In vitro derived gametes

What are they?
- In vitro derived gametes (also known as artificial gametes) are human gametes (egg or sperm cells) that created in the laboratory from other cell types
- Research in this area remains at an early stage, though cells resembling sperm have been created from embryonic stem cells according to the research from Newcastle University (see accompanying round-up)

How might they be created?
- There are two main techniques: firstly by derivation from embryonic stem cells by culturing and inducing them to form primordial germ cells (PGCs), the cells from which gametes are derived in the body
- Alternatively they can be created by somatic cell haploidization, in which the nucleus of a somatic (body) cell is transferred into an egg cell which has had its own nucleus removed. The resulting cell is then induced to divide, producing a haploid cell with half the total number of chromosomes, as is required for gamete formation
- Embryonic stem cells are regarded as the most likely source of IVD gametes

What could they be used for?
- In this case the researchers want to study them in an effort to identify possible causes of male infertility. They could also be used to identify possible causes and treatments for certain types of disease.
- The researchers are not seeking to create babies from IVD gametes, although this is theoretically possible in this case as the resultant gametes look and behave like normal sperm. However this is not permitted by law.

How soon could they be available?
- The HFEA's Scientific and Clinical Sciences Group estimate that: "while research teams could produce sperm from stem cells by in the next few years, the production of eggs from stem cells could be longer. The group thought that it would be at least 5-10 years before eggs or sperm could be produced that could potentially be used in treatment."
(Source: HFEA website)

What is the legal status of this research?
- Creation of IVD gametes is permitted by the most recent HFE Act (2008), although the use of IVD gametes for reproductive purposes is not permitted.
Sources / further information
Briefing note from HFEA:
http://www.hfea.gov.uk/1403.html

Summary of HFEA Scientific and Clinical Advances Group meeting, June 2007

Newcastle University Q&A (available with the press release)

Reference to a recent review paper on the subject:
Mathews DJ, Donovan PJ, Harris J, Lovell-Badge R, Savulescu J, Faden R.
Pluripotent stem cell-derived gametes: truth and (potential) consequences.

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