

# 4<sup>th</sup> World Congress on Cancer Science & Therapy

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## Ultra small gadolinium based nanoparticles for radiotherapy guided by MRI imaging

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This lecture will take place in the field of nanomedicine and will present a new theragnostic compound with high radiosensitizing efficiency. The approach is based on the use of a family of ultrasmall nanoparticles (AGuIX) that can be followed by MRI and can deliver very high doses in the vicinity of the nanoparticle under irradiation. First, a fast description of the synthesis and the characterization of the nanoparticles will be proposed. The particles are made of polysiloxane network and are surrounded by gadolinium chelates. AGuIX particles present high radio sensitizing effect that will then be illustrated by *in vitro* experiments on radio resistant cells under different types of irradiations (photons at different energies, ion). These experiments point out the interest of nanoscale dose deposition for radiotherapy treatment. The behavior of the nanoparticles after intravenous injection in tumor bearing animals will also be presented. Effective passive accumulation of the nanoparticles in the tumors due to enhanced permeability and retention effect is observed by MRI, fluorescence imaging and/or scintigraphy (after labelling by an adapted radioactive isotope). Even at low doses of nanoparticles in the tumor, *in vivo* experiments of radiotherapy show an important increase of the lifespan of tumor bearing rodents. These results are really encouraging for a further transfer to clinical applications.

### Biography

François Lux is former student from Ecole Normale Supérieure de Lyon and has received its PhD in 2007. He was recruited as an Associate Professor in University Lyon 1 in 2009. Since its recruitment by University Lyon 1, he has authored more than 25 publications on nanoparticles for medical applications in peer reviewed journals. He is the coordinator of French ANR program Gd-Lung that evaluates the interest of AGuIX nanoparticles for lung pathologies and co-organizer of nanohybrides meetings that cares about the interest of hybrid nanoparticles for biomedical applications.

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