From IVF to germline gene editing: Ethical challenges

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Ovarian Club, Hong Kong
December 16, 2018
Ethical debates surrounding ART

- Real vs. ‘fake’
Ethical debates surrounding ART

• Real vs. ‘fake’

Ethics Hype?

BY TIMOTHY CAULFIELD

Over the past few years there has been growing concern about the phenomenon of science hype, the tendency to exaggerate the value or near-future application of research results. Although this is a problem that touches every area of biomedicine—including stem cell, neuroscience, and microbiome research—the topic of genetics seems to be particularly prone to enthusiastic predictions. The world has been told for over two decades—by the media, researchers, politicians, and the biotech industry—that a genome-driven health care revolution is just around the corner. And while the revolution never seems to arrive, the hopeful rhetoric continues.

It has been suggested that this unrelenting “genohype” is having a range of adverse social consequences, including misleading the public and hurting the long-term legitimacy of the field. It may also be contributing to less-than-ideal funding decisions, the premature implementation of technologies, an erosion of public trust, and perhaps, the harm of patients.

While we need more good data on the nature and magnitude of these possible harms (let’s not hype the concern about hype), few would argue with the proposition that sustained science hype is a bad thing. Increased attention to the phenomenon of science hype—and to the problem of bad science more generally—is a positive development. We all benefit from robust science and accurate public representations of biomedical research.

Ethical debates surrounding ART

- Real vs. ‘fake’

- Ethics ‘hype’:
  - “informed more by speculation of harm and anecdote than by available evidence”
  - exaggerated
  - not a priority
What’s wrong with ‘fake ethics’?

- Draws public, media & political attention to the wrong issues
- Wastes energy of scholars & decision-makers
- ‘Sexy topics’, but not most important or urgent to patients, clinicians & policy makers
Priorities in setting the ethics agenda

- Designer babies vs. IVF cost & access
Priorities in setting the ethics agenda

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- Designer babies vs. cost of IVF and access
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- Designer babies vs. **cost of IVF and access**

I'm sorry I spent your entire college fund trying to conceive you.
Funding of IVF
Priorities in setting the ethics agenda

- https://www.youtube.com/watch?v=igcd4wNl3s8&feature=player_embedded#!
Priorities in setting the ethics agenda

- Designer babies vs. cost of IVF and access
Priorities in setting the ethics agenda

- Designer babies vs. cost of IVF and access
- The Quebec experience
Priorities in setting the ethics agenda

- Social egg freezing vs. infertility prevention
Welcome to the new spa: juice bar and egg freezing

In New York, boutique clinics are trying to persuade young women to future-proof their fertility

Jennifer Huang, the chief marketing officer at Trellis

High above the noisy and traffic-clogged streets of Manhattan, the Trellis studio is a chic and serene oasis for busy women. Decorated in pastel colours, it has plush sofas and chairs where women can relax
Priorities in setting the ethics agenda

Social egg freezing vs. infertility prevention

Where to chill out in New York – and get your eggs frozen

Fertility treatment centres now targeting women in their 20s with Trellis creating ‘a modern-day experience for women’, writes Katie Warren

BY BUSINESS INSIDER
15 DEC 2018

High above the noisy and traffic-clogged streets of Manhattan, the Trellis studio is a chic and serene oasis for busy women. Decorated in pastel colours, it has plush sofas and chairs where women can relax
IVF for career women: 'social' egg freezing, China’s fertility TV channel and a baby-making reality show

- Pay-as-you-freeze model allows women to harvest eggs when they are most fertile and store them for longer and more cheaply
- Doctor behind the programme says by the time most women turn to IVF in their 30s the quality of their eggs is declining
Making a Difference in Bioethics

SOCIAL EGG FREEZING IN THE RACE AGAINST THE BIOLOGICAL CLOCK

June 13, 2014 · by impact ethics · in Assisted Reproduction, Law & Policy, Reproduction · 1 Comment

Vardit Ravitsky argues that elective egg freezing offers an individual solution to a social problem that should be addressed not only through high-tech medical intervention but also through policy change.

Elective or 'social' egg freezing is a relatively new option available to younger women who are not yet ready to commit but wish to preserve their chances later in life. In 2013, only...
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Social egg freezing vs. infertility prevention

We need a culture thaw, not frozen eggs

VARDIT RAVITSKY AND MARIE-EVE LEMOINE

Contributed to The Globe and Mail
Published Saturday, Oct. 18 2014, 3:00 AM EDT
Last updated Saturday, Oct. 18 2014, 3:00 AM EDT

http://www.theglobeandmail.com/globe-debate/we-need-a-culture-thaw-not-frozen-eggs/article21138405/
Priorities in setting the ethics agenda

- Social egg freezing vs. infertility prevention

The American Journal of Bioethics

Sleepwalking Into Infertility: The Need for a Public Health Approach Toward Advanced Maternal Age

Marie-Eve Lemoine & Vardit Ravitsky
Toward a Public Health Approach to Infertility: The Ethical Dimensions of Infertility Prevention

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Current estimates of infertility rates range between 3.5 and 26.4 per cent worldwide, depending mainly on the various definitions of infertility (Boivin et al., 2007, Bhattacharya et al., 2009, Gurunath et al., 2011). While an increase in these numbers has not been consistently reported in the literature (Stephen and Chandra, 2006, Bhattacharya et al., 2009, Bushnik et al., 2012), the use of assisted reproductive technologies (ART) is becoming more and more common (Practice Committee of the American Society for Reproductive Medicine, 2006, Tarava et al., 2008, Macaluso et al., 2010). Infants conceived through ART now represent more than 1 per cent of all births in the United States (Centers for Disease Control and Prevention; American Society for Reproductive Medicine; Society for Assisted Reproductive Technology, 2010) and an even higher percentage in most European countries, with up to 6 per cent in some countries (Andersen 2006). Many experts and organizations, including the World Health Organization (WHO) (Vayena et al., 2001) and the Centers for Disease Control and Prevention (CDC) in the United States (Centers for Disease Control and as such. It also identifies prevention as a neglected function of public health in the context of infertility. The second section of the article therefore targets the potential for prevention initiatives and analyzes one such initiative through the lens of public health communication ethics.

Infertility as a Public Health Issue

Various factors have been mentioned in previous articles as justifications for including infertility in the public health agenda: the high and potentially increasing prevalence and associated possible threat to social perpetuation; the prevalent nature of many causes; the consequences for well-being; the interactions with the fulfillment or nonfulfillment of social expectations; the associated stigma; the close relationship between human immunodeficiency virus (HIV) and infertility and related risk-taking behaviors in developing countries; the mention of reproduction as a human right in various declarations; the involvement of health inequalities and, finally, the potential benefits...
Priorities in setting the ethics agenda

- Designer babies vs. cost of IVF and access
- Social egg freezing vs. infertility prevention

Where should the focus be?
Ethical debates surrounding ART

- IVF
- Third party ART (sperm/egg donation & surrogacy)
- Mitochondrial replacement & germline gene editing

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IVF: taking the fun out of procreation since 1978.
IVF
IVF
Meet Louise, the world’s first test-tube arrival
IVF: initial reactions

- Challenge to social intuitions/norms (even religious objections)
- Lack of moral imagination
- Knee-jerk reactions vs. well-argued ethical positions

Fast forward 40 years....
To Your Health

Happy birthday, Louise Brown! 40 years after the first IVF baby, 8 million more and counting

Robert Edwards, left, and Patrick Steptoe, two researchers who pioneered in vitro fertilization, with a midwife in white and newborn Louise Brown. (Keystone/Getty Images)
To Your Health

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Robert Edwards, left, and Patrick Steptoe, two researchers who pioneered in vitro fertilization, with a midwife in white and newborn Louise Brown. (Keystone/Getty Images)
Robert G. Edwards

Facts

Robert G. Edwards
The Nobel Prize in Physiology or Medicine 2010

Born: 27 September 1925, Batley, United Kingdom

Died: 10 April 2013, Cambridge, United Kingdom

Affiliation at the time of the award: University of Cambridge, Cambridge, United Kingdom

Prize motivation: “for the development of in vitro fertilization.”

Prize share: 1/1
IVF: what should the focus be?

- IVF (and ICSI) not introduced within clinical trials
- Was there enough data to support moving forward?
- Was there appropriate ethics review?
- What role did commercial drive play?
- What have we learned?
  - CRISPR babies
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IVF: what should the focus be?

- Appropriate introduction of emerging technologies
- Longitudinal studies of outcomes
  - long term risks to women & children
  - epigenetic risks of procedures
The epigenetic effects of assisted reproductive technologies: ethical considerations

M.-C. Roy*, C. Dupras and V. Ravitsky

Bioethics Program, School of Public Health, University of Montreal, Montréal, QC, Canada

The use of assisted reproductive technologies (ART) has increased significantly, allowing many coping with infertility to conceive. However, an emerging body of evidence suggests that ART could carry epigenetic risks for those conceived through the use of these technologies. In accordance with the Developmental Origins of Health and Disease hypothesis, ART could increase the risk of developing late-onset diseases through epigenetic mechanisms, as superovulation, fertilization methods and embryo culture could impair the embryo’s epigenetic reprogramming. Such epigenetic risks raise ethical issues for all stakeholders: prospective parents and children, health professionals and society. This paper focuses on ethical issues raised by the consideration of these risks when using ART. We apply two key ethical principles of North American bioethics (respect for autonomy and non-maleficence) and suggest that an ethical tension may emerge from conflicting duties to promote the reproductive autonomy of prospective parents on one hand, and to minimize risks to prospective children on the other. We argue that this tension is inherent to the entire enterprise of ART and thus cannot be addressed by individual clinicians in individual cases. We also consider the implications of the ‘non-identity problem’ in this context. We call for additional research that would allow a more robust evidence base for policy. We also call upon professional societies to provide clinicians with guidelines and educational resources to facilitate the communication of epigenetic risks associated with ART to patients, taking into consideration the challenges of communicating risk information whose validity is still uncertain.

Received 29 November 2016; Revised 20 April 2017; Accepted 25 April 2017

Key words: epigenetic risks, ethical implications of DOHaD, IVF/ART, reproductive autonomy
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- Mitochondrial replacement & germline gene editing
Third party ART

- Egg donation
- Sperm donation
- Embryo donation
- Gestational surrogacy
Baby M - 1986

An agonizing scene is played out once again when police take the child called "BABY M" away from JoBeth Williams (who stars as Mary Beth Whitehead), while Robin Strasser and John Shea (as Elizabeth and William Stern, who contracted for Whitehead’s surrogate motherhood) look on. The docu-drama airs in two parts on the ABC Television Network, SUNDAY, MAY 22 and MONDAY, MAY 23 (both times 9:30-11:00 p.m., ET).
Baby Gammy - 2014
Third party ART: what should the focus be?

Legal landscape that protects all parties:
- Donors: parental liability
- Surrogates: ill-treatment, exploitation
- Children of surrogates:
  - implications of reproductive tourism
- Children of donor conception:
  - access to donor information
Ethical debates surrounding ART

- IVF
- Third party ART (sperm/egg donation & surrogacy)
- Mitochondrial replacement & germline gene editing
Mitochondrial replacement (MRT) & Germline gene editing

- Sensationalist headlines
  - “3-parent babies”
  - “Genetically modified children”
  - “Designer babies”
Mitochondrial replacement (MRT) & Germline gene editing

Is the UK being too hasty over three-parent babies?

08:00 03 June 2014 by Donna Dickenson and Marcy Darnovsky
For similar stories, visit the Comment and Analysis and Genetics Topic Guides

The rush to permit controversial methods to avoid mitochondrial disease in babies raises questions, say two bioethicists.

"To a country nervous about genetically modified crops, we are making the foolhardy move to genetically modified babies." So said MP Jake Rees-Mogg in a UK parliamentary debate on draft regulations to allow trials of controversial techniques that might allow women with mitochondrial disease to have healthy babies.

If approved, the regulations would, for the first time, allow human germline modification – in which DNA is changed and the change remains inheritable.

The technique at the heart of the debate is mitochondrial transfer. Mitochondria are the energy generators of cells and have their own DNA, which is separate from DNA in the nucleus. Mitochondrial DNA is inherited via the maternal line, from mother to child. So to prevent a woman with faulty, disease-causing mitochondria from passing on her condition, a female donor supplies healthy mitochondria.

However, the phrase mitochondrial transfer does not fully describe what is involved: the manipulation of an entire human egg. In reality, the nucleus is removed from an egg or single-celled embryo from a woman who has mitochondrial disease and is then transferred into a donor egg or embryo that has healthy mitochondria. The resulting baby would have the DNA of three people – the mother and father's nuclear DNA and the donor's mitochondrial DNA.

The UK Department of Health's latest public consultation on whether to permit human trials ended on 21 May. A live vote on whether to allow mitochondrial
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Mitochondrial replacement (MRT) & Germline gene editing

Is the UK being too hasty on this?

08.00 03 June 2014 by Donna Dickenson

For similar stories, visit the Comment area.

The rush to permit controversial methods to repair faulty mitochondria in human embryos raises questions, say two bioethicists.

In a country nervous about genetically modified crops, is it really the best time forbubble moves to genetically modified babies? Last week, in a UK Parliamentary debate on draft regulations for experimental techniques that might allow women who are at risk of having healthy babies.

If approved, the regulations would, for the first time, allow gene modification – in which DNA is changed and passed on to the next generation.

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Emerging technologies: what should the focus be?

- When are we ready for first in-vivo trials?
- What *uses* are socially acceptable
  - Implications for eugenic attitudes
  - Enhancement
  - Disability rights
Emerging technologies: what should the focus be?

- The academic pressure to innovate
- The race to be the first
Emerging technologies: what should the focus be?
He Jiankui’s Genetic Misadventure: Why Him? Why China?

By Jing-Bao Nie
“Has conventional IVF reached its limits?”

- As IVF pushes beyond conventional boundaries towards new frontiers...
- ...we should focus on valid, substantial ethical challenges
- rather than investing our intellectual & political energy in concerns that are rhetorical and probably transient
Thank you!

謝謝