Valerie Racine's Commentary on "Mitochondrial Transfer Therapy as Enhancement Technology"

Commentary On
Case: Mitochondrial Transfer Therapy as Enhancement Technology

The UK government's announcement of its approval of mitochondrial transfer therapies made headlines throughout the world, with many scientists, doctors, and ethicists welcoming the decision as a positive step towards preventing children being born with debilitating conditions from dysfunctional mitochondria and giving many prospective parents hope to have healthy, genetically-related children. Despite the prospects of these benefits, the decision also raised several ethical concerns. First, a common ethical concern that emerged after news of the decision was whether the interventions created "three-parent babies," as the resulting embryos from the modified eggs or zygotes would include genetic material from three individuals. Some scientists have suggested that the term is misleading and merely the result of media sensationalism because mitochondria possess only a very small number of genes and their functions are not known to contribute to physical attributes (Reznichenko et al. 2015). Others have insisted that scientists are still unsure about the exact role of mitochondrial DNA and the interactions between mitochondrial DNA and nuclear DNA in gene expression (Dimond 2015). However, philosophers have pointed out that the debate about the nature and extent of the genetic contribution of mitochondrial DNA rests on a problematic assumption of genetic determinism; that is, the idea that an individual's essence or personal identity is founded on her DNA (Baylis 2013; Dimond 2015). Others have argued that the ethical permissibility of the procedures does not rest on the fact that they will affect the identity of the future child (because that is a given), but on the fact that they will safeguard the future child's right to an open future (because the child will be free of mitochondrial disease) (Bredenoord et al. 2011, 99).

Second, because the proposed therapies have been defined as germline gene therapy, ethicists raised the possibility that the UK's decision could lead to a slippery

slope to eugenics or lead to the creation of designer babies, if/when the interventions become available for non-therapeutic purposes. For example, older women without mitochondrial mutations may seek these interventions in the future to enhance fertility (Couzin-Frankel 2015). Or, perhaps, lesbian couples might want to use these technologies to ensure that their child carries both of their genetic material (Dimond 2015). These hypothetical scenarios would be enhancements, rather than therapies, and would invoke further ethical concerns about non-therapeutic applications of these interventions for human enhancement.

Third, because germline modifications entail the transmission of those modifications to later generations, some have raised concerns about the lack of knowledge of long-term consequences and whether they pose unacceptable risk. Of course, scientists cannot be expected to know all possible consequences in advance, so some level of risk is considered to be acceptable. But, the science is complex and a lot about mitochondrial genes and their functions in gene expression is still unknown. Thus, the language used by the HFEA, claiming the procedures are “not unsafe,” might be misleading (Dimond 2015). Fourth, conservative critics of the procedures have focused their criticisms on the pronuclear transfer technique because it involves the creation and destruction of embryos and, as such, it stands in opposition to the principle of the sanctity of life (Dimond 2015).

Finally, bioethicist Francoise Baylis has provided more general criticisms of the underlying assumptions motivating these sorts of procedures. Baylis argues that a “wish,” rather than a “need,” for genetically-related children might place undue risk on egg providers and it may impose health risks on future children (Baylis 2013). In fact, women affected with mitochondrial mutations have many other options to become mothers. They can become pregnant and undergo prenatal diagnosis of the developing fetus, and then decide to terminate the pregnancy if the fetus is affected. They can use IVF technologies and pre-implantation genetic diagnosis to select healthy embryos. They can choose egg donation or embryo donation and then have IVF. Or, they can adopt (Baylis 2013). Baylis further argues that investing limited resources in the development of mitochondrial transfer interventions for a relatively non-prevalent condition, which could be addressed with many other measures, might not be morally justifiable (Baylis 2013).