Type of presentation: Poster

ID-11-P-5784 Influence of HepG2 Cell Shape on Nanoparticle Uptake

Prats-Mateu B.[1,2], Toca-Herrera J.[1]

[1]Department of Nanobiotechnology, Institute for Biophysics, University of Natural Resources and Life Sciences (BOKU), Muthgasse 11, 1190 Vienna, Austria, [2]Department of Material Sciences and Process Engineering,Institut für Physik und Materialwissenschaft,University of Natural Resources and Life Sciences (BOKU), Peter-Jordan-Straße 82, 1190 Vienna, Austria

Email of the presenting author: jose.toca-herrera@boku.ac.at

Cell mechanics tries to understand cell responses to external stress, which can influence a variety of cell functions. Understanding the relation between mechanical stimulus, cell shape and cell function is essential in controlling cell behavior in different environments and conditions. In this poster, we present first results on the effect of cationic and anionic interfaces on cell shape of hepatocellular carcinoma cells (HepG2) and nanoparticle uptake activity. On one hand, HepG2 cells incubated on cationic poly-ethylene imine exhibited a spread-like form with lamellar protrusions. On the other hand, hepG2 cells adopted a more round-like form when hosted on polystyrene sulfonate. The difference in cell shape did not influence the uptake of 49-nm polystyrene particles (driving by diffusion). However, the internalization of 240-nm diameter polystyrene particles was larger on cells seeded on cationic polyelectrolyte (suggesting an active uptake process). The particle uptake was measured at 4ºC and 37ºC and the optimal incubation time was found to be 6 h. Cell shape and particle uptake were monitored by fluorescence and confocal microscopy. Quantification of particle internalization was carried out with flow cytometry. In summary, the results indicate that cell shape can be changed by using ionic interfaces, and that such change influences nanoparticle uptake. It seem that in this context, the mechanical properties of the plasmatic membrane are crucial for cellular uptake, and that possibly the Young modulus could be a physical indicator of such fact. Therefore, more experiments with different functional nanoparticles should be carried out to get more insight about the uptake mechanism.

Acknowledgement: BPM thanks FFG and AIT. The authors acknowledge Monika Debreczeny and Darren Tan Cheng-Weng for technical help.

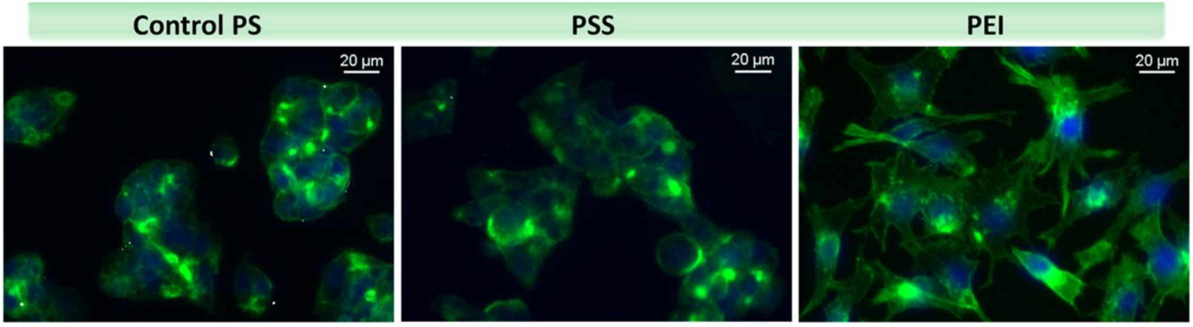

Fig. 1: Fluorescence microscopy graphs of HepG2 cells on three different substrates: control polystyrene (PS), polystyrene sulfonate(PSS), and polyethylenimine (PEI). Adherent cells on PEI show atendency to spread and cover higher surface area than cells on PSS orPS.