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Two-dimensional cultured intestinal stem-cell derived organoids as a model to test nutritional compounds for intestinal health

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We developed a two-dimensional (2D) intestinal stem cell-derived organoid model with both crypt and differentiated villus cells (enterocytes, goblet cells and enteroendocrine cells) to study safety and efficacy of compounds. Organoids were grown from duodenal, jejunal and ileal tissue. We show that these 2D organoid cultures maintain location-specific gene expression and responses, e.g. that the artificial sweetener rebaudioside A (derived from Stevia) stimulates production of GLP1 specifically by ileal enteroendocrine cells. Furthermore, we grow 2D

intestinal organoid cultures in transwell format to confluent monolayers with build-up of electrical resistance, low FD4 leakage and responsiveness to cytokines. Our data indicates that our 2D intestinal organoid model allows studying effects of compounds beyond possibilities with standard epithelial cell lines. We are currently exploring this culture method to investigate effects of other nutritional compounds on the intestinal uptake and mucin production.

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