ERATO SEMINAR

Sponsored by JST ERATO Someya Bio-Harmonized Electronics Project

Field effect devices based on organic compounds of interest for electronic and sensing applications

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Date & Time: Februaru 10th (Tue) 2015, 13：00 - 14:00

Place: Meeting Room 250, Engineering Bldg #10, 2F, Asano Campus, The University of Tokyo

浅野キャンパス　工学部新 10 号館 2 階　会議室1（部屋番号 250）（文京区本郷 7−3−1）

ABSTRACT: Intra-arterial (IA) drugs are used for the treatment of many cancers, mainly as off-label use of of conventional drugs. However, the pharmacokinetics if IA drugs is exceedingly complex because the pharmacological variables are superimposed on the complex hydrodynamic parameters which include vascular anatomy, blood flow and injection characteristics. The situation is even more challenging in the brain where the blood brain barrier prevents uptake of drugs. Furthermore when the drugs are injected into the arteries their concentration increases and decreases in sub-second time frame making equilibrium condition difficult to achieve. These complexities explain why there are no good models that can describe IA drug kinetics and the clinical use is driven by empirical protocols.

However, in the last decade optical methods and optical tracers are developing rapidly. Optical methods can determine concentrations in vivo in a sub-second time frame. They can map drug distribution. Experiments that would take days or months using chemical measurements take minutes to do and in very few animals. Such technology can greatly accelerate IA drug development. In addition optical methods can also determine changes in tumors sizes in vivo, blood brain barrier permeability, tumor histology and response and tumor specific drug delivery. The talk will describe how we are using and developing optical methods and share some of the promising results we have achieved so far.

Biography: From the 2002 he was a permanent Researcher at the University of Naples, Faculty of Engineering, Physics Department. Actually he is Associate Professor and in 2014 he got the italian habilitation for full professor position in experimental condensed matter physics. The scientific activity carried out concerned the investigation of the d.c. and r.f electrical properties of superconductive materials, oxides, organic (polymer) and inorganic organic hybrids (I/O) looking both to the understanding of physical fundamental aspects and possible practical applications in the electronic fields. Firstly, it has been focused the optimization of various techniques concerning realization of superconductive thin films and the study of the electrical properties in the microwaves region (1-100GHz). From an applicative point of view the attention have been focused on the superconducting cavities for particle accelerators and the realization of passive microwave devices (filters, antennas, duplexer) of interest for mobile satellite application. Since 2004, the activity has regarded the realization of field effect devices (FET) based on superconductive films and the study of organic materials and hybrid inorganic organic devices and materials for electronic application (mainly FET, Memories, spin-valve) focusing the attention on both DC and AC (10Hz -1GHz) electrical properties investigated as a function of temperature (4-400K). A Part of the activity, has been dedicated to the realization of microchannels and microdevices (Lab-on-chip) based on PDMS for the study of pathologies of red blood cells.

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