Embryos grown in lab could revolutionise IVF

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Mankind has mapped the floors of the deepest oceans, sounded out the innermost recesses of the Earth's core and watched frozen nitrogen fall from the skies of Pluto in fat little snowflakes.

Until yesterday, however, the journey of our own children from a microscopic handful of cells into the first stages of personhood was a greater mystery than the physics of merging black holes.

Now scientists have grown human embryos outside the womb until they were on the brink of forming bodies. The development not only increases the potential for new IVF techniques and ways to prevent miscarriage but pushes the boundaries of what is legally and ethically possible.

Academics at the University of Cambridge and Rockefeller University in New York have doubled the length of time that embryos can survive in a plastic dish from seven days to at least 14, the limit set by law in most developed countries, including Britain.

Researchers will now be able to peer into the "black box" of early human biology and determine why couples struggle to conceive and why so many pregnancies go wrong.

Since 1956 the insight of science into what happens to a human embryo after it is ready to attach itself to the wall of the womb has been limited to grainy pictures of dissections.

Magdalena Zernicka-Goetz, professor of mammalian development and stem cell biology at Cambridge, who played a leading role in the research, said that the window between seven days after fertilisation — when the embryo is a free-floating bundle of cells — and 14 days was the most "enigmatic and mysterious" period in its lifespan.

This is also the time when couples who have turned to IVF are most frequently disappointed. "Implantation [where the embryo hooks up to the lining of the womb] is one of the major causes of early pregnancy loss," she said. "IVF embryos fail at implantation in 30 to 70 per cent of cases."

Professor Zernicka-Goetz and her team took 59 seven-day-old human embryos and placed them in a nourishing soup they developed for keeping mouse embryos alive.

Under normal circumstances the embryos would die without a connection to the wall of the womb. In the new formula, however, most of them appeared to develop healthily right up to the legal time limit.

This will permit scientists to watch stages of human growth they have never seen before, and to work out what goes wrong when embryos fail to develop normally.

The findings, announced in two separate papers in *Nature* and *Nature Cell Biology*, prompted calls for the government to give scientists longer to grow embryos in the laboratory.

Azim Surani, professor of germline and epigenomics research at Cambridge, said that it was doubtful that the technique could keep embryos alive much longer than 15 or 17 days but that nevertheless it was high time that the law was revisited. The Department for Health, which is in charge of embryology laws, declined to comment.