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***In vivo* tissue pH probing using a combination of MR imaging and smart contrast agent for cancer early detection and post chemo and radiotherapy**

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Probing lactic acid concentration and location in different tissues and organs is extremely vital for medical diagnosis (cancer, brain lesion (neoplasm, radiation necrosis infarcts), renal failure, heart problems, hepatic disease and lactic acidosis, etc). However, very few investigations have been conducted to developed methods for lactic acid detection. Only two methods have been developed viz., lactate detection using chemical exchange saturation transfer magnetic resonance imaging (CEST-MRI) and pH-sensitive poly-ion complex. Both techniques perform poorly at low concentrations and showed a very low selectivity *in vivo* towards lactic acid which makes them unfit for clinical use. Recently, we developed the first chemical process able to quantify and locate lactic acid specifically *in vivo* using a new type of MRI smart contrast molecule based on pH sensitive Gd complex able to switch on its imaging capability selectively in the presence of lactic acid, where each molecule of Gd-complex (new smart contrast) detected by MRI corresponds to three molecules of lactic acid. Further investigation is in progress to use this new technique to detect cancer *in vivo* at an early stage and monitor patient response to chemo and radiotherapy.

Biography

Mouffouk Fouzi is an Associate Professor in Department of Chemistry at Kuwait University. He got his MS and PhD Degree from the Ecole Nationale Supérieure de Chimie and University of Montpellier France in the area of Organic Chemistry. After his PhD, he spent three years as a Postdoc at the Department of Chemistry and the Centre for Bio-Array Innovation, which is one of the four consortiums for PostGenome Sciences in UK (synthesis and characterization of conductive polymers-based gene biosensors). Later, he was appointed as Senior Scientist at Los Alamos National Laboratory, where he worked on a project called Artificial Life (or Living Technology) a collaboration with NASA Institute of Astrobiology, to synthesize and assess the performance of an artificial genes that support the functionalities of these protocells (artificial gene self-replication and gene implication in the protocell metabolism). After that he was hired as an Assistant Professor at the Institute of Biotechnology and Bioengineering Centre for Molecular and Structural Biomedicine at the University of Algarve Portugal. He is presently heading a research group in the area of Biomaterials and Nanotechnology, and is acquainted with all aspects of fundraising, project management, international collaboration, and committee work. His research is in the areas of Biomaterials Chemistry (Synthesis and Application), with a strong focus on Material for Medicine. Key research foci are on the design and synthesis of self-assembled nanomaterials and their implementation in medical-related applications such as medical diagnosis (molecular and cellular imaging and MRI spectroscopy), tissue engineering (regenerative medicine) as well as biosensors technology (point of care devices).

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