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Generation of *in vitro* 3D hepatic tumor model for discovery of novel therapeutics

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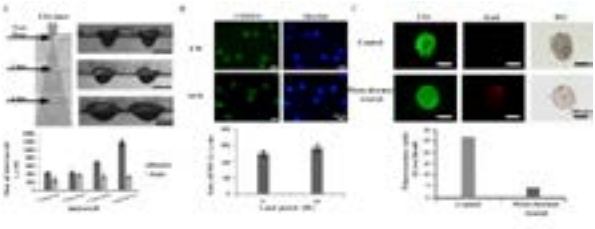
In vitro 3D tumor model has been sought to mimic critical in vivo pathological features that could be used for discovery of therapeutic treatment. Fabricating microwells based on existing lithography/cleanroom-based approaches are often costly and time-consuming that requires laborious process. Based on our previous work, this study presented a rapid and economical microwell fabrication methodology aimed to be conveniently incorporated with conventional workflow from biological and medical laboratories for generating *in vitro* 3D tumor spheroids. Ablation of CO2 laser system was capable of easily incorporating z-axis adjustment to generate microwells with wide-rage size flexibilities, the side view of microwells revealed the depth and width fabricated under different laser power and focusing plane. Evaluation of tumor spheroid generated from different size of microwells was performed by CMFDA live cell staining, and Hoechst nuclear staining indicated good cell viability and illustrated the shape of the tumor spheroids harvested from different size of microwells. To evaluate the preliminary therapeutic response on *in vitro* hepatocarcinomatous tumor spheroid, photo-thermal treatment through bound ConA-Silicon Carbon Hollow Spheres (SCHS) was investigated, live/dead cell staining on tumor spheroid showed the photo-thermal effect could induce cancer cell death via exposure to NIR laser, resulting in higher red fluorescence under photo-thermal therapy. Preliminary therapeutic response from the hepatic 3D tumor spheroids with binding of ConA-SCHSs suggesting the current methodology combining this *in vitro* tumor model could serve as an effective tool for discovery of therapeutic motilities for cancer treatment.



Biography

Ting Yuan Tu joined the Department of Biomedical Engineering at National Cheng Kung University (NCKU) in 2016 as an Assistant Professor. His PhD work was completed in Singapore-MIT Alliance for Research and Technology Centre in Singapore and received the PhD degree in Mechanobiology from National University of Singapore in 2015. Prior to joining NCKU, he was an Application Scientist at Clearbridge Bio medics (Now Biologics). His current research interest lies in the development of better biomimetic tumor microenvironment for cancer drug discovery, such as *in vitro* tumor models and 3D tumor invasive co-culture microfluidic platforms.

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