

Brief on the Human Fertilisation and Embryology Bill Amendments relating to Clause 4 'Human Admixed Embryos'

Prepared by the Academy of Medical Sciences, the Medical Research Council, the Royal Society and the Wellcome Trust.

We do not support amendments 1 and 2, which would prevent the creation of all Human Admixed Embryos (HAEs). The creation of HAEs offers important potential for the development of new treatments for debilitating diseases and infertility, while reducing the number of human eggs and embryos needed to produce stem cells for research.

We do not support amendments 7 - 11, which would prevent the creation of 'true' hybrid embryos for research. The use of 'true' hybrid embryos offers significant potential for research to improve our understanding of infertility, sperm function and stem cell development, and must not be prohibited.

Human Admixed Embryos

We strongly support the inclusion of human admixed embryos in the legislation. The Bill defines four categories of HAE:

- Cytoplasmic hybrid embryos: created when human DNA is placed into an animal egg from which the nucleus has been removed.
- True hybrids: embryos created with human eggs and animal sperm, or with animal eggs and human sperm.
- Transgenic human embryos: human embryos to which animal DNA has been added.
- Chimeric human embryos: human embryos to which one or more animal cells have been added.

We consider that each of the four categories provides opportunities to conduct research of potentially great benefit; including stem cell research, research to overcome infertility, and to understand early developmental processes and abnormalities.

The creation of HAEs is one important option to overcome the limited availability of donated human eggs – one of the major barriers to embryonic stem cell research. Research on stem cells from different sources is complementary – at present, it is not known which route will ultimately be most effective, and closing off any one avenue of research could be detrimental. Importantly, research on embryonic stem cells will inform the development of alternatives, including the use of adult stem cells.

Including all four types of HAE in the legislation ensures that there are robust safeguards to regulate research. Their production and use for research is only permissible under licence from the HFEA and subject to strict safeguards that prohibit development beyond 14 days and implantation into an animal or woman.

'True' hybrids

'True' hybrid embryos are one specific type of HAE, made by combining a human and animal gamete or human and animal pronuclei. These 'true' hybrids have previously been successfully used to test male sperm function prior to IVF treatment and may be of considerable importance in future research. We have discussed this over recent months with leading scientists (including Dr Robin Lovell-Badge FRS FMedSci and Professor Martin Bobrow CBE FRS FMedSci) who have reviewed recent international developments. Some of the areas of research where this category of HAE could be used are:

- 1. Fertility and sperm function.** At present the 1990 Act allows the combination of human sperm and hamster eggs to test sperm function prior to assisted reproduction. Using animal eggs provides a means by which human sperm function can be assessed and studied, while overcoming the shortage of human eggs. Male factor infertility is a significant problem preventing many couples from being able to conceive naturally. Research with 'true' hybrids offers potential to improve treatment options for affected men.
- 2. Early development.** Combining animal and human gametes could provide considerable information about how developing cells activate certain genes and make others silent. This in turn will inform studies into how inherited diseases affect cell function.
- 3. Stem cell research.** While discussion has focused on the use of cytoplasmic hybrids in embryonic stem cell research, there will be areas in which true hybrid embryos could greatly assist as this field develops. Examples include clarifying the role of nuclear and mitochondrial DNA in cellular function and understanding how one cell can be reprogrammed into another.

As this field of research develops, there are likely to be further potential uses for 'true' hybrids, as well as other HAEs, in research to develop new treatments for debilitating diseases and infertility. Given the speed of development of the technology, it is important to future-proof the legislation and not to block potentially productive avenues of research.

By including 'true' hybrids within the definition of an HAE, it ensures that their status is clear and fully regulated, and any research will be subject to robust safeguards. It sends an important signal about the boundaries between human embryo and animal legislation, and ensures 'true' hybrids are accorded the same treatment under law as a human embryo. True hybrids would be subject to the same 14-day rule and ban on implantation as other HAEs.

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