27 DEFINING ELITE MACROPHAGES FROM TUMOR-ON-A-CHIP

[1]Yang Xiang*, [2]Xiaohan Feng. [1]*The University of Hong Kong, Hong Kong, Hong Kong*; [2]*Hong Kong University of Science and Technology, Hong Kong, Hong Kong, Hong Kong*

Background Macrophages are one of the most predominant immune cell types in the solid tumors. Macrophages are heterogeneous though minor of them kill cancer cells in the tumor.[1 2] Our central hypothesis is that phagocytosis capacity reflects macrophages' cancer-killing activity.

Methods Here we employed tumor-on-a-chip platform[3] to model macrophage interaction with cancer cells and defined elite macrophages that exhibited high phagocytosis capacity.

Results We loaded macrophages from human monocyte cell line THP1 into central macrophage channel and detected less than 10% of them migrated into peripheral tumor channel seeded with hepatocellular carcinoma cell line HepG2. Among macrophages migrated to tumor channel, a few percent of them exhibited phagocytosis of cancer cells. We designated these macrophages elite population. We are determining gene regulatory network of elite macrophages compared with the other two populations, one stayed in macrophage channel and the other migrated to cancer channel but not phagocytosis. We anticipate to capture key transcriptional factors and signals to convey high phagocytosis capacity in macrophages. We will further verify these factors in tumor-on-a-chip vs. 2D.

Conclusions In total, these results will deepen our understanding of tumor killing macrophages and facilitate the study of tumor-on-a-chip and drug target screening.

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