



Séminaire invité

Mardi 10 mars 2009 à 11h

Salle séminaire C3-104
CEA – 17 rue des Martyrs – Grenoble

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Chaire d'excellence, Fondation "Nanosciences" RTRA, TIMC-GMCAO, UJF

Providing permeability to microcapsules with incorporated ion channels

Nanobiotechnology is an interdisciplinary field of research and development that integrates engineering, physical sciences, and biology through the development of very small physical and biological devices using biomimetically inspired nano-fabrication techniques[1]. In this presentation I will describe a nanobiotechnology approach for the fabrication of iontransporting microcapsules. These microcapsules have developed from my studies of liposomes[2] and ion-channel electrophysiology[3,4] and are a step towards constructing an artificial cell which has several biomedical applications[5]. The microcapsules are based on hollow poly(sodium styrenesulfonate) (PSS)/poly(allylamine hydrochloride) (PAH) microspheres that support a lipid bilayer membrane. Engineered ion channels are incorporated into the lipid membrane coating to provide a functional capability to control transport across the microcapsule wall. This controlled transport can be tuned for selective release biomimetically by controlling the gating of the incorporated ion channels. This system provides a platform for the creation of "smart" biomimetic delivery vessels for the effective and selective therapeutic delivery and targeting of drugs. We have also considered ways to use this system as a biosensor that is based on the change in gating of the incorporated ion channels[6].

[1] Martin DK (ed.) *"Nanobiotechnology of Biomimetic Membranes"*, Springer, NY, 2007

[2] di Maio IL et al (2005). *Proc SPIE*, 6036-70 V3, pp1-9

[3] Martin DK et al (1995). *J. Membr. Biol.* 147:305-315

[4] Herok GH et al (2008). *Invest. Ophthalmol. Vis. Sci.* 49:5517-5525

[5] Battle AR et al (2009). *Adv. Func. Mater.* 19:201-208

[6] Krishnamurthy V et al (2007). *IEEE Sensors Journal.* 7:1281-1288

Hôte : iRTSV/Biopusces

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