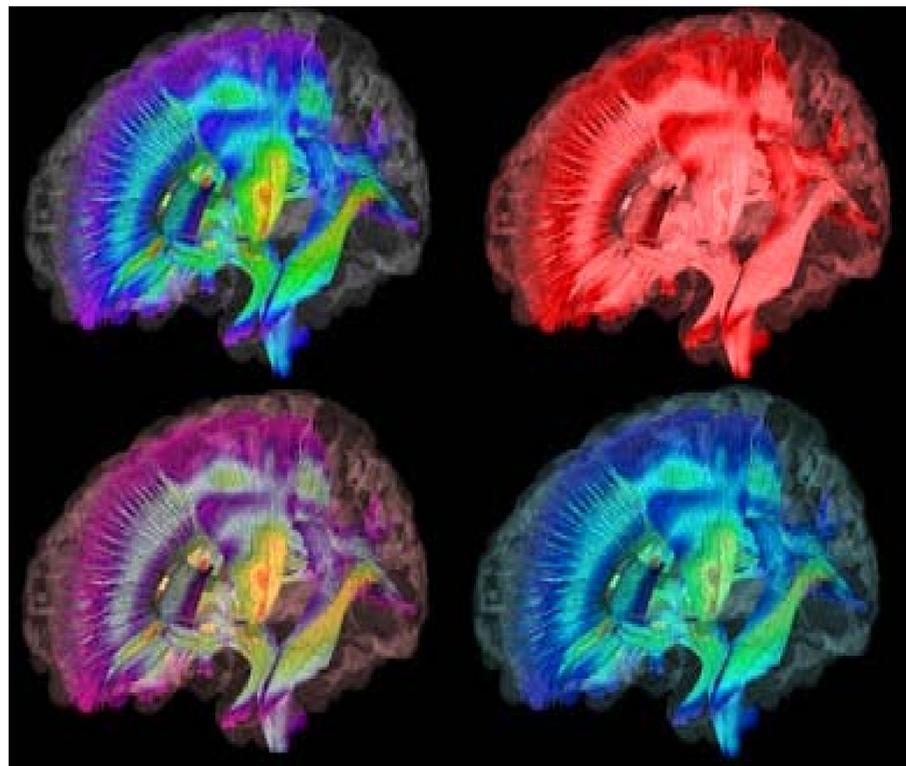# OncoNanoBBB

Development and evaluation of a quantitative imaging technique for assessment of nanoparticle drug delivery across the blood-brain barrier:
Applications for brain cancer therapeutics

The problem

Current treatment options for brain cancer are limited with patients having a poor prognosis. One of the major hurdles is the BBB, which prevents effective doses of drugs reaching the site of disease. There is thus a major need for technologies that can successfully overcome such a hurdle without having a negative effect on safety and tolerability.

The aim of the project is to work on the problem of delivering therapeutic agents, eg for brain cancer, across the blood-brain barrier (BBB) at the efficacious dose. The partners of OnconnanoBBB wish to build a long term European, Industry-Academia consortium, to work on the problem of delivering therapeutic agents, e.g. for brain cancer, across the blood-brain barrier (BBB) at the efficacious dose.

OnconanoBBB Objectives

- Design and synthesis of a range of NPs for in vitro and in vivo assessment, suitable for drug delivery across BBB
- Physicochemical characterization of NPs in different mediums and assessment of their radiochemical stability
- Optimization of NPs formulation using a variety of pharmaceutical excipients
- Investigation of mechanism of action, by carrying out high resolution imaging studies, using endothelial cells both in vitro and in vivo
- Application of a methodology for labeling NPs with radionuclides, without altering their biological properties and by taking into account factors such as ease of preparation and in vitro and in vivo stability
- Assessment of the ability of NPs to enhance transport of a diverse set of existing cancer drugs in in vitro models of BBB
- Establishment of the in vivo pharmacokinetics Structural Distribution Relationship for these NPs via different administration routes
- Establishment of the in vivo Structural Distribution Relationship for these NPs utilized via optimized route identified from above
- Establishment and validation of imaging protocols for screening of Cerense™-formulated chemotherapeutics in models of brain cancer
- Assessment of CNS and non-CNS penetrating chemotherapeutics with and without the Cerense™ technology in in vivo model of brain cancer.

Contact

Scientific Coordinator
Prof. George Loudos (EL)
Technological Educational Institute of Athens, Greece
gloudos@teiath.gr

Project Office
Ms. Theodora Christopoulou
TEI Athens, Greece
thchristopoulou@gmail.com

Project website
www.onconanobbb.eu

The Consortium

The OnconanoBBB brings together a multidisciplinary consortium of specialists in different areas of life science (PPH), technological and radiological sciences (TEIA) and physical science (UoB), united by the aim of developing new and efficient means of treating patients with currently incurable brain diseases.

Project Partners	Role in the project
Technological Educational Institute of Athens (TEIA)	Project coordinator; Provide validated animal models of brain cancer; Radiolabel NPs; Carry out imaging studies
Pharmidex Pharmaceutical Services Limited (PPH)	Provide the drug delivery technology; assess brain penetrability; CNS drug discovery expertise; Biodistribution and safety studies
University of Brighton (UoB)	Carry out physical chemical characterization of the liposome nanoparticles and formulations