Fertile union

Scientists and politicians are working together to bring new reproductive techniques to Britain.

Too often, scientists and policy-makers talk past one another and 'science-based' policy-making is anything but. But sometimes, they get it right, and when they do, they deserve praise.

One such case is last week's announcement that Britain intends to develop *in vitro* fertilization (IVF) techniques that could cut the number of children born with devastating genetic conditions such as muscular dystrophy. Not only are scientists, lawmakers and ethicists speaking the same language, they are also synchronizing their efforts to make Britain the first country to test the techniques in humans, taking it light years ahead of other nations (see page 419).

Uniquely among IVF procedures, the new techniques involve embryos that combine genetic material from three people. The prospect of a child with three genetic parents has inevitably raised concern among some commentators, and among politicians worried about what those commentators will say.

The diseases targeted by these techniques are passed to children by mothers through faulty mitochondria in their eggs. The techniques therefore remove the genetic material from the nucleus of the faulty egg and insert it into a healthy egg that has been stripped of its own nucleus. This is where the third 'parent' comes in: a different woman must supply the healthy egg. A child born from IVF using one of the modified eggs will therefore carry the genes of three people: nuclear DNA from both parents and mitochondrial DNA from the donor.

Concerns over the science, safety and ethics of the procedures prompted the British government to ban them in 2008, in an amendment to the Human Fertilisation and Embryology Act, which governs fertility treatments and research. But the law also anticipated scientific advances in these technologies and set out a streamlined mechanism to legalize the procedures if a future government saw fit. Since then, one of the techniques has been used to produce two healthy rhesus monkeys and the other has been tested successfully in defective human eggs fertilized *in vitro*.

Britain has now decided that the time is right to revisit its legislative ban. A scientific review released in April 2011 by the Human Fertilisation and Embryology Authority (HFEA) — the agency that would regulate the procedures — found no scientific evidence that the techniques are unsafe, but did recommend additional studies that would be needed before clinical trials could begin. Many of those studies are now under way or soon will be. The Wellcome Trust, Britain's biggest biomedical charity, announced last week that it would pay for some of them.

Legislators and regulators are not standing idle while the scientists work away. Simultaneously, and in anticipation of positive scientific findings, the HFEA announced a public consultation on the techniques. The consultation is the first step towards legalizing clinical trials. Under the 2008 change to the fertility act, the government can write an amendment to legalize the procedures that would require only brief discussion before being voted on by Parliament.

"Elected officials do seem to be giving the issue a fair and informed hearing."

Any number of issues could yet derail the trials. Additional research could raise safety problems or find the process too inefficient. The public, perhaps swayed by 'three-parent baby' headlines, could resist. And the Nuffield Council on Bioethics in London, which has just started an independent review of the techniques, could identify more ethics qualms. Allowing changes to the mitochondria of an embryo, for instance, could increase the chances that changes to nuclear DNA will be allowed in order to treat other conditions, such as cystic fibrosis. In exploring that path, we eventually come to designer babies, with non-medical tinkering to develop certain traits.

Critics may say that the UK government could have addressed these issues more quickly by legalizing the procedures and then leaving regulators to decide when the science was sufficient. But elected officials do seem to be giving the issue a fair and informed hearing, and are placing science at its centre.

The situation is very different in other countries. A government review of embryo research in Australia last year recommended against changing the law to legalize clinical use of the procedures. And in the United States, regulators consider the techniques to be a form of gene therapy, controlled by the Food and Drug Administration, which seems in no hurry to consider their clinical use.

About one in 200 women passes a mitochondrial disease on to her children. In Britain, those children have a chance of a better future because scientists and politicians, for once, are seeing eye to eye. ■

Notes on screen

Computer tablets are changing the way that scientists record their experiments.

In its introductory handbook for physics students, the Cavendish Laboratory at the University of Cambridge, UK, says that lab notes "need not be particularly tidy, but they should be understandable by the writer or somebody else at a later date". Written in 2008, the guidance adds: "Your notebook must be A4 in size and hard-bound. A suitable book can be bought from the laboratory technician."

So far, no doubt, so familiar — but technology is marching on, and commuters are starting to abandon dog-eared paperbacks for e-books. For how much longer will the lab book prevail in its current form? And how many more notebooks will the Cavendish technicians sell?

Reports of the death of the standard lab book — in use for hundreds of years — are, of course, as premature as they are exaggerated. And *Nature* has been here before — in a feature in 2005, we reported that electronic notebooks were poised to become increasingly popular among researchers (see *Nature* **436,** 20–21; 2005). The News Feature on page 430 of this issue, which takes a look at the rise of the digital lab, shows that we were right.

"Paper has nothing to offer me," says Michelle James, an Alzheimer's disease researcher at Stanford University in California who is profiled in the feature, and who has moved her scientific notes to her iPad. James is far from alone — a generation of bench scientists is ditching paper and taking advantage of computer tablets and software that allow people to share protocols and swap notes. (If it cheers the old guard, who even now are vowing never to abandon their trusty notebooks and pencils, the digital-savvy researchers must place their fancy kit in plastic bags to protect it from spills.)

There is more to this than the migration of content from print to web. Just as newspapers have been able to exploit the Internet to reach readers and build communities in ways that they could not have imagined when they first started placing their copy online, so powerful processors and the digitization of data could let researchers analyse their results much earlier in the scientific process than is common now.

Such an approach is not completely new, but digitization makes it easier. The Cavendish introductory notes say: "Ideally you should plot graphs as you go along, not after completing the experiment, though in practice this is not always possible." It is now. ■

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