Singapore-MIT Alliance for Research and Technology

BIOSYSTEMS AND MICROMECHANICS

Introductory Talks by New Researchers @ BioSyM

10 Oct 2016 – 19 Dec 2016

Development of a Miniature Laser Induced Autofluorescence set up for *in vivo* Tissue Spectroscopy

Dr. Ajeetkumar Patil

Date: 19th December 2016, Monday

Time: 12 pm to 1 pm

Venue: Perseverance Room, Enterprise Level 5

Abstract

Optical techniques offer noninvasive and easily applicable tools for the detection of alternations in structural and biochemical compositions of tissues and cells, which may indicate the presence of disease. They have the added advantage of being highly objective because of the fact that diagnostic evaluation is by statistical methods, eliminating errors from lack of experience, fatigue factor, and subjectivity of visual perceptions. The present research work involves in designing and assembling of a low cost, miniature oral cancer screening device for routine clinical applications by laboratory technicians as operators. The work was carried out in two stages. In the first stage, a portable, laser-based system was assembled and exhaustive in vivo studies were carried out on approximately 400 subjects. Detailed statistical analysis of the data proved that such a system can meet all the requirements of an efficient diagnostic tool. Based on the results obtained, a miniature system was designed and assembled with much smaller and cost-effective components like LED source and miniature photo diode array, in a hand-held unit configuration. The performance of the system was evaluated using animal -mouse- SCC model. From the analysis results it can be attributed that, fluorescence spectroscopy is an extremely convenient technique for screening for early detection in malignancies of oral cavity sites, and similarly for the other cases also.

Short Biography

Dr. Ajeetkumar initially earned his B.Sc. and M.Sc. in Physics from Karnatak University of Dharwad (KUD). He subsequently obtained his Ph.D. in Physics from Manipal University. Dr. Ajeetkumar is an Assistant Professor at Department of Atomic and Molecular Physics, Manipal and serving as a Faculty Adviser for SPIE Manipal University Chapter, Manipal, India. He received Young Scientist Award in the year 2014 from Vision Group on Science and Technology, India. In August 2016, he joined as a Postdoctoral Associate at BioSyM, Singapore-MIT Alliance for Research and Technology (SMART) in Peter So's group. In this capacity, he is exploring imaging tools for liver cells as well as understanding in vivo mechanisms of mice muscle regeneration. Dr.Ajeetkumar has interests in pursuing research in developing molecular, cellular and tissue level diagnostic tools for the early diagnosis of diseases. He has worked in fluorescence spectroscopy, optical microscopy, and LC based proteomics related areas.