EuroSciCon

EuroSciCon Conference on

Nanotech & Nanobiotechnology

July 12-13, 2018
Paris, France

W Daear et al., Nano Res Appl 2018, Volume 4
DOI: 10.21767/2471-9838-C2-011

BIOPHYSICAL STUDIES ON THE INTERACTION OF POLYMERIC NANOPARTICLES WITH THE LUNG SURFACTANT

W Daear and E J Prenner
University of Calgary, Canada

The pulmonary route offers many advantages for drug delivery such as the high surface area and the close proximity to the blood circulation. The air-blood barrier of the alveoli in the lungs is around 500 nm thick. Above the epithelium cells of the alveoli lies a thin aqueous layer with a thickness of 50-80 nm. A monolayer of phospholipids, natural lipids and few proteins called the lung surfactant (LS) adsorbs onto this aqueous film. The major phospholipid classes include phosphatidylcholines and phosphatidylglycerols. One of the main roles of the LS is to reduce the surface tension experienced in the lungs during breathing cycles in order to prevent lung collapse. From the perspective of pulmonary drug delivery, the LS is the first point of interaction for the drug carriers. With the advancements of nanomedicine, nanoparticles (NPs) became highly relevant as novel drug delivery systems. In particular, there is a great scientific interest for the use of biodegradable NPs for the pulmonary delivery route. The objective of our work is to develop a biomimetic model of the LS and study the effects upon interaction with NPs. Therefore, we focus on understanding the mechanism of interaction between biodegradable polymeric NPs with the biomimetic model of the LS and test whether the stability and lateral architecture of LS is affected. These measurements are done by using Langmuir monolayers at the air-water interface and imaged using Brewster angle microscopy. Results show that the film stability upon compression is not affected, but there are significant changes in the lateral domain organization of the LS upon NP addition. This work is significant because it helps understand the mechanism of NP-LS interaction and will provide an *in-vitro* screening approach to assess nanotoxicology.

Biography

W Daear is a PhD Candidate at the University of Calgary. She has a Bachelor's degree in Biological Sciences with a minor in Nanoscience. She currently has 3 publications in peer reviewed articles (*J. Phys. Chem. B., Colloids Surf. B, and Biochim. Biophys. Acta, Biomember*).

wtdaear@ucalgary.ca