

Investigation of Cell Signaling using a Folding Paper System

Professor Kin Fong Lei

Department of Biomedical Engineering, Chang Gung University, Taoyuan, Taiwan
 Department of Radiation Oncology, Chang Gung Memorial Hospital, Linkou, Taiwan

Date: Friday, February 2, 2024 14:00-15:00

Venue: Faculty of Engineering Bldg. 2, Room 31B

Abstract:

Cancer metastasis, tumor cells migrate from a primary site to distant site, is the major cause of death for cancer patients. Patients with fatal cancers, such as pancreatic, liver, lung, and stomach cancers, have high probability to be diagnosed with distant metastasis. Study of molecular players involved in metastasis can lead to develop targeted therapeutic approaches to effectively treat cancer metastasis. Due to cell proliferation in solid tumor, decrease of oxygen and nutrient concentrations leads tumor cells invading from solid tumor to peripheral blood vasculature. The cells may invade short or long-distance away from the solid tumor depending on their gene expression. In this work, a folding paper system is developed to mimic tumor-vascular interface for studying cell invasion distance. A rectangular paper sheet is folded to become a 3D stacked paper construct. Tumor cells are cultured in the inner layer of the construct and experienced low oxygen and nutrient concentrations. Depending on cell characteristics, the cells invade to outer layers and reach different layers of the construct. After 3 days of culture, the paper construct is disassembled and number of cells on each layer can be respectively counted. Invasion distance is analyzed and correlated to their metastasis-associated genes. The folding paper system provides an alternative approach for analyzing long-distance cell invasion. Study of metastasis-associated genes that regulate long-distance cell invasion may potentially lead to develop targeted drugs to effectively inhibit cancer metastasis.



Professor Kin Fong Lei
 Department of Biomedical Engineering, Chang Gung University, Taoyuan, Taiwan
 Department of Radiation Oncology, Chang Gung Memorial Hospital, Linkou, Taiwan