

**(P 82) Co-Culture of Endothelial and Smooth Muscle Cells for the Development of Blood Vessel Constructs**

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Diseases of the blood vessels, particularly of small diameter arteries are responsible for most of deaths in developing and developed countries. The number of operations using arterial

prostheses and of small calibre vascular bypass reaches enormous values every year. With the limited availability of functional autologous vessels the need for new strategies to develop artificial blood vessels is increasing. The aim of this work is to develop constructs composed of a polymeric support with two different surfaces, displaying distinct surface properties, to seed endothelial (ECs) and smooth muscle cells (SMCs) with the purpose of obtaining an artificial blood vessel substitute.

Novel polycaprolactone (PCL) 2D bi-layer membranes fabricated by means of electrospinning and solvent casting, were developed. ECs and SMCs were isolated from human umbilical cord vein. After confirmation of the phenotype of the isolated cells by immunocytochemistry, static co-cultures were established by seeding ECs and SMCs respectively on the electrospinning and solvent cast layer. Cell proliferation and collagen and glycosaminoglycans (GAGs) production were assessed on the co-cultures and on the isolated cultures established as controls.

The results revealed that the bi-layer structure enhanced the proliferation rate and the collagen production in the co-culture while no differences in GAGs deposition were observed. Moreover the established co-culture system permitted to conclude that one cell type was not negatively influencing the other. In this context, the proposed structure constitutes an interesting strategy for assembling a blood vessel substitute.