CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP120617

Project Title:
Advanced in vivo imaging of tumor initiation and progression

Award Mechanism:
Core Facility Support Awards

Principal Investigator:
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Entity:
University of Houston

Lay Summary:

Research on the interactions of tumors with their local tissue environment requires live animal assays to fully understand the process of cancer progression. Recognizing this need, researchers have made significant progress in the noninvasive imaging of animal models of cancer. By imaging the animal at multiple time points, we can better understand disease pathology, pharmacokinetics and other contextual aspects of the molecular processes taking place in the living animal. Additionally, in whole-animal imaging, each animal serves as its own statistical control, which improves the statistical quality of the data and thus reduces the required number of animals. At the forefront of this technology is the IVIS Spectrum imaging system. This system uses bioluminescence and fluorescence to quantify tumor burden, detect metastases and impalpable tumor masses, follow treatment responses over time, monitor multiple therapies, and provide a 3D anatomical context. The overall goal of this proposal is to improve the usefulness of diverse models of cancer initiation and progression using emerging computational modeling approaches. This proposal is unique in that it integrates the advanced image computational skills of members of the Departments of Computer Science and Engineering Technology with the biological expertise of the School of Pharmacy and the Departments of Biology and Biochemistry and Chemical and Biomolecular Engineering. Here, cancer biologists will generate the image data from developed animal tumor models. These initial images will then be used to create new algorithms by the computationalists to enhance 3D reconstructions for the purpose of generating more accurate quantitative data. We anticipate that this campus-wide collaboration will facilitate an unprecedented level of analysis for preclinical tumor models. Further, this project will provide a core resource that has been needed to bring together the University’s broad cancer research disciplines.