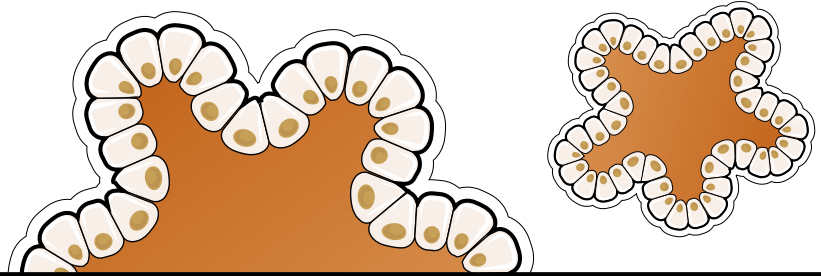


What are organoids?

An organoid is a miniature version of an organ. They are useful for research in the lab (*in vitro*) and are models that can be used as an alternative to animals (*in vivo*).



MINI-GUT AS AN ALTERNATIVE FOR ANIMAL TISSUE

Intestinal organoids, mini-guts, can be used to study transport and interactions between food ingredients and the gut lining, concluded a multidisciplinary research team led by Professor Jerry Wells of the Animal Sciences group.

Infographic Pixels&inkt

1

- A** The researchers used stem cells from the duodenum of a mouse to grow the organoid.
- B** The gut is a tissue that regenerates itself from stem cells. Mini-guts can now be made for different animal species, like chickens or pigs. This can be done using slaughterhouse waste, or donated tissues so no animals are killed for their stem cells.

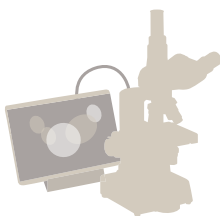
A stem cell from the duodenum of a mouse

A

4

What do they study?

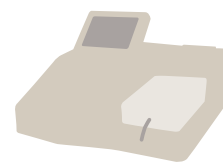
Now the researchers can study the positive and negative effects of the protein sources. To do this they look at for example:



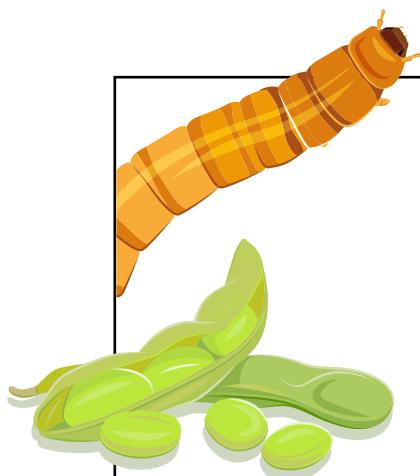
Microscopic changes in the cells



Differences in cellular gene expression



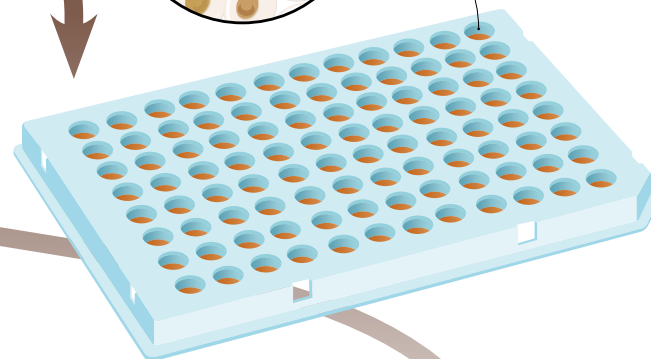
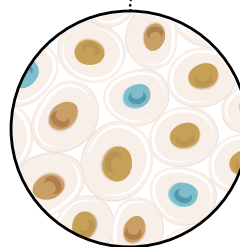
Biochemical processes, such as enzyme reactions



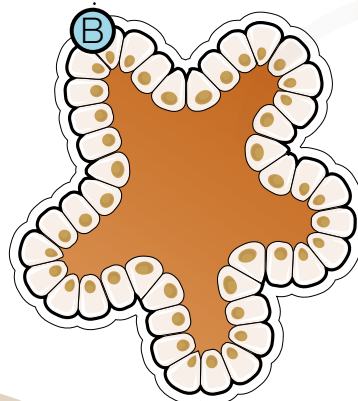
These cells are then grown in a monolayer (one cell layer thick) on a semi-permeable membrane, so that the cells take up an orientation just like in a real gut. The cells are then exposed to different alternative sources of protein for animal feed, such as soya beans, yellow mealworms or black soldier fly larvae.

3

The single layer of cells that functions as a gut wall



Organoids grown from a stem cell



2

The organoid, containing different cell types, grows as a kind of hollow ball of cells in a 3D matrix. This makes it difficult to get the test substances on the inside, which is the surface exposed to food. To make it easier, the researchers separate the cells.

