SUMMARY

1. Optimized custom built electrospin apparatus to obtain novel 3D scaffold from collagen, gelatin and polycaprolactone polymers.

2. Identified a novel solvent system to electrospin collagen which maintains the ultra structural integrity for tissue engineering applications. And the process has been filed for Indian patent.

3. Electrospun collagen nanofibrous matrix with preserved biological properties was characterized with modulus suitable for contracting cardiomyocytes and maintains contractility more than two weeks without external stimuli.

4. Electrospun gelatin nanofibrous matrix and cross linked successfully without distorting the morphology and characterized with modulus suitable for contracting cardiomyocytes and maintains contractility approximately for a period of 1 month without external stimuli is definitely an alternative cheap source for collagen.

5. Electrospun polycaprolactone nanofibrous matrix and characterized the modulus 50 times lesser than the currently available electrospun matrices which can also be suitable for soft tissue engineering without blending with natural polymers.

6. *In vivo* evaluation of tissue response to the biodegradable nanofibrous matrices showed positive results.

7. Developed an economical source of biomaterial device for tissue engineering applications.