# Caco-2/HT-29 cells absorption effect of insulin loaded into chitosan-coated SLN

**C. Gehm[1,2*], J. Fonseca[1], B. Sarmento[1], D. Ferreira[1]**

[1]Department of Pharmaceutical Technology, Faculty of Pharmacy, University of Porto, Portugal.
[2]Department of Health Sciences, Faculty of Pharmacy, Regional University of Northwest of Rio Grande do Sul, Brazil

*cristianegehm@hotmail.com

Oral insulin is expected to become a new kind of treatment of diabetes that makes it less disruptive and reduces reliance on injections [1], increasing the adherence to the treatment. However, the oral bioavailability of insulin is still low because of chemical and conformational stabilities, cellular and luminal enzymatic degradation in the gastrointestinal tract and poor intrinsic penetration of the intestinal membrane [2], its incorporation in nanoparticles is explored to overcome some of these drawbacks.
Some pharmacological properties of conventional drugs, such as pharmacokinetics and biodistribution, can be improved with the incorporation of those in nanoparticles [3], among them the carriers with lipid nature. Solid lipid nanoparticles (SLN) are generally well tolerated by the body and do not have most of the disadvantages of colloidal carriers, what make them an alternative to the polymers used in the production of medicaments [4].
Caco-2 cells are used to study oral drug absorption because they are an established cell model for the intestinal epithelium [1] and HT-29 cells, as mucus-secreting cells [5], demonstrate with great precision the intestinal epithelium. As our interest is to investigate the permeability of insulin across Caco-2, HT-29 and co-culture (90:10, 80:20, 70:30, 50:50) cells monolayers in Transwell® and Ussing chamber. Insulin was entrapped into Witepsol E85® SLN by W/O/W multiple emulsion and further coated by chitosan to take advantage of its mucoadhesive properties. Insulin was determinated by HPLC.

Our results demonstrate that Caco-2/HT29 co-culture cell model is a reliable system to correlate *in vitro* insulin absorption with in vivo animal model. We also found that absorption insulin entrapped into chitosan-coated SLN seems to be a promising alternative for the development of a formulation for oral insulin administration.

References:

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