

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

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Organisation

Name of the organisation Ghent University (UGent)

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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

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 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>

Associated documents

[2021h Vermeire B et al porcine small intestinal organoids and ETEC_Vet Res.pdf](#)

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