



Fertility • Genomics • Clarity

Testing Embryos and Fetuses: Eugenics or Healthcare?

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I have no conflicts of interest to declare

Part 1

What does this actually mean?

Testing Embryos and Fetuses:
Eugenics or Healthcare?



What does it mean to 'test' an embryo or fetus?

What are we doing?

- Testing
 - Screening?
 - Diagnosis?
 - Prediction?
- (Modification?)

When are we doing it?

- Before conception?
- Before pregnancy?
- During pregnancy?

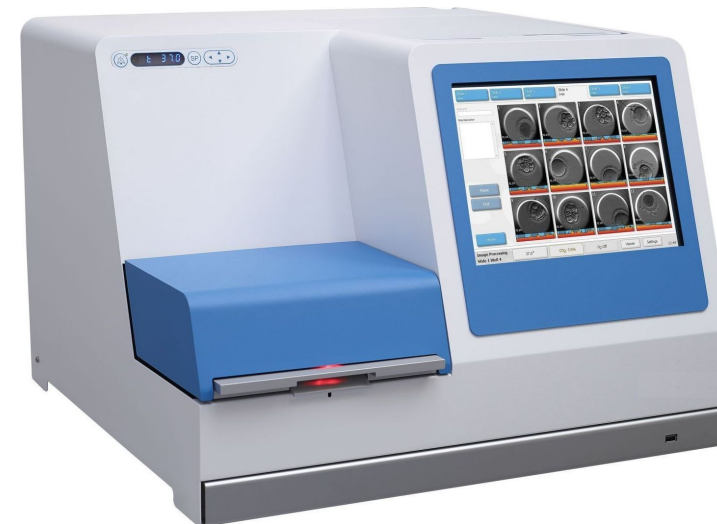
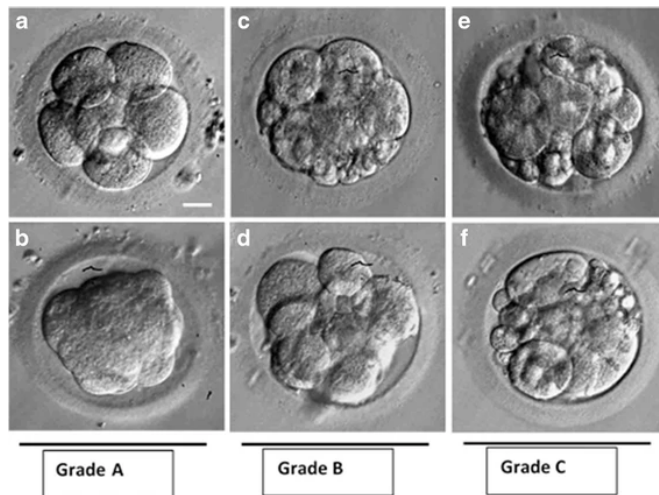
How are we doing it?

- Genetic/genomic test?
 - Cytogenetics?
 - Deeper analysis of DNA?
- *Non-genetic* biochemical test?
 - (Or a genetic/genomic-adjacent test – epigenetics, epigenomics, other 'omics'?)
- Morphology?
- Simple human judgment?

A note on the embryo/fetus distinction

- Scientific convention is that a human embryo becomes a human fetus after 8 weeks of development.
- However, there are contexts in which the distinction might be drawn differently.

IVF generally involves subjecting embryos to the test of (technologically assisted) human judgment



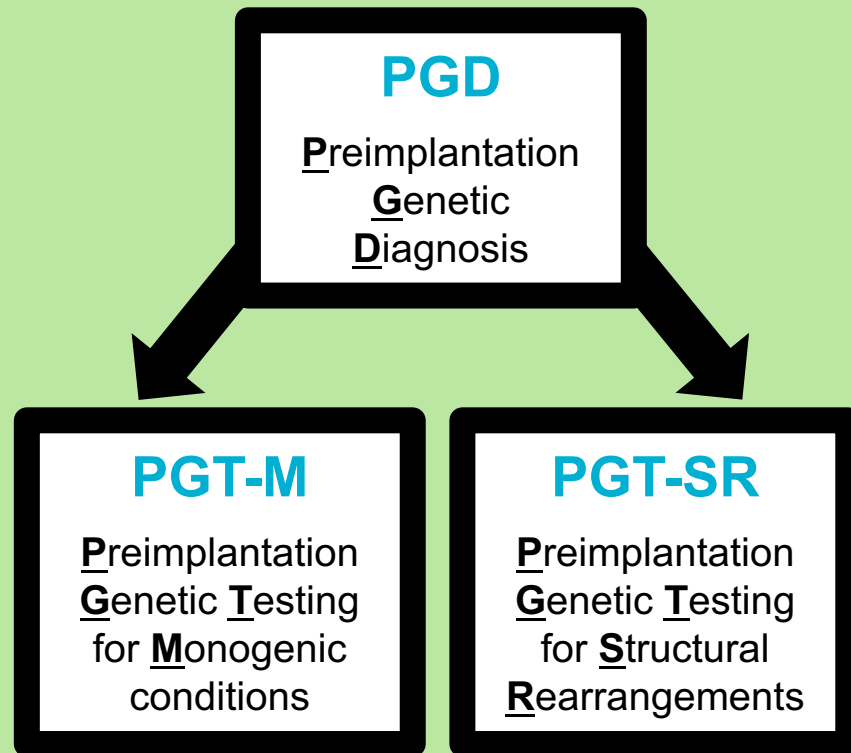
Genetic/genomic testing *before* pregnancy

Old terminology

New terminology

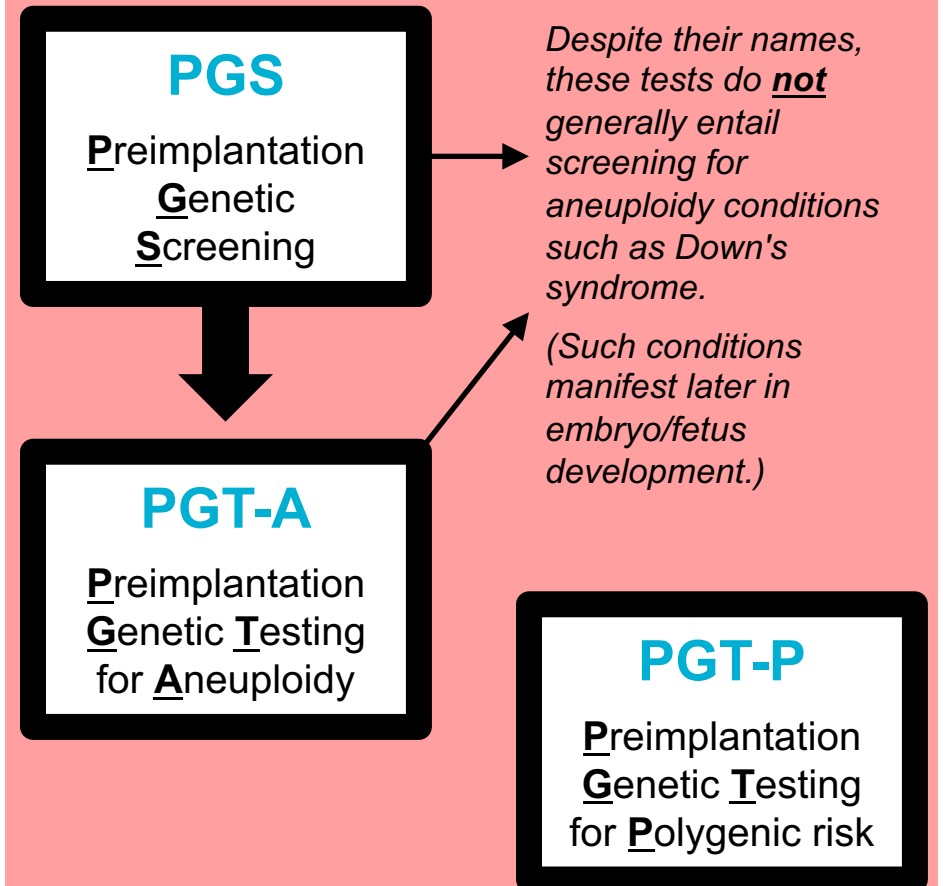
Tests with a strong evidence base

Proven to be useful (for certain specific purposes)



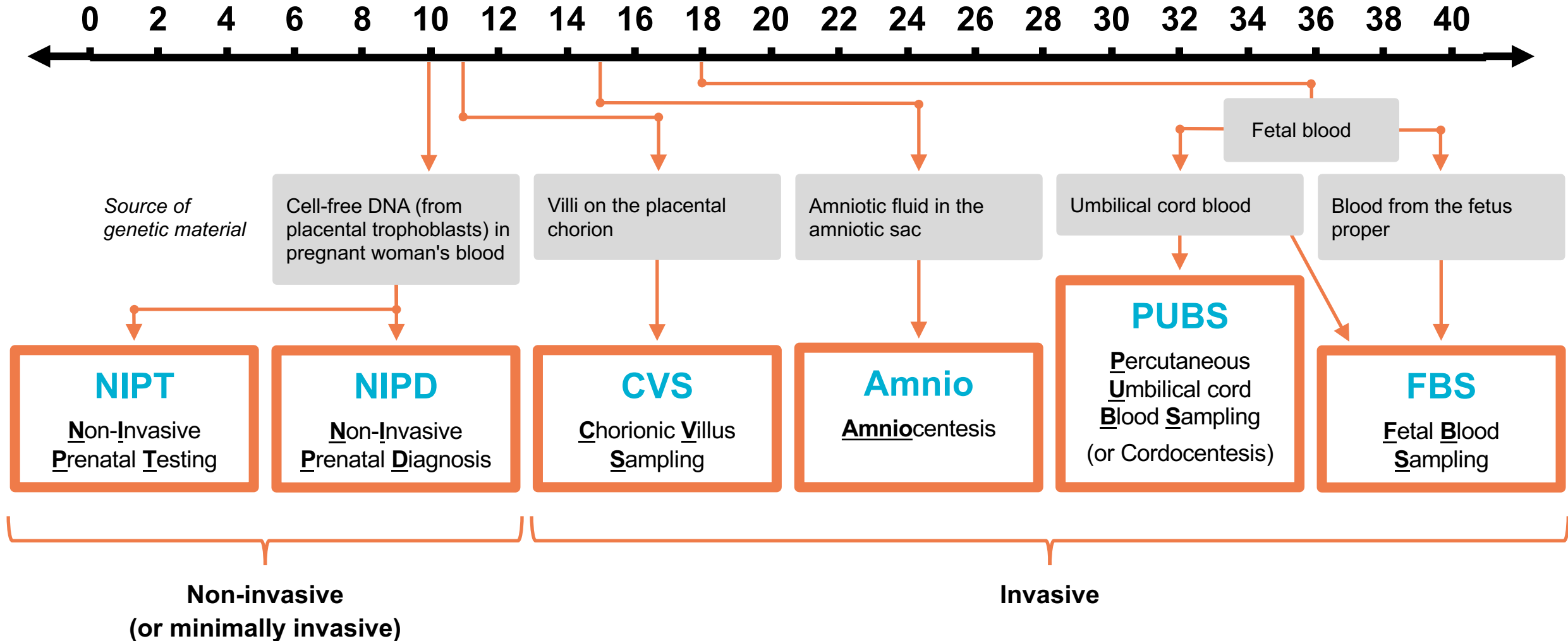
Tests *not* supported by evidence

Dubious/unproven



Genetic/genomic testing *during pregnancy*

Approximate earliest stage of pregnancy (in weeks) when it is both safe and practical to obtain and test the sample (this may change in future if technology improves)



Forthcoming guidance that should be useful



**Ethical Issues in
Prenatal Genetic Diagnosis**

**Prenatal Diagnosis and PGT-M for
Germline Cancer Susceptibility
Gene Variants**

Changing DNA in an embryo or fetus?

Mitochondrial donation

Creating an embryo with nuclear DNA from a mother and a father, *plus* mitochondrial DNA from a female mitochondrial donor.

A strong case can be made for using this – diligently – to avoid transmission of (certain types of) mitochondrial disease from mother to child.

However, a strong case can ***not*** be made for using this to address infertility. There is as yet no credible evidence that it works for this purpose.

Genome editing

Deliberately changing selected DNA sequences. In principle, this could be done before, during *or* after conception, *or* pregnancy, *or* birth.

Useful in some ***non***-reproductive treatment contexts (including treating some severely ill infants), and useful in reproductive ***research***.

However, ***nowhere near ready*** for use in reproductive treatment contexts. Much more research is still needed.

The one known instance where this technology was used in a reproductive treatment context prompted justified international outrage.

Part 2

What does this actually mean?

Testing Embryos and Fetuses:

Eugenics or Healthcare?



Encapsulating the meaning of '*eugenics*' and '*healthcare*'

Eugenics

The idea that human (eu)genes – as these were understood before the function and structure of DNA were properly established – should have moral meaning and moral standing in the eyes of society, and that society should control human reproduction accordingly (possibly via coercive measures reminiscent of Nazi brutality during the Second World War).

At the risk of stating the obvious, I think pursuing this idea is *wrong*.

Healthcare

The idea that the physiological *and* psychological needs of individuals in society – determined largely *by* those individuals (if they are adult), and including needs related to human reproduction – should be attended to, as safely and effectively as possible, by appropriately qualified professionals.

At the risk of stating the obvious, I think pursuing this idea is *right*.

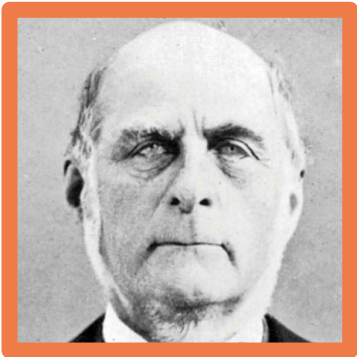
Part 3

So what's the answer to this question?

**Testing Embryos and Fetuses:
Eugenics or Healthcare?**

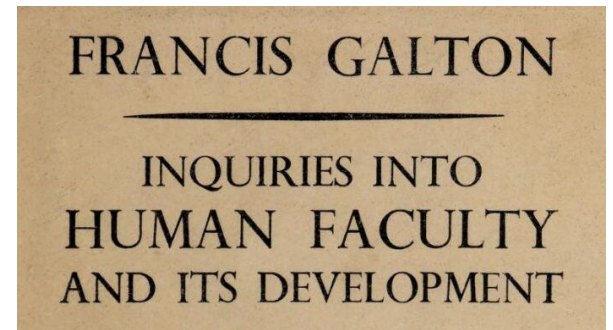


The science of genetics and the pseudoscience of eugenics can be, and have been, disentangled



In the 19th century, genetics and eugenics were *entangled* by Francis Galton (cousin of Charles Darwin), and by his contemporaries and successors.

Ironically, Galton's contributions to the science of genetics would eventually help to undermine the pseudoscientific aspects of his eugenic thinking.



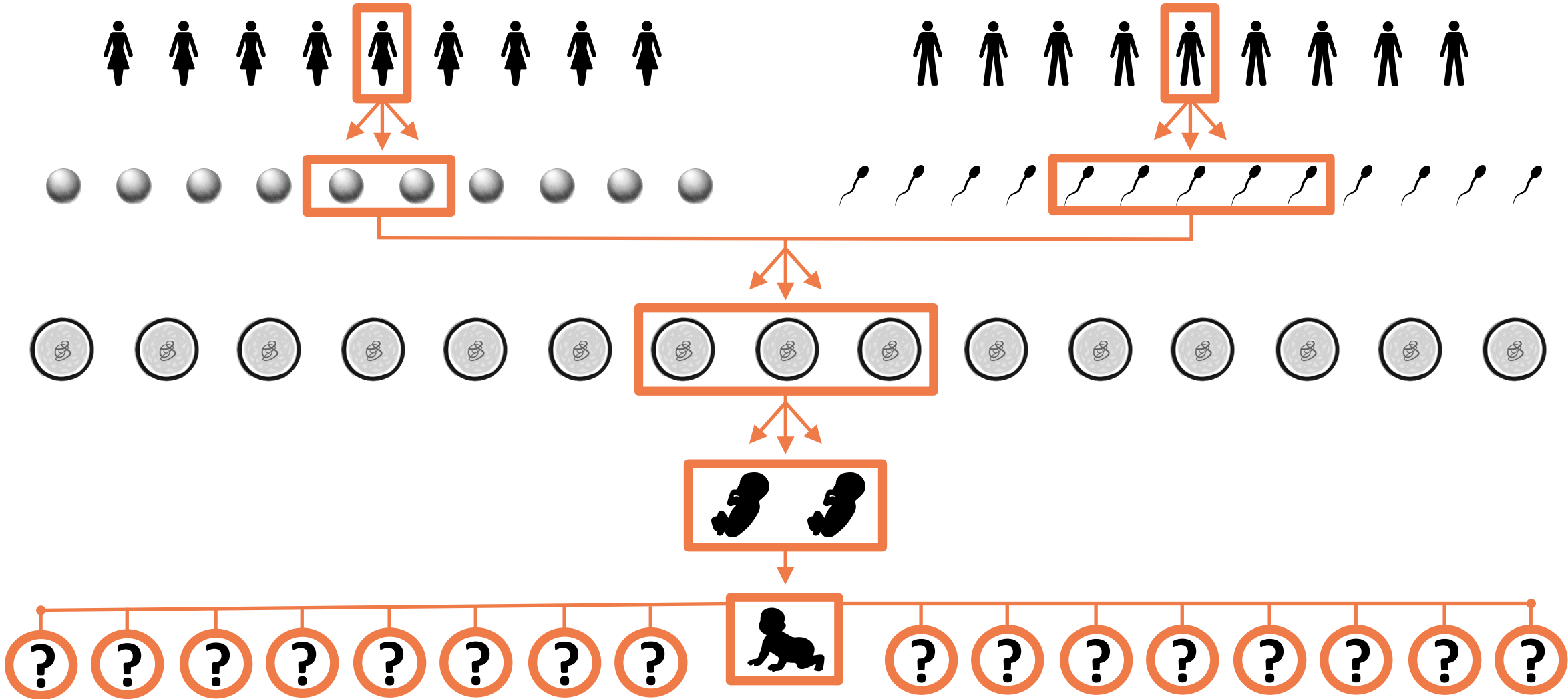
In the 20th century, genetics and eugenics were *disentangled* by Richard Lewontin and others, who established that 'race' is not a scientific category.

Eugenics was discredited on (at least) two different levels following the experience of the Second World War – politically and scientifically.



The Apportionment of Human
Diversity
R. C. LEWONTIN

Given countless uncontrollable possibilities, exerting *some* control over reproductive outcomes is legitimate



Conclusion

'Healthcare' is – generally speaking – an accurate, fair and meaningful way to describe/understand the testing of embryos and fetuses in the present day.

'Eugenics' is not.

If there is a challenge or difficulty with *some* of the more recently devised approaches to testing, then it has nothing to do with eugenics.

Rather, the challenge is to take claims made for the meaning and reliability of tests, subject these claims to critical scrutiny, and then convey our understanding clearly and honestly to patients.



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Thank you

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