

ADVANCED IN VITRO MODEL OF INTESTINAL BARRIER

^{1,2} [Isabella De Angelis](mailto:isabella.deangelis@iss.it), ^{1,2} Valentina Prota, ³Olimpia Vincentini

¹Environment and Health Department; ²Multidisciplinary Unit on Nanomaterials and Nanotechnologies;

³Dipartimento Sicurezza Alimentare, Nutrizione e Sanità Pubblica Veterinaria

Istituto Superiore di Sanità (ISS), Rome, Italy

isabella.deangelis@iss.it

In vitro cell culture systems of the intestinal barrier constitute a good and reliable model to investigate early interactions between human body and ingested materials.

Over the past thirty years, the Caco-2 cell line, obtained from a human colon adenocarcinoma but able to differentiate in long-term culture on permeable inserts system, has been considered the most popular and exploited model of *in vitro* small intestinal mucosa. Nevertheless, Caco-2 monoculture does not correctly represent the complex environment of the intestinal barrier in which many cell types of different origins interact with each other. Recently, a tri-culture model Caco-2/HT29-MTX/Raji-B, improving the physiological relevance of the *in vitro* barrier system, has received growing interest for the assessment of nanoparticles uptake/translocation processes in the gastrointestinal tract.

In the framework of national and EU projects, a pilot study to standardize and optimize this tri-culture model was performed at ISS. Although some critical issues still need to be solved, the tri-culture has shown good performance in terms of stability and reproducibility.

Presents results are challenging towards the use of advanced *in vitro* models as reliable alternative to animal test in nanosafety area, also in the perspective of their regulatory application.

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