A Better Tissue Engineered Vascular Graft

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Cardiovascular disease (CV disease) is one of the leading causes of death in the World. This disease affects individuals from different backgrounds including various ages, ethnicities, or economic stances. A significant cause of CV disease is vascular tissue malfunctions which damage blood vessels or inhibit blood flow via plaque build-up in arteries. The problem can be exasperated with insufficient blood flow to vital organs. Physicians who specialize in cardiovascular disease prefer to use tissue engineered vascular grafts (TEVG) in vessels that need remediation. This is the preferred approach because it better models the walls of a blood vessel. The following approach to constructing a TEVG is accomplished through electrospinning a synthetic polymer onto a cylindrical mandrel. Preference is given to this fabrication method because of the ability to control the shape and dimensions of the final product. By using synthetic polymers, one avoids issues regarding autografts and donor site morbidity and also avoids ethical issues regarding use of animal or human cells. The synthetic polymer offers the benefit of lower cost in production than living cells. Living cells can also impact overall health of the patient due to possible graft rejection. This results in a TEVG containing living cells being difficult to gain FDA approval. Finally, the use of synthetic polymers and electrospinning fabrication method will allow for cost efficient mass production and off-the-shelf availability. By creating a scaffold for TEVG through this method, researchers will be able to control the measurements of the final TEVG based on requested proportions from clinicians. These advancements will result in a more effective TEVG that will revolutionize the field of vascular tissue engineering.

Awards Won: