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Development of an intestinal absorption model based on organoids obtained from pig duodenum tissue

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Background: Our research interest is to evaluate the influence of the food matrix on the bioavailability of bioactive compounds, such as GABA, which can be released by bifidobacterial strains. Then, our aim was to develop an absorption model closer to the physiological condition.

Methods: Tissue excised from a duodenal pig section was treated to release stem cells which were cultivated to obtain intestinal organoids. These were used to generate 2D monolayers, which absorptive capability was compared with the reference Caco2/HT29-MTX model.

Results: Preliminary data shows a reduction in the monosodium glutamate (MSG) amount quantified by HPLC, which is the substrate for the bioconversion in GABA, in the apical compartment of the transwell system after 3 and 6 hours of incubation in both models. The reduction in MSG increased with the time and the amount detected in the basolateral compartment was very small. This suggests that an effective absorption of this GABA precursor occurred.

Conclusion: We are on the way to develop an absorption model that could better mimic the uptake of bioactive compounds from functional foods on the upper part of the small intestine.