nature

www.nature.com/nature

Vol 442 | Issue no. 7103 | 10 August 2006

Safeguards for donors

Clashing perspectives on the ethics of the donation of human eggs for research purposes are likely to complicate international collaboration — whether stem-cell researchers like it or not.

What price a human egg? The question provokes a variety of emotions and responses. Some will argue that an egg has no monetary value when it is just one of those ovulated each month by billions of women and that perishes unfertilized. Others might contend that the same egg is priceless — because it could, if introduced to the correct sperm, form the seed of a new person. Others still will find it morally problematic even to pose the question, on the grounds that it treats human cells as merchandise.

But the question is being asked, nonetheless — indeed, it is at the forefront of a vigorous debate about whether and how much to pay women for donating their eggs for research (see page 606). Some biologists are keen to use fresh human eggs for the production of human embryonic stem cells. Yet they are anxious to distance themselves from the path taken by disgraced South Korean researcher Woo Suk Hwang, who lied about paying women for eggs and tainted the whole idea of oocyte donation.

In a Commentary in this week's issue, Insoo Hyun of Case Western Reserve University in Cleveland, Ohio, who chairs a task force exploring the issue at the International Society for Stem Cell Research, argues that women who donate eggs should be financially compensated for their time, discomfort and trouble (see page 629). Hyun argues that institutional review boards and other oversight bodies can select a level of remuneration that is enough to ensure that donors are compensated for their trouble, but not enough to blind them to the risks involved.

That will be an exquisitely fine line to draw. A sum that will be merely compensation for one woman could be enticement for another, poorer one. And in the real world, where questions over clinical research, informed consent and conflicts of interest have lately enjoyed a high profile, confidence in the ability of these review boards to ensure adequate oversight will not be universally shared.

The situation is further complicated by the health risks that may be posed by ovarian stimulation (see page 607). There are hints, but no definitive evidence, that the drugs used to stimulate the ovaries for both *in vitro* fertilization (IVF) and egg donation increase the long-term risks of cancer. How, then, can a fair level of compensation be set for risks that are essentially unknown?

One possible way forward lies in a practice called egg-sharing, in which women who are already considering or undergoing IVF are asked to contribute surplus eggs to research in return for treatment at reduced cost. The North East England Stem Cell Institute in Newcastle Upon Tyne, UK, will soon start offering this scheme. Proponents point out that, by working with donors who are using ovulation-stimulating drugs anyway, this avoids exposing otherwise healthy women to any risks associated with them. The idea does not, however, impress those who object on ethical grounds to any financial inducements to donors.

"How can a fair level of compensation be set for risks that are virtually unknown?"

The International Society for Stem Cell Research is currently drafting guidelines on this issue. But they won't overrule local laws and regulations, the uneven application of which looks set to slow down stem-cell research. Researchers in nations that prohibit payment for eggs, for example, may find themselves unable to work on stem cells derived from eggs secured by collaborators elsewhere from paid donors.

In April 2005, the US National Academies issued guidelines stating that women who donate eggs for research should receive only direct expenses, such as travel to the clinic. If stem-cell researchers are to suggest that payments should be more extensive, they will have to make a more convincing case that adequate safeguards will be in place to protect donors' rights. ■

Capturing carbon

Sequestration of greenhouse gases could play an important role in capping emissions.

Fresh approaches to energy use and production are vital if serious climate change is to be averted and developing countries are to attain the standards of living to which they aspire. However, the rich nations spend a deplorably low proportion of their research funds on energy — far less, in real terms, than they were spending 25 years ago.

The case for greater emphasis on energy research is overwhelming, and was made again last week by Martin Rees, president of Britain's Royal Society (see *Science* 313, 591; 2006). But sometimes research can get in the way of deployment. Scientists can always find further interesting questions, and research can become an end in itself. In some fields, there is a need, instead, for action. Energy conservation is the most obvious case. Carbon capture and storage — which offers the possibility of using fossil fuels without releasing carbon dioxide into the atmosphere (see page 620) — is another.

Bringing carbon sequestration onto a faster track requires more than scattered demonstration projects and a vague hope that prudent industries might voluntarily adopt it at some point in the future. The International Energy Agency predicts that 1,400 gigawatts of new, coal-fired generating capacity will be commissioned worldwide in the next 25 years. The United States has proposals for 153 coal-fired plants under consideration, few of which are likely to be designed with carbon capture in mind. And every year, China builds coal-powered plants capable of generating a stunning 75 gigawatts

— an energy project on a scale unprecedented in human history. To ensure that carbon dioxide from at least some of these plants is stored away in geologically suitable repositories requires more than research; it needs political will.

Evidence of such political will would include regulations or fiscal incentives to design plants so that carbon-capture equipment can be retrofitted to them with relative ease. And those who build plants must be convinced that, at some time in the future, any carbon dioxide they emit will be a cost to their businesses.

Carbon capture and storage is no panacea. It substantially decreases the efficiency of all existing plant types. It also requires an enormous infrastructure — putting carbon dioxide back down into the ground requires pipes and pumping comparable to that needed to bring oil and gas up out of it. Some reservoirs may turn out to be flawed, leaking carbon back over decades or centuries. Even under the most optimistic assumptions, less than half of human-produced carbon dioxide emissions could possibly be captured and stored.

Even so, carbon sequestration is the only credible option that would allow the continued use of fossil energy without the threat of dangerously altering Earth's climate system. Speeding up its deployment must therefore become a priority on the global energy agenda.

Parallel development of several different approaches to carbon sequestration will be needed. The more hands-on experience that's gained with carbon capture from different plant types, and with carbon storage in different kinds of underground reservoir, the easier it will be to convince governments and industry to begin carbon sequestration on a commercial scale.

But political negotiations, regulatory frameworks and further research and development need not await the results of existing pilots. The G8 nations, together with China, India, Mexico, Brazil and South Africa, should tell their energy industries in no uncertain terms that carbon production will cost them, and that sequestration is a partial solution available in the short term. In some situations, subsidies and other incentives may be justified.

"Carbon sequestration is the only option that would allow the use of fossil energy without the threat of dangerously altering Earth's climate system."

As the largest and fastest-growing emitters, respectively, the United States and China need to take the lead on this. Not all the approaches to carbon capture will work out, and some money will doubtless be wasted. But the risks are small compared with the potential benefits of making some significant inroads into carbon dioxide emissions. ■

Toronto crossroads

The international AIDS meeting still has a purpose.

It has become fashionable over the years to knock the International AIDS Conference, which opens this weekend in Toronto. The usual critique is that the meeting is too messy, too noisy and lacking in compelling, new science. But these complaints miss the point of a unique biennial gathering that brings scientists, activists and drug-company and government officials into close and often contentious contact.

Laurie Garrett, a former journalist and a fellow at the Council on Foreign Relations in New York, has summed up the case for the prosecution. "What began in 1985 as an annual gathering of scientists, aimed at sharing laboratory findings and information from the battlefronts in the war on HIV, has been transformed into a meeting of 17,000 consultants, bureaucrats and activists fighting one another for money to build a huge global AIDS treatment program, employing tens of thousands of people," she wrote in *The New York Times* during the last meeting, in Thailand in 2004.

It is certainly true that the AIDS meetings have changed over the years, and that would-be participants must, from time to time, question the value of their attendance.

But it is vitally important that science continues to be represented in this forum. The need for science to inform and lead the fight against global AIDS has never been greater. This goes far beyond the laboratory research required to overcome the obstacles that have stymied the search for an AIDS vaccine. It extends to the need to help steer the allocation of resources in fighting the AIDS epidemic, which took some 2.8 million lives last year.

To give one example, policy-makers and scientists were worried a few years ago that the availability of drug treatments in sub-Saharan Africa would lead to a rise in drug resistance and increases in risky behaviours. Some even used this fear as a reason for dragging their feet over the delivery of the drugs to people in poor countries.

But as we report on page 617 of this issue, scientists working on treatment roll-out programmes have found that patients in Africa adhere to their regimens just as well as those elsewhere. The main impediment to effective drug treatment in sub-Saharan Africa is not drug resistance, it turns out, but rather interruptions to drug supplies caused by logistical and financial issues that governments and donor agencies need to address.

At the Toronto meeting, researchers will also present studies on other important questions, such as the effectiveness of abstinence education and of condom promotion in AIDS-prevention programmes. They will discuss the challenges of starting clinical trials to test whether drugs can protect exposed people from contracting HIV — an approach strongly opposed by some activists — and consider the difficulties in monitoring treatment effectiveness and drug resistance in poor countries.

Discussions such as these can have a much greater impact on policy if they occur at a forum such as the Toronto meeting, in front of audiences that contain activists and government officials, as well as researchers. As scientists in this field are well aware, it is almost impossible to fully disentangle activism and politics from science in AIDS. That is why the scientists' presence at the AIDS meeting is so important.

The biennial ritual of activists heckling drug-company officials or tearing down their stands may seem trite, the political speeches tiresome, and the appearances by Hollywood figures and other celebrities frivolous. But that's the world we live in. Full participation in the AIDS meeting will, as it has in the past, serve to invigorate researchers and ensure the continued relevance of their work. ■