EDITORIAL

nature cell biology

Registries and banks

The European Registry for Human Embryonic Stem Cells (hESCreg) adds an important global resource to the fragmented landscape of stem cell research.

Human embryonic stem (ES) cells were first derived in the US state of Wisconsin in 1998. Yet the current US president imposed a moratorium on the use of federal funds for stem cell lines derived after August 2001, limiting publicly funded research to a dozen lines which are generally deemed to be unsuitable for research. This ruling catalysed an impressive level of advocacy by researchers that ultimately garnered the support of Congress and indeed public opinion (see *Nature Cell Biology* editorial September 2005, doi:10.1038/ncb0905-845a). Despite this, President Bush chose to follow his personal ethical convictions and vetoed legislation to lift restrictions on human ES cell research in 2006 and 2007. As a result, the National Stem Cell Bank (NSCB), based at the WiCell Research Institute in Wisconsin, continues to carry a rather grand title for a repository restricted to the 16 available human ES cell lines (although four more are "coming soon"). The last veto was accompanied by an executive order to change the name of the NIH's Human Embryonic Stem Cell Registry to Human Pluripotent Stem Cell Registry, in an apparent effort to increase the spectrum of cell lines covered by including adult-derived lines. Cell lines eligible for the registry will receive prioritized funding. The political motives for this move are clear, but what is far less clear is how human stem cell lines can be functionally assessed for pluripotency (that is, the ability to form cells of all three embryonic germ layers), given that definitive markers are currently unavailable and the only *in vivo* technique at hand is a crude teratoma assay in mice (see *Nature Reports Stem Cells*, doi:10.1038/stemcells.2007.102).

The purpose of the NIH registry is mainly limited to providing a list of human stem cell lines eligible for US federal funding and to provide contact information on how to acquire them. Meanwhile, on January 18 2008, hESCreg was launched in Berlin. This database, funded by the Sixth EU Framework Research Programme, has more global ambitions than the NIH Registry. According to Joeri Borstlap, joint coordinator of the programme with Anna Veiga, "hESCreg was derived from the demand for a collaborative and interdisciplinary platform where researchers, regulators, as well as the general public can access comprehensive information about all human ES cell lines available". The registry aims to systematically catalogue cell derivation and cultivation methods, gene and protein expression profiles, and available biological function data *in vitro* and *in vivo*, as well as legal documentation. Importantly, the project aims to better describe the characteristics that define human ES cells. Thus, the EU project aims to increase the transparency of human stem cell research and to standardize research in this currently fragmented field by providing links to other repositories, cell banks, regulatory bodies, and, notably, specific research projects. George Daley, president of the International Society for Stem Cell Research (ISSCR), notes that they also aim to establish a registry for information on the provenance of ES cell lines and hopes to coordinate with hESCreg so that these databases are complementary and interlinked.

It is notable that hESCreg is located in Germany, a country with even more draconian restrictions on human ES cell research than the US — any research on ES cell lines derived after January 2002 is considered a criminal offence. Part of the reason for this harsh measure lies in the fact that the German state was never formally separated from the Church; consequently, Catholic and Protestant ethics flavour political debate and, ultimately, decisions. Actually, the Protestant Church has taken a liberal approach and supports the recommendation of science minister Schavan and her political party, the Christian Democratic Union, to reset the cut-off date for human ES cell lines, a move aggressively opposed by the Catholic Church.

The UK Stem Cell Bank (UKSCB), funded by the Medical Research Council (MRC) and Biotechnology and Biological Sciences Research Council (BBSRC), was launched in 2002. Recently, funding to the UKSCB was renewed with a grant of almost £10 million to establish a purpose-built, permanent repository for all human stem cell lines (adult, fetal and embryonic), including clinically compatible samples. A stated goal of the bank is its global reach. Together, UKSCB and hESCreg will do much to bolster Europe's standing in the global stem cell research landscape.

It is lamentable that despite the many well articulated justifications for human ES cell research, some key politicians in the US and Germany still fail to appreciate the fact that blocking human ES cell research effectively prevents the development of more ethically unequivocal and clinically relevant approaches using reprogrammed adult stem cells. A notable advance in this respect is the recently described induced pluripotent stem (iPS) cell, which is indistinguishable from natural pluripotent cells in many respects (gene expression, epigenetic status, *in vitro* pluripotency and teratoma formation). However, the full extent of its relation to *bona fide* ES cells remains to be fully assessed. Nevertheless, currently the nature of human pluripotency is simply not understood and this information can only be obtained from ES cells; all the evidence indicates that the epigenetic mechanisms of mouse and human are too divergent to fall back on the mouse model alone. It is encouraging that an authoritative forum such as hESCreg, which resides right on the doorstep of the Berlin government, has articulated that one of its key missions is to "make this information freely accessible to the research community, governmental bodies, regulators and the public at large in order to further open up the field". Clearly, however, continued advocacy is necessary to convince lawmakers of what Wolfgang Huber, chairman of the advisory council of the Protestant Church of Germany, articulated well in an essay in the *Frankfurter Allgemeine Zeitung*: "in order to facilitate research with adult stem cells and the hope for therapeutic progress, at this time we still need research on embryonic stem cells". A well-attended session dedicated to advocacy at the 2008 meeting of the American Society for Cell Biology (ASCB) focused mainly on human ES cells — the momentum must not be lost as the US president is replaced.

Further reading: http://www.connotea.org/user/ncb/tag/hESCreg