"NEW GROWTH FACTOR_RICH ELECTROSPUN MATERIAL FOR TISSUE ENGINEERING, DRUG DELIVERY, AND WOUND HEALING" VCU #10-087

Applications

- Tissue engineering
- Growth factor delivery
- Hemostasis
- Wound healing

Advantages

- Incorporates growth factors and blood proteins crucial to wound healing process
- Appropriate ratios of growth factors/blood proteins at raised concentrations
- Bioresorbable
- Electrospun on its own or with other natural or synthetic polymers

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Market Need

When developing tissue engineering scaffolds, it is important to incorporate materials that promote cellular activity and stimulate the healing process due to the often synthetic nature of the structural elements. To enhance the bioactivity or regenerative capacity of a scaffolding, the concept of incorporating a milieu of growth factors, lipids, and cytokines in a physiologically relevant ratio, albeit at supraphysiologic concentrations, from platelet-rich plasma preparations is gaining attention clinically as an autologous regeneration enhancer (i.e chronic wounds, musculoskeletal applications, etc). Therefore, electrospinning of such preparations has the potential to play a crucial role in the development of novel wound dressings and tissue engineering scaffolds, leading to accelerated tissue repair/regeneration.

Technology Summary

VCU researchers have developed electrospun structures comprised of preparations rich in growth factors (PRGF)as enhanced tissue regeneration platforms. The PRGF can be electrospun on its own or in conjunction with other natural or synthetic polymers in order to create scaffolds composed of sub-micron diameter fibers with a high porosity. These scaffolds can then be used in various applications including tissue engineering scaffolds, and growth factor delivery systems for angiogenesis, hemostasis, and wound healing. The electrospun fibers contain growth factors, cytokines, and blood proteins that are critical in the wound healing process and bioresorbable.

Technology Status

Patent pending: US and foreign rights are available.

In vitro testing demonstrated that human stem cell proliferation and migration was increased in the presence of PRGF released by electrospun matrices. Additionally, macrophage interaction with the PRGF incorporated scaffolds further increased stem cell proliferation indicating a conducive environment for regeneration driven by the cells likely to interact with the implanted scaffold.

A publication describing a portion of this technology can be found at the following link:

http://www.ncbi.nlm.nih.gov/pubmed/21679135

VCU is seeking a commercialization partner to license and develop this new growth factor-rich platform technology.