Contribution ID: **1194**   Type: **Oral (Student, Not in Competition) / Orale (Étudiant(e), pas dans la compétition)**

Red Blood Cell Ghosts for biomedical applications: Blood on a Chip

Wednesday 15 June 2016 10:15 (15 minutes)

The preparation of Red Blood Cell (RBC) Ghosts is a well-known protocol in biological and medical research. It describes the extraction of the membranes from RBCs. Another well-known protocol is the preparation of highly ordered stacks of artificial lipid bilayers on silicon wafers. This technique is useful for analyzing the molecular structure and dynamical properties of these bilayers via X-Ray and neutron scattering experiments, and other biophysical techniques. Such experiments in particular allow the study of the interaction between cell membranes and drugs, small molecules, and bacteria.

There are various attempts to adapt this protocol to a native cell membrane. For the first time we were able to combine both described protocols and to prepare highly ordered stacks of RBC membranes on silicon wafers. These systems can now be used as inexpensive and safe platforms for testing the effect of drugs and bacteria on RBC membranes in-vitro using biophysical techniques, such as X-ray and neutron diffraction, optical spectroscopy and AFM.

We present the preparation and characterization of "Blood on a Chip" from molecular structure to the morphology of the membrane assemblies. Aspirin, which is commonly used in the "low-dose-aspirin therapy" was found to have a drastic effect on our human blood membranes and leads to a significant softening and fluidification of the membranes.

Author: HIMBERT, Sebastian (Mcmaster University)

Co-authors: DHALIWAL, Alex (McMaster University); RHEINSTADTER, Maikel (McMaster University); ALSOP, Richard (McMaster University)

Presenter: HIMBERT, Sebastian (Mcmaster University)

Session Classification: W1-4 Radiation Therapy (DPMB-DNP) / Thérapie par rayonnement (DPMB-DPN)

Track Classification: Physics in Medicine and Biology / Physique en médecine et en biologie (DPMB-DPMB)