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Engineering poly(hydroxy butyrate-co-hydroxy valerate) based vascular scaffolds to mimic native artery

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Highlights

- Tri-layered bi-directional aligned electrospun mat mimics native artery structure.
- Bioactive nature of scaffold improved by incorporation of cell specific growth factors.
- HUVECs, SMCs and MSCs attachment and spreading observed along the fiber direction.
- The tri-layered scaffold showed blood compatibility.
- The developed prototype is suitable for vascular graft designing.

ABSTRACT

Electrospun tri-layered fibrous scaffold incorporating VEGF and Platelet Factor Concentrate (PFC) in multiple layers having different layer architectures was designed to mimic native artery. The scaffold consisted of longitudinally aligned poly(hydroxy butyrate-co-hydroxy valerate) (PHBV) and poly(vinyl alcohol) (PVA) nanofibers (inner layer), radially aligned PHBV-elastin nanofibers (middle layer) to provide the bi-directional alignment and combination of longitudinally aligned PHBV-elastin and random PHBV/PVA multiscale fibers (peripheral layer). Tubular constructs of diameter <6mm were developed. The developed electrospun fibers were characterised by Scanning Electron Microscope (SEM), Fourier Transform Infrared Spectroscopy and Tensile tests. Further

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