Lipid based delivery systems design and development for inflammatory and infectious diseases

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The pharmaceutical research is increasingly linked to nanotechnology, due to the remarkable characteristics of nanoscale vectors for drug delivery. Among the multiple approaches, lipid based nanoparticles are considered the most promising since they are composed by highly biocompatible molecules and may enable site-specific release of bioactive compounds due to their high stability, high carrier capacity and ability to load both hydrophilic and hydrophobic substances.
In this presentation, two examples of these types of nanoparticles as drug delivery systems will be discussed. Emphasis will be given to the rational design, focused on nanoparticles features, the physico-chemical properties of the encapsulated bioactive compounds, the target microenvironment and how the three should guide formulation choices. Simultaneously, key characterization procedures and *in vitro* interaction studies will be pointed out.
The first study describes hyaluronic acid-conjugated pH-sensitive liposomes as an effective drug delivery-targeting strategy to synovial cells [1]. Overall, results reveal that conjugated pH-sensitive liposomes are a promising nanoapproach for the targeted delivery of prednisolone within inflamed synovial cells for rheumatoid arthritis treatment.
The second study addresses the encapsulation of amoxicillin in lipid nanoparticles, increasing the retention time at the site of infection (gastric mucosa), while protecting the drug from the harsh conditions of the stomach lumen [2]. Overall, the designed formulations present suitable physico-chemical features for being henceforward used by oral administration to treat *Helicobacter pylori infections* (figure 1).

REFERENCES

[1] Virgínia M Gouveia, *et al*, Nanomedicine, 13(9) (2018), 1037-1049.
[2] Daniela Lopes-de-Campos, et al., International Journal of Nanomedicine. 14 (2019) 2781–2795.

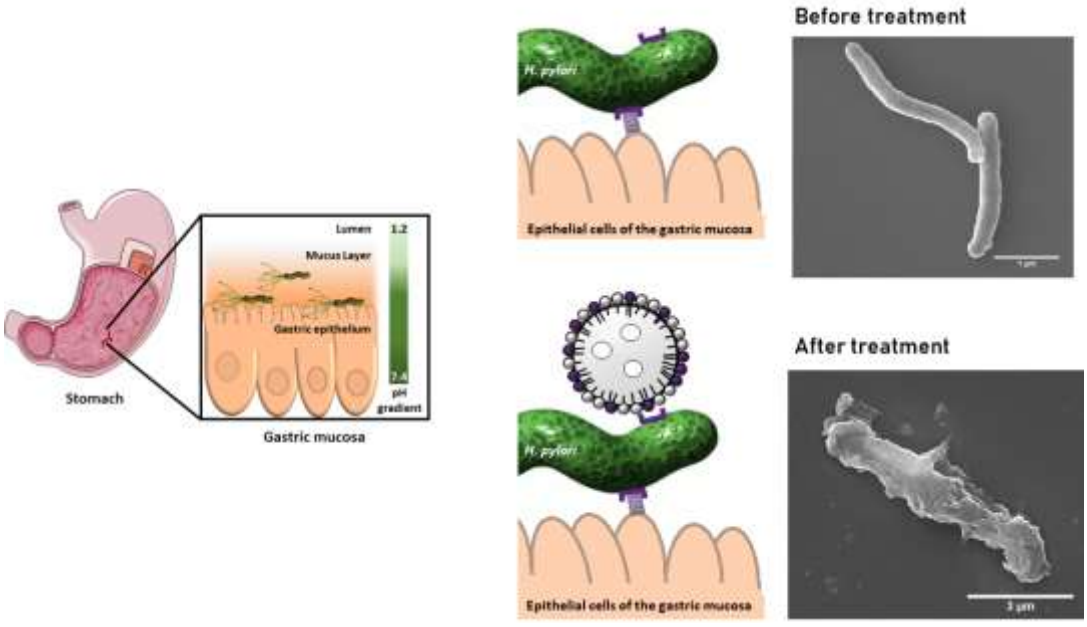

Figure 1: Lipid nanoparticles strategy to target *Helicobacter pylori*.