TECHNOLOGY WATCH

Non-destructive development

Ethical issues surround human embryonic stem (ES)-cell research, and one of the most fundamental concerns relates to the fact that ES-cell derivation involves embryo destruction. However, two papers in *Nature* now describe techniques that might circumvent this problem.

In the first paper, Meissner and Jaenisch created mouse fibroblasts that carried a short hairpin RNA construct targeted against *Cdx2*. *Cdx2* encodes the earliest known protein that is involved in the development of the trophectoderm — the cell layer that is essential for the formation of the fetal–maternal interface. They then used nuclear transfer to derive mouse blastocysts from the donor fibroblasts. The cloned mouse blastocysts were morphologically abnormal and were incapable of implanting into the uterus and developing further. However, these blastocysts generated pluripotent ES cells when they were explanted into culture and the effects of the *Cdx2* knockdown were reversed.

In the second paper, Lanza and colleagues carried out single-cell biopsies on mouse embryos and showed that the resulting pre-implantation blastomeres could be used to establish ES cell lines. A similar single-cell biopsy technique is currently used in the pre-implantation diagnosis of genetic defects, and a significant advantage of this approach for ES-cell derivation is that the single-blastomere-biopsied embryos developed to term with no reduction in their developmental potential.

REFERENCES Meissner, A. & Jaenisch, R. Generation of nuclear transfer-derived pluripotent ES cells from cloned *Cdx2*-deficient blastocysts. *Nature* 16 Oct 2005 (doi:10.1038/nature04257) | Chung, Y. *et al.* Embryonic and extraembryonic stem cell lines derived from single mouse blastomeres. *Nature* 16 Oct 2005 (doi:10.1038/nature04277)

Sweet success

The field of functional glycomics concerns the study of glycan structure, function and recognition by carbohydrate-binding proteins (CBPs). However, the current glycan-array technology is limited by the difficulty in producing derivatives of free, reducing glycans with primary amines for conjugation. Now, though, in *Nature Methods*, Cummings and co-workers present a new method that allows the efficient derivatization of glycans for glycomics analyses.

They describe a simple approach that involves the derivatization of glycans using the inexpensive reagent 2,6-diaminopyridine (DAP) to create fluorescently labelled glycans (GDAPs). They were able to convert a broad variety of glycans to GDAPs, as confirmed by high-performance liquid chromatography and mass spectrometry. Importantly, the DAP part of each GDAP contains a primary amine that can be used for further conjugation, and the authors were able to conjugate GDAPs to, for example, biotin, microspheres and glass slides. All of the different types of conjugated glycan were recognized by the relevant CBPs. These results therefore show that GDAPs are a versatile new tool that will allow the visualization, quantification and covalent capture of minute quantities of glycans. These glycans can be studied structurally and functionally, and can also be used to generate glycan arrays from naturally occurring glycans.

REFERENCE Xia, B. *et al*. Versatile fluorescent derivatization of glycans for glycomic analysis. *Nature Methods* **2**, 845–850 (2005)