

In vitro models using co-culture systems of endothelial cells and fibroblasts in nanomedicine

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Co-culture models are currently bridging the gap between classical cultures and *in vivo* animal models. Exploring this novel approach unlocks the possibility to mimic tissue microenvironment *in vitro*, regarding the inflammation in vascular system.

Fibroblasts are known to maintain the structural integrity of connective tissues by continuously secreting growth factors and extracellular matrix precursors, which are essential for endothelial cells (EC) adhesion and spreading. The crosstalk between these two cells types was investigated in order to understand how fibroblasts could influence the angiogenic process. *In vitro* studies using cocultures of ECs and fibroblasts in direct and indirect contact. These several angiogenesis assays performed intend to elucidate the viability, stabilization and sprouting of ECs in the presence of fibroblasts.

When fibroblasts were cultured in direct contact with ECs from the umbilical vein (HUVEC) or from the microvasculature (HDMEC), microvessel-like structures were formed and a direct correlation with an increase in collagen synthesis was observed during 21 days.

These findings are of crucial importance for the future design and optimization of nanoparticles and new drug delivery systems, since their real targeting capacity must be addressed in heterogeneous cell populations, such as those found vascular system.