

Although plenty of systems for vessel regeneration have been developed, no system is successful in small diameter (under 6 mm) vessel replacement yet. Synthetic materials, such as Dacron and ePTFE, have good results in large vessels replacement, but they cause thrombosis in small vessels. In addition, they are not degradable and do not allow a natural remodeling of the vessel system. Furthermore, endothelial cells, which are essential for creating natural antithrombogenic endothelium, do not adhere on these materials, as well as smooth muscle cells. Decellularized xenogenic material is the non-synthetic alternative for vessel regeneration. Appropriate detergent removes donor's cells and only extracellular matrix remains, which is able to host acceptor's cells. The main disadvantages of this system are difficulties with animal's nurture and structure violations after detergent is used. It appears that electrospun materials are the best alternative. The relatively simple process can be modified in many ways and provides then a scaffold, which mimics extracellular matrix. A big advantage of this process is the possibility to incorporate bioactive substances into a fiber. The substances serve there as an attractant for blood cells or as an anticoagulation factor. In combination with the progenitor cells seems electrospinning to be the great hope for the regeneration of small vessels.