Metastasis-on-chip: 3D human microvasculature network to study extravasation dynamics of lung cancer in vitro

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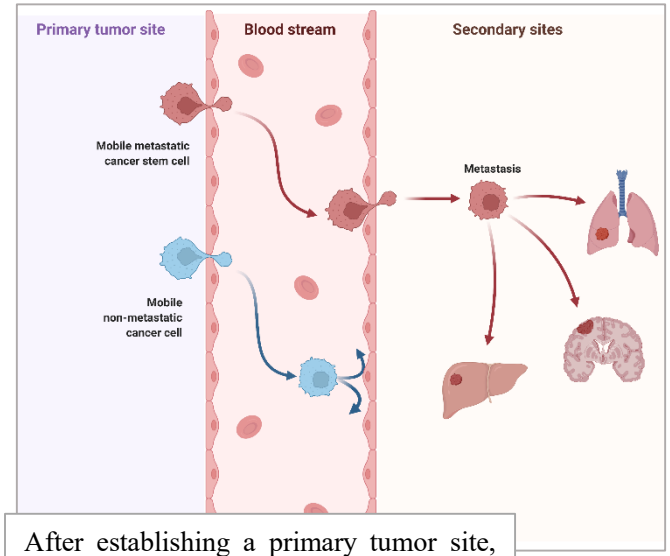
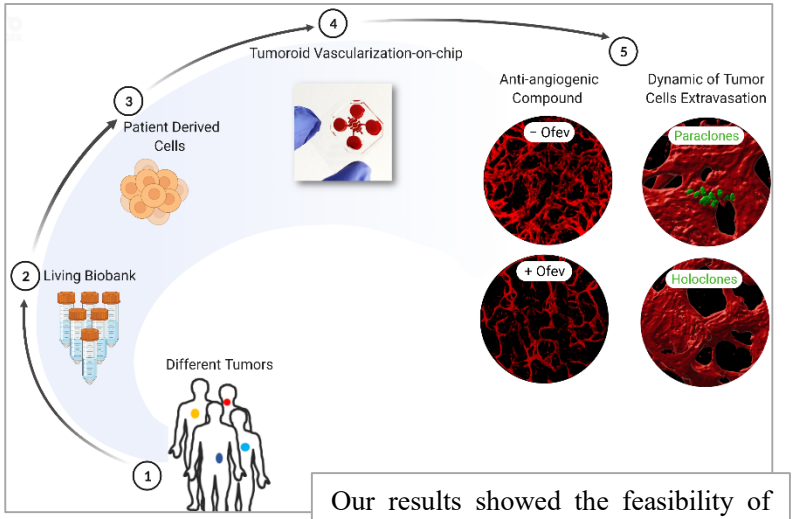
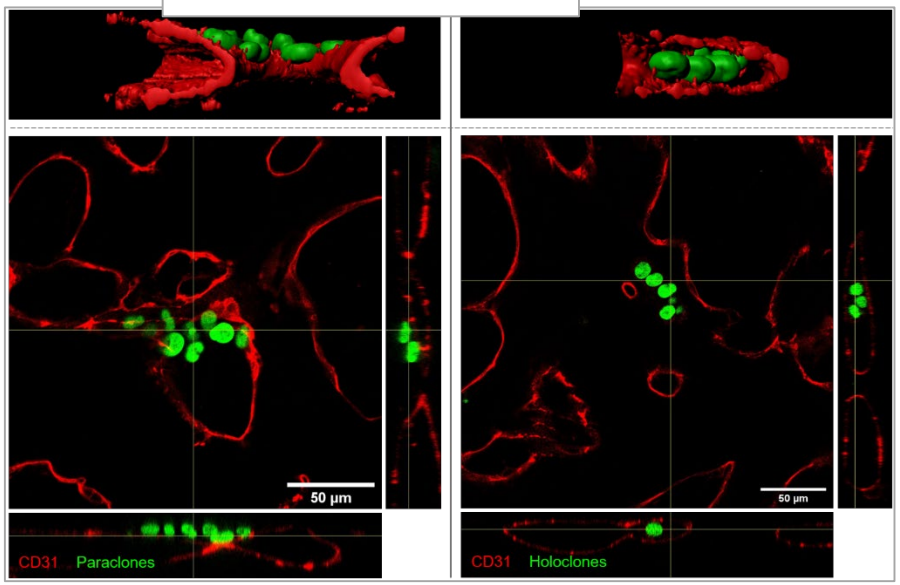


After establishing a primary tumor site, lung cancer cells undergo vascular invasion followed by the formation of metastatic sites in other organs, preferentially in the brain, bone, and liver. However, the exact mechanisms of the vascular invasion through lymphatic or blood vessels are not yet clearly understood. Current in vivo and in vitro models struggle to mimic the geometry, composition, and physicochemical properties of the tumor microenvironment during the metastasis journey. Therefore, such models systems are incapable of answering mechanistic questions behind the dynamics of lung cancer metastasis.

Our experiments to examine extravasation dynamics of A549 subpopulations revealed that holoclones and paraclones showed different extravasation capacities in vitro. Paraclones extravasate within 24 hours from the microvasculature network towards the surrounding tissue/hydrogel, whereby holoclones remain inside the microvasculature attached to the endothelial wall





Our results showed the feasibility of the advanced in vitro microvasculatures to study the metastasis capacity of the cancer cells in vitro. These models of human microvasculature represent an exciting approach because they allow to study of human pathology and physiology on isolated human microvessels and resolve cell-cell interactions in greater detail than in vivo studies.

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