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Morphology related functionality in Caco2/HT-29 co-culture cells: a versatile model of human intestinal epithelium

Paola De Luca, Francesca Arnaboldi, Margherita Maggioni, Elena Donetti, Amelia Fiorilli, Anita Ferraretto

Dipartimento di Scienze Biomediche per la Salute, Università di Milano, Milano, Italy

Caco2 and HT-29 cells represent two frequently used cell models of intestinal epithelium. Both cell lines consist of cells of tumour origin induced to differentiate but while Caco2 cells differentiate mainly toward absorptive entherocytes, HT-29 cells differentiate toward entero-endocrine/mucus secreting, goblet entherocytes (Zweibaum et al. 1991). Co-cultures of Caco2 /HT-29 cells, when completely characterized, could represent a more physiological model for drug absorption and intestinal tumor studies. Caco2/HT-29 co-culture at full confluency shows a proliferation rate, measured by tetrazolium colorimetric assay (MTT), intermediate to that of parental HT-29 and Caco2 cells. Protein content progressively increases with days of post confluence, corresponding to the presence of multilayers, as revealed by TEM. Alkaline phosphatase and sucrase-isomaltase are two known biochemical markers of intestinal cell differentiation. In Caco2/HT-29 co-cultures the ALP activity progressively increases while the sucrase-isomaltase activity decreases with days at post-confluence. These results are similar to the ones reported for the parental cell lines and reflect the development of a functionally differentiated epithelium, in agreement with the observed morphology. Trans electrical epithelial resistance (TEER), indicative of the barrier properties of the formed monolayer, increases with days at post confluence up to the 6^{th} day. Taken together the present data identifies Caco2/HT-29 co-cultures here analysed as a valid model of human intestinal epithelium, characterized by the presence of more than one intestinal citotype thus with wide possibilities of use for all the studies needing a physiological model as much as possible comparable to human intestine.

References

[1] Zweibaum et al. (1991) The gastrointestinal system IV. In Handbook of Physiology, 4th edn (Rauner BB, Field M, Frizzel RA & Schultz SG, eds), 223–255.

Keywords

Human intestinal cell co-culture, proliferation rate, enzyme assays, TEER.