Are we ready for genome editing in human embryos for clinical purposes?

NO

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Disclosure

• Partner in:

EMBRYOLOGY & PGD
A C A D E M Y

• And CEO and founder:

Global Women Connected
Knowing, Caring, Sharing, Worldwide

FemTech

salve
My argument
Ethics and safety

• The cost of ART
• Genetics enters the arena
• Choosing our ‘healthiest’ and ‘desired’ embryo
• The end of genetically or chromosomally abnormal children?
• All born knowing our genetic code?
• All reproduce by ART?
• Making a super race?
• Utopia or dystopia?
40 years of IVF

And here she is...
THE LOVELY LOUISE

[Image of a baby and a woman]
## The cost of IVF

<table>
<thead>
<tr>
<th></th>
<th>Czech Republic</th>
<th>Spain</th>
<th>Cyprus</th>
<th>UK (Average of at least 3 London clinics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVF (own eggs)</td>
<td>1795</td>
<td>3723</td>
<td>2517</td>
<td>4782</td>
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<tr>
<td>Egg Donation</td>
<td>3687</td>
<td>5553</td>
<td>4388</td>
<td>9394</td>
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<tr>
<td>Embryo Monitoring</td>
<td>277</td>
<td>277</td>
<td>232</td>
<td>550</td>
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<td>First Consultation</td>
<td>99</td>
<td>115</td>
<td>Usually free</td>
<td>228</td>
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<tr>
<td>Sperm Freezing</td>
<td>153</td>
<td>158</td>
<td>302</td>
<td>422</td>
</tr>
</tbody>
</table>
Reproductive Rich

Reproductive Poor
DNA: Franklin, Crick & Watson
1953
Sequencing

2003 human genome sequenced

James Watson

2007 - $1.5m

2017 - $1000

China National Genebank
Shenzhen
Preimplantation genetic testing - PGT
Gender Selection

World Leading Center for Virtually 100% Guaranteed Gender Selection using PGD
Choose Your Baby’s Eye Color
Taking advantage of the ever-expanding role of modern genetics
The near future….

the ‘healthiest’ embryo…..

the ‘desired’ embryo…..

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[Image of movie poster, piano, and soccer ball/award]
Non invasive prenatal testing

- Maternal blood sample 10 weeks
- Sequencing to look at free fetal DNA
- For every pregnant woman?

The non-invasive prenatal test (NIPT) is now available for every pregnant woman in the Netherlands.
Should we use PGT/NIPT to select out these people?
Denmark aborted all but 4 babies diagnosed with Down syndrome last year

"What kind of society do you want to live in?": Inside the country where Down syndrome is disappearing
Baby genes to be mapped at birth in medical first

Your Unborn Baby’s Genetic Code: Do You Want To Know?
In the future…
will we stop using sex for reproduction??

Reproductive rich
Genetic rich

Reproductive poor
Genetic poor

Reproductive and
genetic classism
What happens next? Genome editing

- **therapeutic** genetic interventions
  - Options
    - PGT
    - NIPT

- **genetic enhancements**
  - Michael Sandel
  - To appreciate children as gifts is to accept them as they come, not as objects of our design or products of our will or instruments of our ambition
Use technology to greatly enhance human intellect and physiology.

Hesitancy against the use of technology to modify or enhance humans.
Will they be human?

Jürgen Habermas –
A person who becomes aware of his programmed genetic nature will feel less free and less authentic
How do we ‘prove’ technology is safe?

When and how should new technology be introduced into the IVF laboratory?

Joyce Harper¹, M. Cristina Magli², Kersti Lundin³, Christopher L.R. Barratt⁴, and Daniel Brison⁵

The clinical benefit and safety of current and future assisted reproductive technology

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Rachel Brown is a graduate of the University of Edinburgh, where she obtained a first-class degree in medical biology. She recently completed a Master’s degree with distinction in prenatal genetics and fetal medicine at University College London. She is currently a first-year PhD student funded by the Medical Research Council and maintains an interest in genetics and reproductive biology.
Utopia or dystopia?

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