

Possibility of Passage of Polymeric Micro- and Nanocapsules to Metastatic Cells in Lymph Node-On-Chip

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One of the important tasks of tumor surgery is the question of the presence of metastases in the lymph nodes, their therapy and removal.[1] Polymeric nano and microcapsules (PCs) are widely studied as tumor targeted vehicles.[2] The penetration of PCs into the tumor is considered as a major barrier for delivery of PCs into tumor cell and a big challenge to translate PCs from lab to the clinic. The objective of this study is to know how the size of PCs, the lymphatic node architecture and the fluid flow around the tumor cells affect the penetration and accumulation of PCs into the tumor cells, through in vitro penetration study based on a spheroid-on-chip system. Bovine Serum Albumin / Tannic Acid (BSA-Cy5/TA) polymeric microcapsules with size 3.5 μm , 500 and 300 nm were loaded to the multicellular spheroids in collagen matrix under static and flow conditions. PCs penetration was investigated by confocal laser microscopy scanning followed with quantitative image analysis. The results reveal that 300 nm PCs are easier passage to tumor spheroid and penetrate into. We hope that this study may improve the understanding of PCs penetration into metastatic tumors in the lymph nodes.

1. Kurochkin M.A. et al. Sentinel lymph node detection by combining nonradioactive techniques with contrast agents: State of the art and prospects // J. Biophotonics. 2021.
2. Kurapati R., Groth T.W., Raichur A.M. Recent Developments in Layer-by-Layer Technique for Drug Delivery Applications // ACS Appl. Bio Mater. 2019. Vol. 2, № 12. P. 5512–5527.