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Dolly's legacy

Ten years on, mammalian cloning is moving forward with central societal issues remaining unresolved. Yet human reproductive cloning seems inevitable.

Ten years ago, given a week's notice by *Nature*'s usual embargoed press release, journalists were gearing up for what many of them recognized as the hottest science story for years. The press release announced the cloning of sheep from adult cells. A journalist on a British Sunday newspaper, *The Observer*, picked up the same story from a film production company and ran with it ahead of the embargo date. Furious editors and writers on other newspapers scrambled to catch up. "It is the prospect of cloning people, creating armies of dictators, that will attract most attention," said *The Observer*. And so it proved. Within days the president of the United States, the head of the European Commission, the Vatican and many others were calling for a review of the regulations on cloning research, if not an outright ban.

The world was simply not prepared for the debate. The cloning a year previously of sheep from embryonic cells had led Davor Solter, in an accompanying News & Views article in *Nature*, to warn that "it might be a good idea to start thinking about how we might use" the ability to clone from adult cells. But others were dismissive of the prospect, or predicted it to be many years away.

The researchers who cloned Dolly had kept their research under wraps. But learning from their media experiences with embryonic cloning, they had hired a public-relations company and collaborated on a television documentary to be broadcast after publication. Their approach misfired, but their intentions still serve as a model for others: researchers and their institutions have a responsibility to provide their perspective of the context and implications for a broad audience when announcing startling results, both to the media and through their own websites. Journals, including this one, can no doubt do more to help them convey that context.

What of the subsequent research? As we describe on page 800, much of it has focused on the transfer of nuclei of somatic cells in the context of stem cells. The agricultural implications of Dolly received relatively little public attention at the time, but it is here that reproductive cloning has proceeded apace, with a dozen mammalian species cloned. One measure of that progress is the risk assessment, currently open for public consultation, by the US Food and Drug Administration (FDA; see www.fda.gov/cvm/CloneRiskAssessment.htm).

Although generally upbeat about safety, the FDA report highlights one critical lack of progress: the efficiency of mammalian cloning is still low. The agenda for fundamental biology is clearly highlighted. One area of study, for example, is epigenetics: which chemical markers attached to the DNA are altered? And what exactly happens in chromatin structure, compared with conventional reproduction? We can look forward to progress in these areas. Meanwhile, although US consumers are uneasy about animal cloning, it seems unlikely that they will oppose its application, let alone its products.

In contrast, what has been universally deemed as unacceptable is the pursuit of human reproductive cloning — or the production of what some have called a delayed identical twin. Here, the two issues that have dominated the discussion have been dignity and safety. There is a consensus that dignity is not undermined if a human offspring is valued in its own right and not merely as a means to an end. But there is no consensus that we will eventually know enough about cloning for the risks of creating human clones to be so small as to be ethically acceptable.

The debate may seem to have been pre-empted by prompt prohibition. But as the science of epigenetics and of development inevitably progresses, those for whom cloning is the only means to bypass sterility or genetic disease, say, will increasingly demand its use. Unless there is some unknown fundamental biological obstacle, and given wholly positive ethical motivations, human reproductive cloning is an eventual certainty. ■

Rise to the challenge

The European Research Council, launched next week, is a stimulus for weak universities.

Outside Europe it may be hard to imagine the scale of the triumph involved in the creation of a Europe-wide agency for competitive basic research, along the lines of the US National Science Foundation. After what seems like another hundred-years' war, a solution to member countries' concerns — that they must pay into a pot that then funds researchers elsewhere — has finally been found in the form of the European Research Council (ERC). It launches to great fanfare in Berlin next week. Importantly, it is committed to funding the best science, free of regional and political agendas.

The first call for grant applications will be restricted to young investigators, with a second call, for advanced investigators, to be announced later in the year. But too few European universities are ready to host the recipients.

The grants, which can run for up to five years, will be big: between €100,000 (US$130,000) and €400,000 per year, and deliberately designed to be prestigious. With a budget of only €300 million this year, competition will be particularly stiff (although annual funds will rise to €1.5 billion by 2013). The two-tier application procedure will be handled by twenty panels of experts, five in social sciences, eight in physical sciences and seven in life sciences. With the advice of specialist referees that they themselves select, the panels will judge the applications on the basis of merit, without reference to the nation involved.

But they will also assess the ability of the host institute to offer an