A Gut-on-a-chip for the Study of Food Effects on Human Health

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Food for health

1946

2019
Models of the gut

Animal Models

In vitro Macro-Models

In silico Models

In vitro Micro-Models

The University of Sydney
Standard Static Culture

- Tests after weeks
  - No physiology
  - Cannot be customised
  - No flow of luminal content

Microfluidics Organs on chips

- Three times faster
- Microphysiological
- Can be customised
Gut-on-a-chip

Caco-2

Inlet Top

Inlet Bottom

Outlet Top

Outlet Bottom

Macrophages

Channel area 0.32 cm$^2$
Gut-on-a-chip

Day 0  Day 1  Day 6 - Dynamic

DAPI (nuclei)
Zonula Occludens
Testing-on-a-chip
Thank you!

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- Adj. Prof. David F. Fletcher
- Dr. Peter Valtchev
- Dr. Jun Lae Cho
- A. Prof. Aaron Schindeler
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