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The University of Hong Kong

DEPARTMENT OF MECHANICAL ENGINEERING
THE UNIVERSITY OF HONG KONG

SEMINAR

Collagen-based Pancreatic Ductal Adenocarcinoma Drug Screening Platform for Personalized Medicine

Date: 14 April, 2023 (Friday)
Time: 10:00 a.m.
Venue: Room 7-35, Haking Wong Building, HKU

Speaker: Mr. Ko Lok Him (M.Phil. candidate)
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Abstract:

Pancreatic Ductal Adenocarcinoma (PDAC) as one of the most fatal cancers in the world is the second leading cause of cancer death in USA with a 5-years-survival rate around 10%. The major reason for such poor clinical outcome is that 80~85% patients were diagnosed at late stage, either unresectable locally advanced or metastasis. One interesting feature in pancreatic cancer is that they have a very low tumor cellularity of 26% comparing with all other cancer which have a mean tumor cellularity of 81%. This result in high heterogeneity and complex tumor microenvironment (TME) composed by multiple cell type which contribute to various resistance to chemotherapy and immunotherapy. Cancer associate fibroblast (CAFs) is one of the most abundant cells in PDAC which can which responsible for generating extracellular matrix for the tumor development, chemokine and cytokine secretion. All this contributes to a highly suppressive immune environment and complex rigid extracellular matrix (ECM) which reduces the effect of various immunotherapy and poor drug infiltration. The recent treatment of PDAC usually uses combined drug which use Gemcitabine with an addition of another drug as therapeutic options. Hence there is a significant need of a drug screening platform to predict a patient response to drug as different mutation may result in different sensitivity of drug combination. Most drug screening platforms only co-culture cells on 2D surface. Yet, multiple review shows that various ECM composition contributes to PDAC cells sensitivity to gemcitabine for example collagen I have an increase expression of HMGA2 mRNA and protein in PDAC which attenuates Gemcitabine and protect cancer cells from DNA-damage-induced apoptosis. In this study, we aim to develop a collagen based sophisticated biomaterial which crosslink multiple ECM component such as fibronectin, hyaluronic acid to better mimic the complex nature of extracellular matrix, encapsulating patient derived cells including cancer cells and cancer associated fibroblast to form collagen sphere to generate in vitro tumor model. The model will then be screened with a different combination of drug and dosage and undergo viability testing. Ultimately, this model can be a good reference to aid clinician judgement for better treatment design.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. B. Chan at 3917 2632.