



Wolfson Department of Chemical Engineering Special Seminar

Lecture Hall 6, Wolfson Department of Chemical Engineering,

Wednesday June 28th at 13:30

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Chemical Engineering, Technion

Permeation of Macromolecules Through the Mucosa Layer

Abstract

In recent years, there has been a search for non-invasive routes of drug delivery that exclude the need for injections. The main reason is the growth in use of therapeutic agents such as peptides and proteins that cannot be administered orally since their intestinal absorption is limited by hydrophilicity and large molecular weight characteristics. With injection, the drug can access the blood circulation and the tissues directly however it can harm the tissues and can cause discomfort for the patient. Several alternative routes of delivery have been investigated for such molecules, including nasal, vaginal, buccal and pulmonary routes, but each of them have limitations associated with the mucous layer.

Understanding the mucous physiologic for the transport of peptides and proteins can help designing product that can overcome the barriers and enhance the mucous layer for delivery of these macromolecules. In this work, we proposed to transfer macromolecule drug through the mucous layer with an appropriate absorption enhance, Taurine and N-Acetylcysteine.

To study the permeation of a model macromolecule (Blue Dextran) through the mucous layer we used home-made glass vertical Franz diffusion cell. Our results showed that dextran permeation in the presence of taurine is grater then in the absence of Taurine, and the permeability of dextran in the presence of NAC didn't improve at all. Measurements of Small Angle X-ray Scattering were performed with mucin, Taurine, NAC, and their mixture with mucin, and the results show no change in the X-ray scattering between the mucin and the mucin mixture. Another measurement that we did was viscosity, the results showed that the mucin viscosity in the presence of NAC is lower than mucin viscosity in the presence of Taurine. Moreover, the mucin viscosity alone is higher than its viscosity in mixtures.

To conclude our work, we found out that Taurine, affects the mucin layer and increases the permeability of the BD. In contrast, the NAC, which lowers the viscosity of the mucin more than Taurine, do not cause an increase in permeability due to his interaction with the sulfide group in the mucous layer.

Refreshments will be served at 1:15pm