

Porcine intestinal organoids as a model to explore the function of the small intestinal epithelium

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Organisation

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Specific Research Group or Service Laboratory of Immunology

Country Belgium

Geographical Area Flemish Region

SCOPE OF THE METHOD

The Method relates to	Animal health
The Method is situated in	Basic Research, Translational - Applied Research
Type of method	In vitro - Ex vivo
Species from which cells/tissues/organs are derived	swine

Type of cells/tissues/organs	small intestine
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DESCRIPTION

Method keywords

gut organoids

epithelium

adult stem cells

3D Cell culture

primary cell culture

Scientific area keywords

Host-pathogen interactions

epithelial cells

drug transport

gut health

gut barrier

Method description

Advances in cell culture methods allowed 3D culture of gut epithelial cells derived from adult intestinal epithelial stem cells in mice and humans. We show that starting from crypts cultured in an extracellular matrix hydrogel together with essential growth factors, gut organoids can be grown from all segments of the small intestine in swine. These gut organoids and better mimic the *in vivo* environment in response to bacterial toxins as compared to traditional cell lines. Small intestinal organoids will be instrumental to decipher epithelial cell responses to gut pathogens, to model drug transport and to evaluate effect of compounds on gut health in swine.

Lab equipment

- Incubator;
- Biosafety cabinet.

Method status

Still in development

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

- Primary cells;
- Better resembles *in vivo* intestine;
- 3D cultures;
- Versatile applications.

Challenges

- Access to the apical membrane of the epithelial cells in 3D culture;
- Lack of other cell types, such as immune cells.

Modifications

Co-cultures with other cells, like immune cells, might be explored.

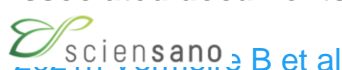
REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Vermeire B., Gonzalez L.M., Jansens R.J.J., Cox E., Devriendt B., 2021. Porcine small intestinal organoids as a model to explore ETEC–host interactions in the gut. *Veterinary Research* 52:94.
<https://doi.org/10.1186/s13567-021-00961-7>

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