a shortage in Quebec of medical

staff and a surge of cancer patients in an ageing population (*BMJ* 1999;318:1507).

But the Canadian Association of Medical Radiation Technologists says that despite these remedial efforts, 195 more technologists will be needed in Canada this year alone.

Since last April, 1233 Canadians, mostly with breast and prostate cancer, have travelled to the United States for treatment, some staying in hotels for six weeks at a time.

Quebec's budget, announced last week, provides an additional \$C2.7bn to be spent on health care and social services, thanks to strong economic growth and a balanced budget. □

Dutch insurers flouting law on genetic disease, researchers say

Tony Sheldon *Utrecht*

A study in the Netherlands claims to have uncovered evidence that insurance companies are circumventing a Dutch law that bans discrimination against people on the basis of information obtained from genetic screening.

Researchers asked a sample of 202 people with and without familial hypercholesterolaemia whether they had had problems getting life insurance. Seventeen of the 46 (37%) who had applied for life insurance had had difficulties, and all of them had familial hypercholesterolaemia,

according to the study published in the journal of the Royal Dutch Medical Association (*Medisch Contact* 2000;10:360).

The researchers, from Amsterdam's Academic Medical Centre, emphasised that the genetic information about the disease, which insurers should not have known, seemed to have been the "important factor" in the participants' difficulties, not their cholesterol concentrations.

After the study was published, members of parliament argued that these difficulties were just the "tip of the iceberg" and demanded an evaluation of the law on medical examinations.

The Association of Insurers denied breaking the law and argued that people applying for insurance are asked whether they have high cholesterol concentrations and "not explicitly" if they have a hereditary condition. □