World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:15, No:10, 2021

Development of Electrospun Membranes with Defined Polyethylene Collagen and Oxide Architectures Reinforced with Medium and High Intensity Statins

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Abstract : Cardiovascular diseases (CVD) are related to affectations of the heart and blood vessels, within these are pathologies such as coronary or peripheral heart disease, caused by the narrowing of the vessel wall (atherosclerosis), which is related to the accumulation of Low-Density Lipoproteins (LDL) in the arterial walls that leads to a progressive reduction of the lumen of the vessel and alterations in blood perfusion. Currently, the main therapeutic strategy for this type of alteration is drug treatment with statins, which inhibit the enzyme 3-hydroxy-3-methyl-glutaryl-CoA reductase (HMG-CoA reductase), responsible for modulating the rate of cholesterol production and other isoprenoids in the mevalonate pathway. This enzyme induces the expression of LDL receptors in the liver, increasing their number on the surface of liver cells, reducing the plasma concentration of cholesterol. On the other hand, when the blood vessel presents stenosis, a surgical procedure with vascular implants is indicated, which are used to restore circulation in the arterial or venous bed. Among the materials used for the development of vascular implants are Dacron® and Teflon®, which perform the function of re-waterproofing the circulatory circuit, but due to their low biocompatibility, they do not have the ability to promote remodeling and tissue regeneration processes. Based on this, the present research proposes the development of a hydrolyzed collagen and polyethylene oxide electrospun membrane reinforced with medium and high-intensity statins, so that in future research it can favor tissue remodeling processes from its microarchitecture.

Keywords : atherosclerosis, medium and high-intensity statins, microarchitecture, electrospun membrane
Conference Title : ICNPBEA 2021 : International Conference on Natural Polymers for Biomedical Engineering Applications
Conference Location : Dubrovnik, Croatia
Conference Dates : October 04-05, 2021