SEMINAIRE ISMO

Mariléna CARBONE
Dept. of Chemical Science and Technologies,
University of Rome Tor Vergata, Italy

Nanotools from life science to surface

Nanotools can have a fundamental role in the control of pH-regulated cellular and micro-organism functions. For example, an abrupt intracellular pH variation may cause apoptosis and necrosis, which is important in the fight against cancer cells, since they are typically more resistant to extreme pH values. An efficient way to regulate and monitor the intracellular pH is by the employment of exogenous proton caged compounds (PCCs), which release protons upon near UV irradiation. They may be engineered to interact with cells such that they can change the intracellular pH on-command when irradiated with the proper wavelength. It has been observed by infrared spectroscopy, that the coupling of a PCC to gold nanoparticles enhances the intracellular proton release a 100 times and causes low pH values in localized intracellular areas.

When non coupled PCCs are dosed to cells they are confined in nano-vesicles of different size as a function of the incubation time. Their release is, then, regulated by the nano-vesicles breaking.

Metal or metal oxide nanoparticles and PCCs are also known to act as antibacterial agents and may be used to enhance the antibacterial activity. Its effectiveness can be monitored by mapping the distribution of the nanoparticles inside cells and bacteria. For this we use an AFM and infrared spectro-microscopy after immobilization of the biological moiety on a semiconductor surface.

Mardi 15 septembre 2015 à 11h
Bât 351 – 2ème étage (Bibliothèque)
Université Paris-Sud - 91405 ORSAY Cedex