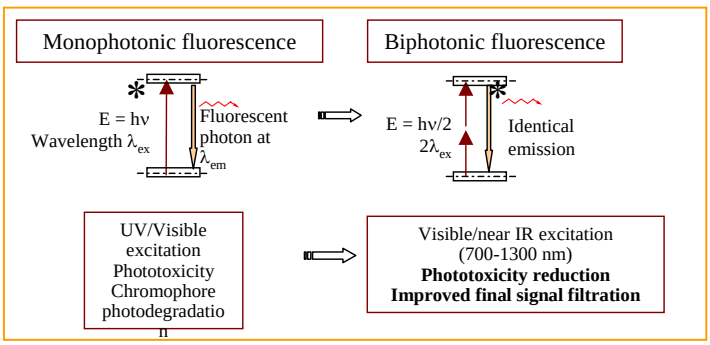
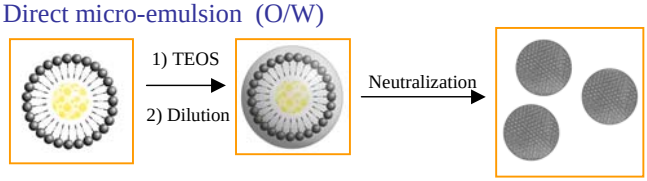
Journées 3N Réseau National en Nanosciences et en Nanotechnologies 6 au 8 novembre 2006

FUNCTIONALIZED NANOPARTICLES FOR MULTIPHOTONIC BIO-IMAGING OF TUMORAL CELLS

Synthesis of nanoparticles encapsulating biphotonic chromophores



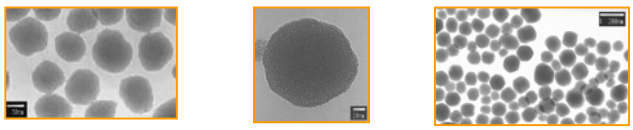
Direct micro-emulsion (O/W)



Surfactant : $CH_3(CH_2)_{15}N(Me)_3B$r

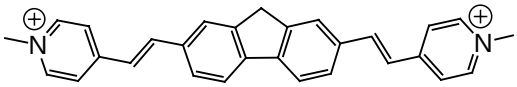
Organic phase

Transmission Electronic Microscopy (TEM) :

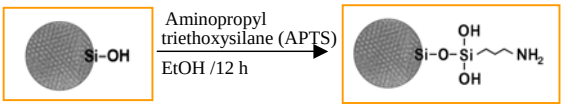


Organized silica nanoparticles encapsulating a biphotonic chromophore

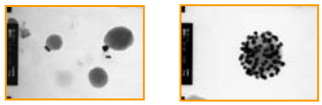
Biphotonic chromophore :



Surface nanoparticles functionalisation



Characterisation by gold nanoparticles grafting

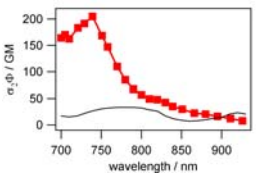


NH_2-free nanoparticles in presence of Au particles **NH2-Au interactions after grafting of APTS**

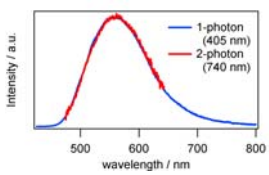
Biphotonic fluorescence

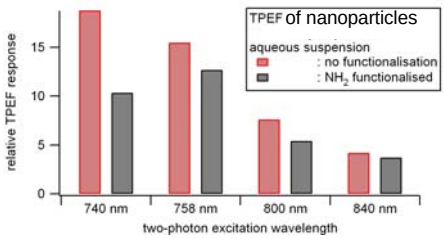
two photon excitation spectrum

5 x 10^{-5} M chromophore in pure H_2O



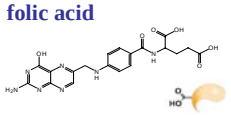
fluorescence emission spectra



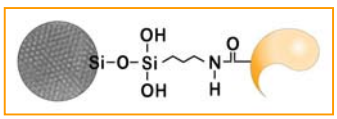


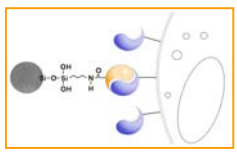
Functionalisation with folic acid

folic acid



→Vitamin B9
→a cofactor in DNA replica





→Folic acid receptors are overexpressed on tumoral cells
→ Thanks to substrate – receptor recognition, nanoparticles
→will accumulate on the surface of the cell
→ Biphotonic fluorescence will then detect the chromophores and subsequently the tumoral cells

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