

OoCs, MoCs, & HoCs:
Can organs-on-a-chip replace
animal testing?

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TJM Consultancy

What's the problem?

- What do we do now?
 - Test on animals or test on human cells in artificial environment
- What's wrong with this?



\$2.6 BILLION to develop a new drug



EU Cosmetics Directive, REACH, Lautenberg Act



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Unrepresentative - animals are not humans, petri dish is not systemic



13 years to develop new drug

WRONG

~~RIGHT~~



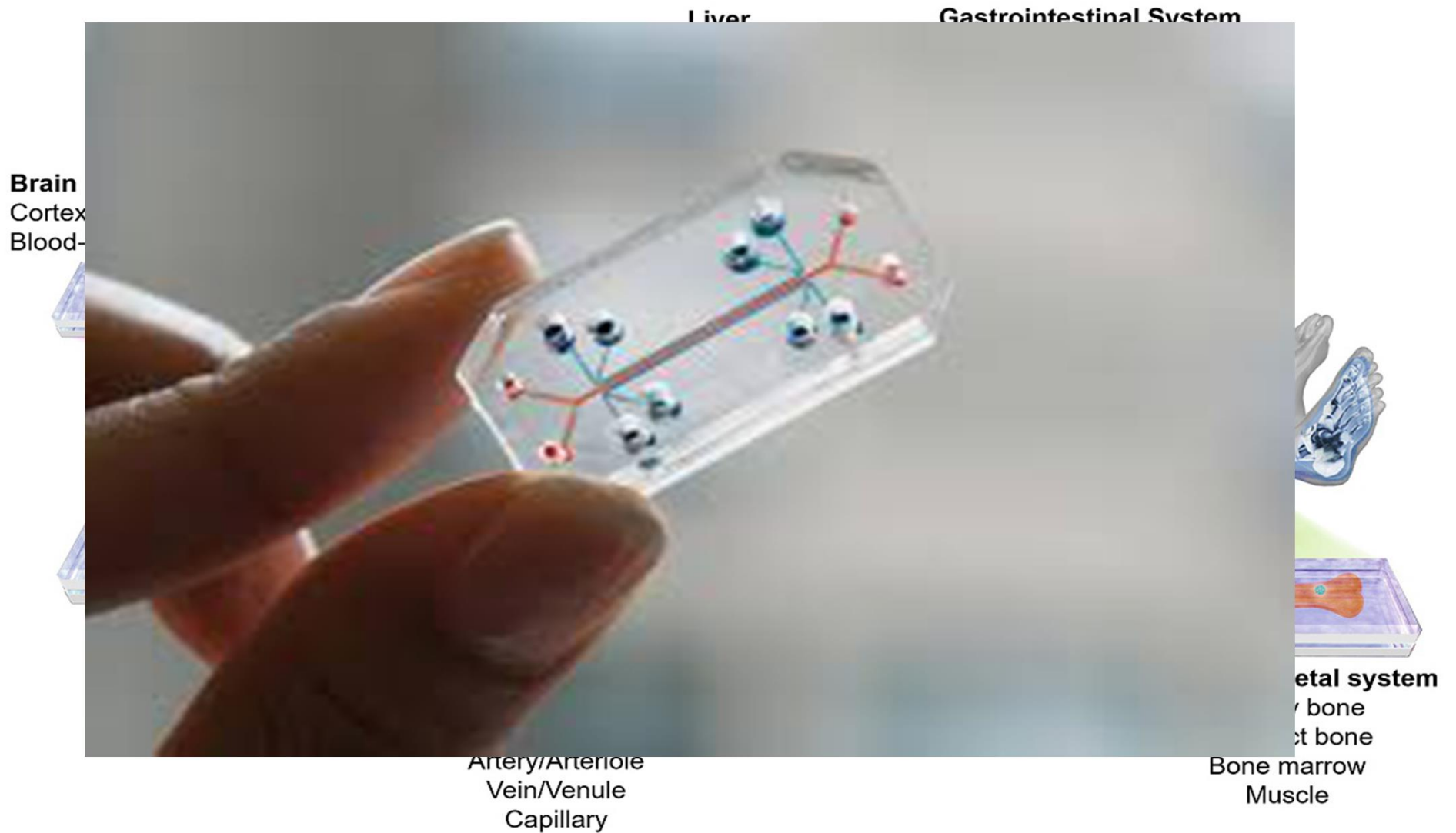
Unethical to use animals in chemical testing

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What's the alternative?

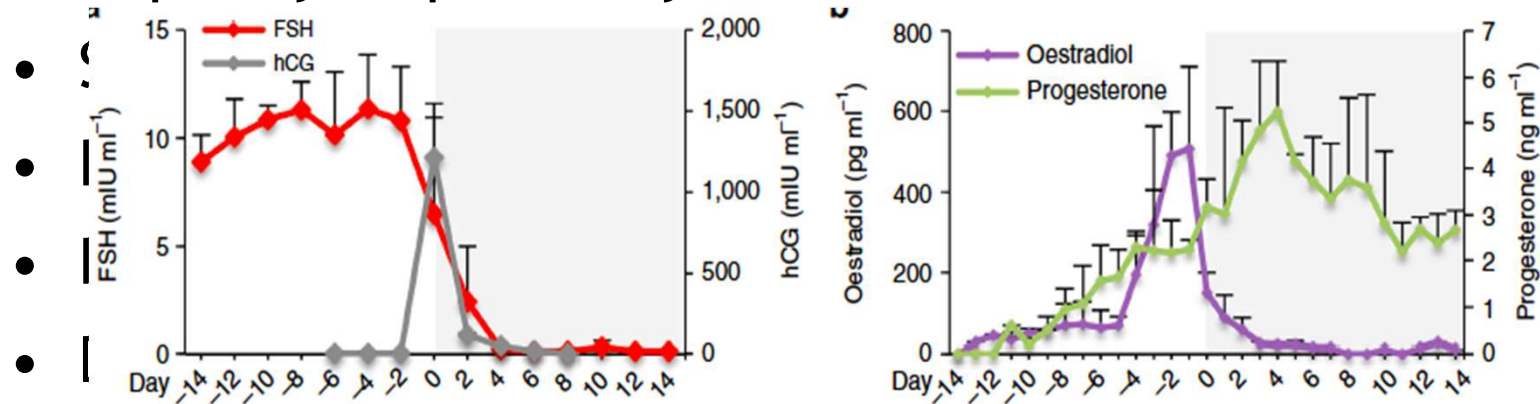
- OoCs, MoCs, and HoCs
 - Organs-on-a-chip, multiple organs-on-a-chip, human-on-a-chip - aka microphysiological systems (MPS)
- Precision-engineered human cell culture systems that recreate tissue-level functions
- Why are they better?
 - They allow cells to interact in a “living” way, to replicate the complex interactions found within a human
 - They are not rats, mice, rabbits, dogs, or monkeys
 - They are not cancerous cells stuck to an unnatural, flat, hard surface

What do OoCs look like?

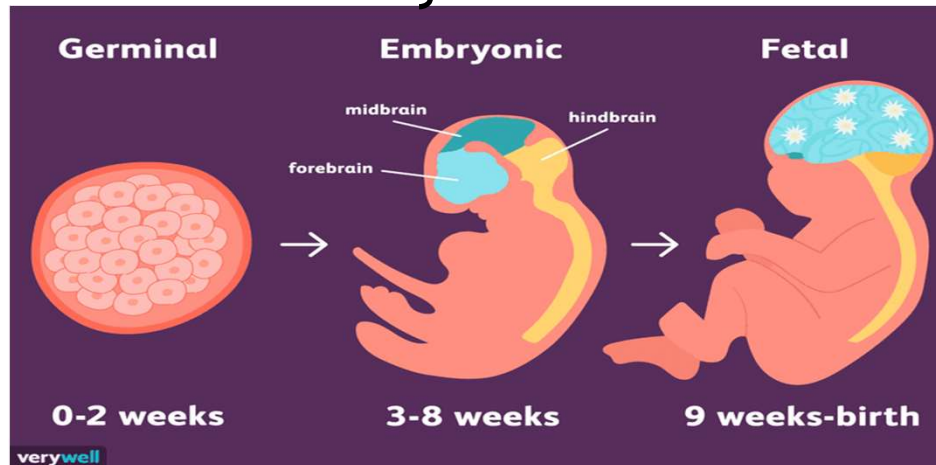


Can OoCs replace animals?

- Reproductive treatments



- Developmental toxicity



Future of OoC technology

- Technical barriers to overcome
 - Cells, vascularisation, microstructure, immunocompetence, materials etc
- FDA willing to adopt technology for drug testing (involved since 2010) - OECD position is less clear
- Provide non-animal solutions to difficult toxicity tests
- Model diseases - OoCs, MoCs, & HoCs could replace animals in drug testing
- Major companies are adopting technology

L'ORÉAL

AstraZeneca 

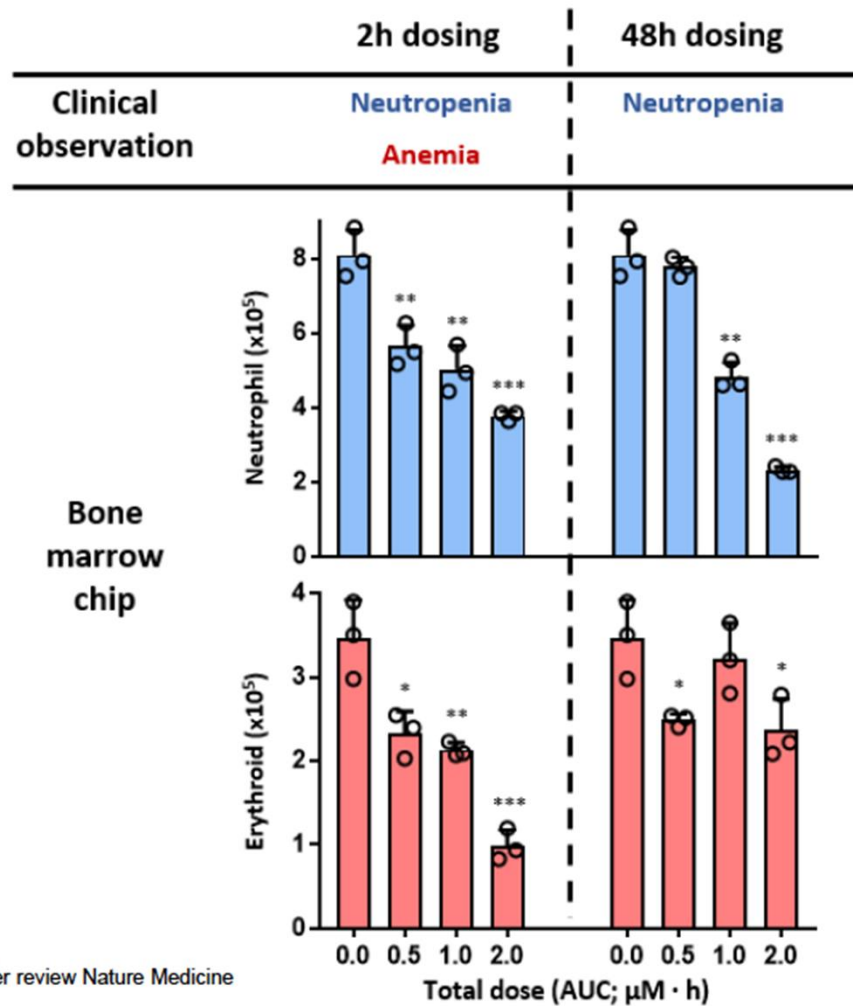
Roche

Janssen
PHARMACEUTICAL COMPANIES
OF Johnson & Johnson

 Ainylam®
PHARMACEUTICALS

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Microphysiological system replicates lineage-specific toxicity of clinical asset 2 across 2 different dosing regimens



With thanks to Dr Lorna Ewart, IMED Biotech Unit, Drug Safety & Metabolism, AstraZeneca

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So can organs-on-a-chip replace animal testing?

- Yes, potentially
- Evidence required that OoC technology provides solutions to problems facing pharmaceutical, personal care, & chemical industries
- Many companies are already on the pathway AND creating the evidence
- Next 3 to 5 years critical to establish irreversible momentum for change