

# Mind the gut

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## Propositions

Accompanying the dissertation

# Mind the gut: Advancing intestinal organoid technologies

by

**Panagiota Kakni**

Maastricht, 3<sup>rd</sup> February 2023

1. Animal models do not accurately reflect the complexity and physiological responses of the human intestine, thus there is a great need for representative and robust human *in vitro* models. (*This thesis*)
2. Organoids bridge the gap between traditional 2D culture systems and *in vivo* models. (*This thesis*)
3. The future of intestinal organoid models lies in the combination of advanced biology and microfabrication technologies. (*This thesis*)
4. The organoid models described in this thesis advanced our understanding of 3D *in vitro* models and provided powerful platforms to study intestinal physiology and disease, and conduct high-throughput nutrient and drug screenings. (*This thesis*)
5. “We tried to make something much more holistic and simple. When you first start off trying to solve a problem, the first solutions you come up with are very complex, and most people stop there. But if you keep going, and live with the problem and peel more layers of the onion off, you can often times arrive at some very elegant and simple solutions.” (*Steve Jobs, Impact of this thesis*)
6. “Over the past 30 years, the use of various, equally valuable animal model systems, as well as 2D human cancer cell lines, has led to an explosion of knowledge about human development and mechanisms of disease, but it has also revealed the limitations of these same model systems in emulating human pathophysiology.” (*Jihoon Kim, Bon-Kyoung Koo & Juergen A. Knoblich*)
7. “Because reductionism is often the key to unravelling intricate biological questions, *in vitro* models can be vital to scientific discovery.” (*Ilaria Chiaradia & Madeline A. Lancaster*)
8. “The current challenge is to engineer cellular complexity into organoids in a controlled manner that results in organized assembly and acquisition of tissue function.” (*Takanori Takebe & James M. Wells*)
9. “Excellence is never an accident. It is always the result of high intention, sincere effort, and intelligent execution; it represents the wise choice of many alternatives - choice, not chance, determines your destiny.” (*Aristotle*)
10. “There are, in effect, two things, to know and to believe one knows; to know is science; to believe one knows is ignorance.” (*Hippocrates*)