

Early embryos fuel hopes for shortcut to stem-cell creation

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In an advance that could boost the production of stem cells for medical research, fertility researchers have grown human embryonic stem cells from an embryo that was younger than any used before.

Yury Verlinky and his colleagues at the Reproductive Genetics Institute in Chicago, IL, grew cells from four-day-old human embryos called morulae (see *Reproductive BioMedicine Online* www.rbmonline.com/Article/1558). Previously, stem cells have been grown only from blastocyst-stage embryos, which are a day or two older and have more specialized tissues.

Researchers in the field say the new technique is quicker and simpler than previous methods and could boost the success rate for making embryonic stem-cell lines, which are in short supply. "It takes a huge step out of the whole process," says Peter Braude, who studies human embryonic stem cells at Guy's, King's and St. Thomas' School of Medicine in London.

Verlinky and his team attempted to grow stem cells from 46 human morulae left over from *in vitro* fertilization (IVF) treatment. They succeeded in making eight stem-cell lines – a success rate roughly equivalent to that achieved using blastocysts.

In its paper, the team presents preliminary evidence that these stem cells are able to generate a similar repertoire of cell types to those grown from blastocysts. They have already used both techniques to create a library of stem-cell lines for disease research, including many carrying genetic abnormalities (see *Nature* **429**, 691; 2004).

The new method is advantageous because it avoids the delicate task of culturing embryos until they grow into blastocysts, a period when perhaps half of them stop growing or die. It also cuts out a laborious step from the conventional technique, in which the outer shell of the blastocyst is destroyed to gain access to the precious 20-30 stem cells inside. In the new method, the entire morula of around 60-70 cells is grown in culture.

The advance is unlikely to affect the contentious global debate over the ethics of embryonic stem-cell research, scientists say. Opponents of such research point to the fact that stem-cell lines can only be created by destroying a human embryo.

But Braude notes that researchers will now want to test the more radical concept of growing stem cells from a single cell plucked from a morula-stage embryo without damaging the rest of it. That would also raise the prospect that couples having IVF treatment could ask to have one of their embryo's cells removed before it is implanted in the womb. The cell could be grown into a stem-cell line and stored in case the child should need it for disease therapy in the future.

Because this technique would avoid destroying the entire embryo, stem-cell researchers say that it could also serve to quell some of the ethical arguments against the use of human embryos for research.

Researchers might also use the new method to grow stem cells from morula-stage embryos that have stalled in their development and are incapable of growing into babies, suggests stem-cell researcher Jose Cibelli of Michigan State University in East Lansing. "You could remove a big obstacle from the ethical standpoint," he says.