Conference abstract SL-12

Pluronic® F-68 Enhances the Nanoparticle-Cell Interaction

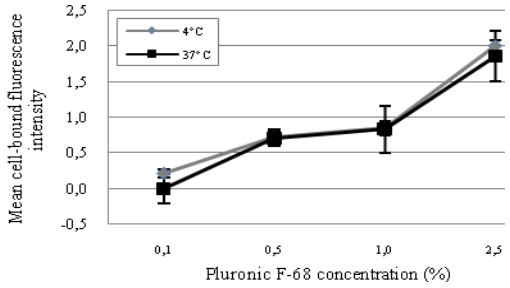
V. KERLETA [1], I. ANDRLIK [1], M. SCHNEIDER [2], T. FRANKE [2], M. WIRTH [1], F. GABOR [1]

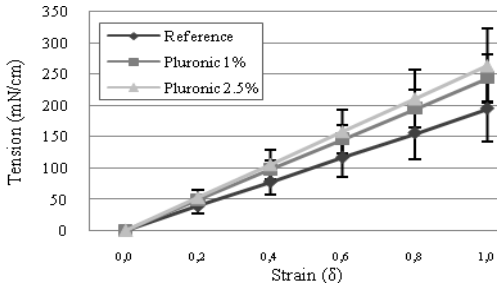
[1] Dept of Pharm. Technology a. Biopharmaceutics, Univ. of Vienna, Althanstr. 14, A-1090 Vienna, Austria
[2] Institute of Physics, Univ. of Augsburg, Universitätsstr. 1, D-86135 Augsburg, Germany

E-mail: vera.kerleta@univie.ac.at (V. Kerleta)

Sci Pharm. 2009; 77: 179 doi:10.3797/scipharm.oephg.21.SL-12

Nowadays, the various surfactants find wide application in pharmaceutical industry. The nanoparticle preparation process by emulsion techniques essentially requires a surfactant, most commonly Pluronic® F-68 [1]. This non-ionic tenside influences cell physiology and was tested in clinical trial for the treatment of sickle cell disease [2] and myocardial infarction [3]. Out of these reasons, even residual tenside in nanoparticle preparations might influence the cells as well as their interaction with the colloidal carriers. At this, Caco-2 single cells were incubated with fluorescent polystyrene nanoparticles, in presence of increasing amounts of Pluronic® F-68 and cell-associated nanoparticles were detected by flow cytometry. Independent from incubation temperature, the cell-associated fraction of nanoparticles concurrently increased with the tenside concentration. Ongoing from micropipette aspiration experiments this effect could be attributed to an increase of membrane stiffness of Caco-2 cells in presence of Pluronic® F-68. Furthermore, the toxicity assay revealed that viability of the cells remained unaffected at any concentration of Pluronic® F-68.





All in all, the non-ionic surfactant Pluronic® F-68 not only promises as a therapeutic agent but also as a non-toxic enhancer of nanoparticle-cell interaction. That way, the challenge (presently existing limit) of reaching therapeutic levels in drug therapy with nanoparticles might be overcome.

[1] Weissenböck A, Wirth M, Gabor F. WGA-grafted PLGA-nanospheres: preparation and association with Caco-2 single cells. J Control Release. 2004; 99: 383–392. doi:10.1016/j.jconrel.2004.07.025

[2] Adams-Graves P, Kedar A, Koshy M, Steinberg M, Veith R, Ward D, Crawford R, Edwards S, Bustrack J, Emanuele M. RheothRx (Poloxamer 188) Injection for the Acute Painful Episode of Sickle Cell Disease: A Pilot Study. Blood. 1997; 90: 2041–2046. PMid:9292541

[3] Armstrong JK, Meiselman HJ, Fisher TC. Inhibition of red blood cell-induced platelet aggregation in whole blood by a nonionic surfactant, poloxamer 188 (RheothRx injection). Thromb Res. 1995; 79: 437–450. doi:10.1016/0049-3848(95)00134-D