# End - capped Pluronics© as building blocks for 3D tissue engineering scaffolds

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In the past years, advances in rapid prototyping technologies have brought new dimensions to the field of tissue engineering. Interestingly, rapid prototyping enables the development of hydrogel-based scaffolds with a complex 3D architecture. The latter occurs in close relationship with customized chemistries and cell-related issues mimicking the *in vivo* tissue environment.
Natural tissue consists of three components including cells, extracellular matrix (ECM) and signalling molecules. The ECM is made up of a complex of cell secretions immobilized into spaces and thus forming a scaffold for its cells. Hence, it is natural that the engineered tissue construct is a triad, of which the three constituents correspond to the above-mentioned basic components of natural tissue.

In the present work, Pluronic® (lutrol F127) was applied as starting material. In order to enable subsequent crosslinking (in order to avoid dissolution) of the hydrogels developed, different polymerizable groups were introduced using a series of chemical modification strategies, including: bis-acrylate, methacrylate, methallylether, allylether, thiol, tosylate, thioactetate (protected thiol), amine, methacrylamide, acrylamide and isocyanate. The macromonomers were characterised for their chemical structure by NMR and IR spectroscopy. Several kinds of polymer films were synthesized and evaluated for their chemical and physical properties. The curing efficiency in terms of UV intensity, irradiation time, initiator concentration, polymer concentration, … were optimized with the aim to determine the optimal parameters. Crosslinking of the functionalised polymers is obtained by UV irradiation of a polymer solution in the presence of Irgacure® 2959 as biocompatible photo-initiator.

In order to finetune the biocompatibility of the materials developed, a cell-membrane mimetic monomer (phosphoryl choline) was applied. Interestingly, the latter can be combined with polymers using either radical co-polymerization or via grafting. Cell viability studies are currently under investigation.

At present, the materials are being applied for the production of porous scaffolds using the Bioscaffolder technology, in combination wit several kinds of cell viability studies.

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