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Drugs and mucus: an innovative biosimilar mucus model to study the diffusion of drugs

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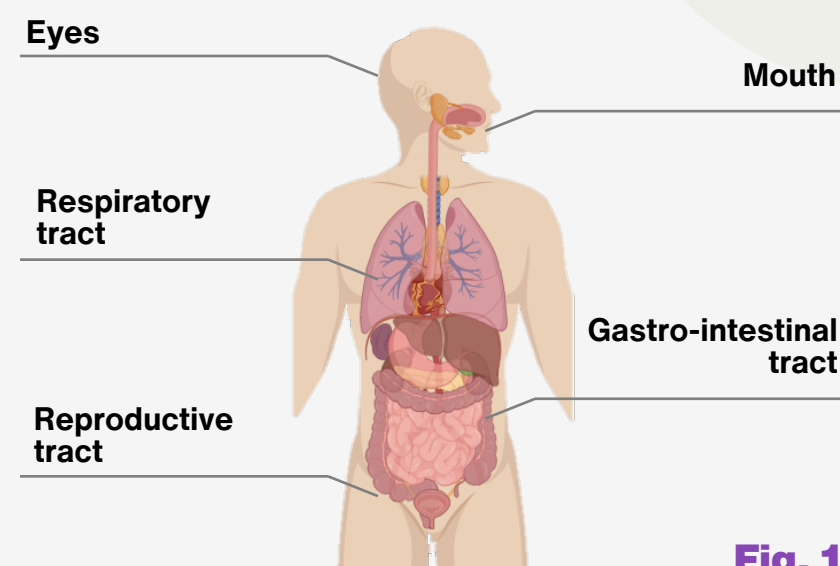


Fig. 1

Mucus distribution

Mucus covers all the wet tissues of the human body. Mucus is helping us staying healthy. It is a natural barrier (Fig 1).

Mucus barriers

Mucus is a selective barrier against pathogens however, it is an obstacle even for drugs orally administered. Drugs may rest trapped into the mucus network (Fig 2).

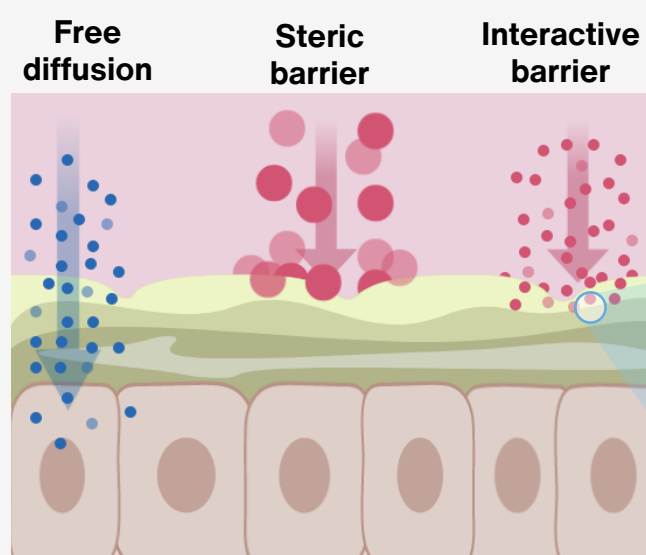


Fig. 2

Up until now there are no standard protocols that model the passage of molecules through mucus.



Pharmaceutical companies need an *in vitro* screening mucus model in order to reduce the number of non effective drugs reaching preclinical trials.

Physico-chemical characteristics

The mucus model Mu³Gel, produced by Bac³Gel (www.bac3gel.com) reproduces the physico-chemical properties of cystic fibrosis mucus.

Rheological parameters such as the elastic (G') and the viscous (G'') modulus of the biosimilar mucus are as similar as possible to the pathological mucus (Fig. 3).

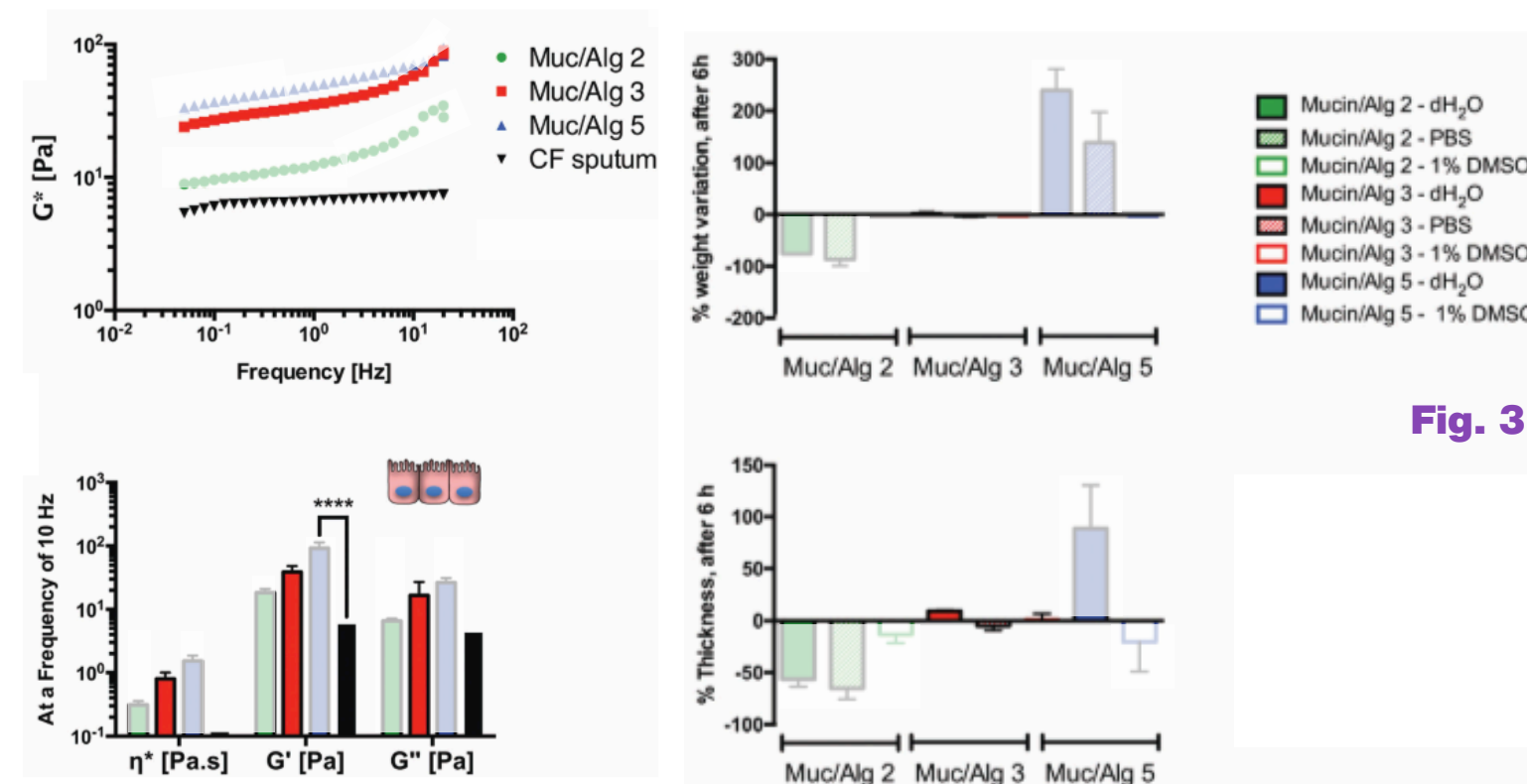
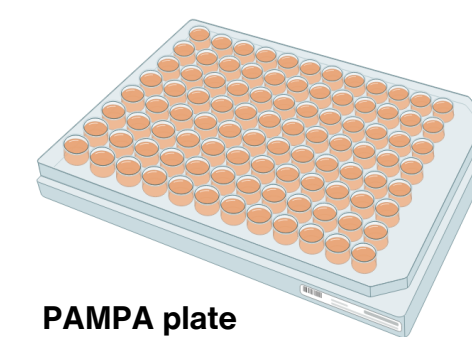


Fig. 3

Diffusion of drugs

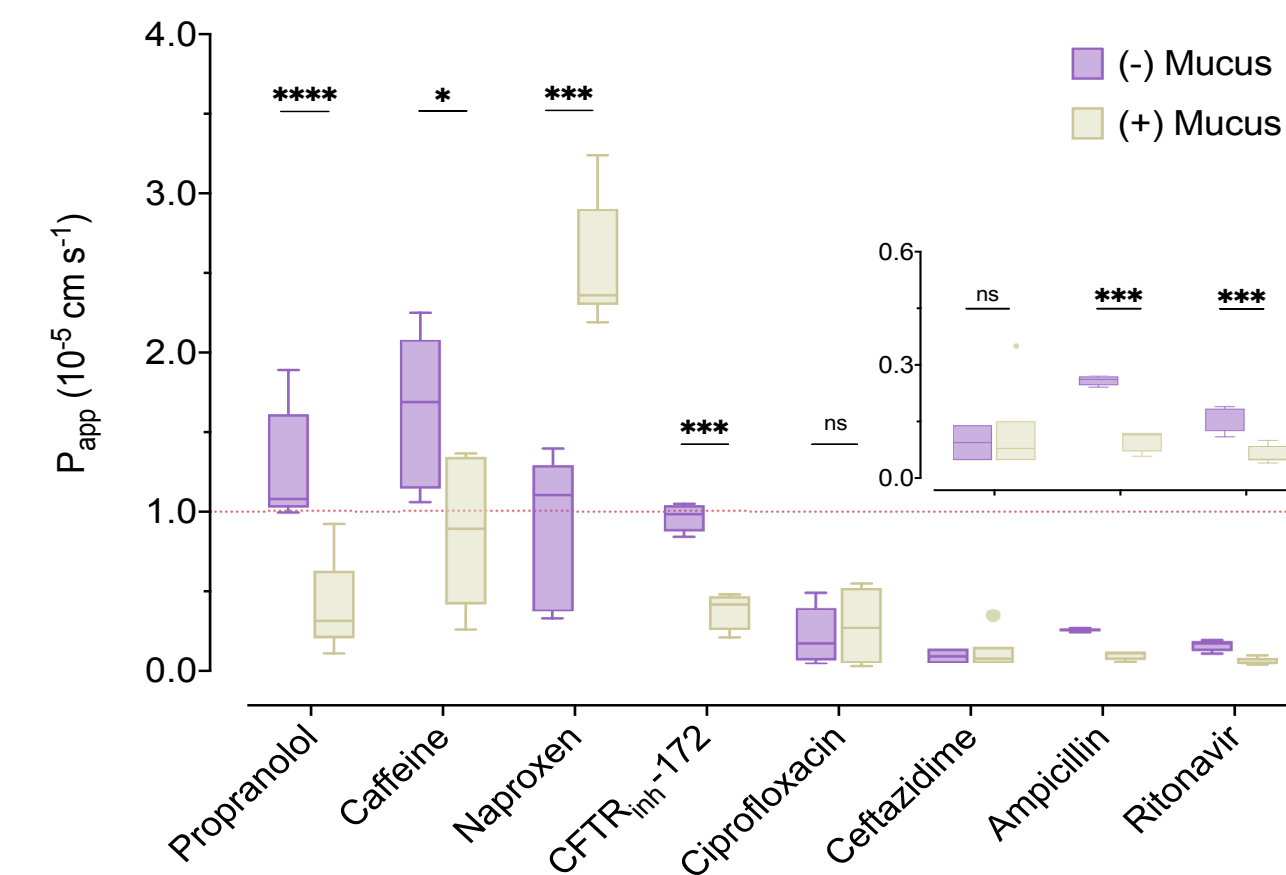
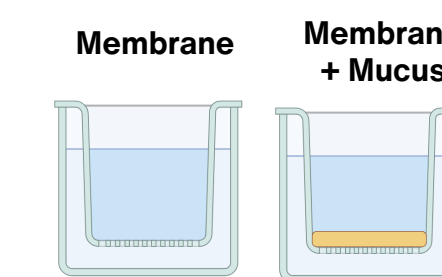
The mucus model can be coupled to classic diffusion platforms (e.g. PAMPA) for high throughput analysis.

The diffusion across the mucus model of different drugs was studied by means of PAMPA and compared with the diffusion rates in absence of mucus (Fig. 4).



PAMPA plate

Fig. 4



Take home messages

- Mu³Gel is fully tuneable. The production method allow to incorporate other mucus components
- Mu³Gel reproduces the interactive and steric barrier of human mucus
- Mu³Gel is cytocompatible
- Mu³Gel can host different and competitive microorganisms
- Mu³Gel is easy to use and easy to produce

