Tissue Engineering of Muscle

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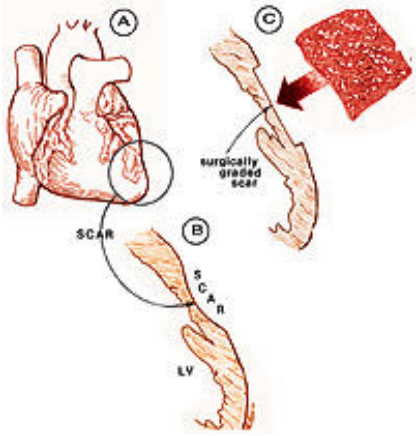
There are many potential applications for engineered skeletal muscle that range from basic research needs to transplants, prosthesis and or even as abstract as a food sources.
A more specific application would be that of myocardial infarctions a form of Heart disease that result in irreversible muscle damage.



Tissue engineering is based on the concept that tissue cells can be grown with biomaterials to form equivalents, and this matrix equivalent can be used to repair or even entirely replace damaged tissues or organs.

There are currently two different approaches to tissue engineering:
Injecting a cell suspension into the muscle tissue
Or implanting a polymer of matrixes and cultured cells

The definition of muscle tissue functions: is the generation of controlled force, work or power.

In other word it is necessary to organize the tissue in such a way as to promote the generation of a force in the desired direction, and control over the contractions or stimulations.
Therefore the problem doesn't lie in the development of a similar matrix to that of our muscles but in the fact that it has to be mechanical strong and functional in terms of control.

Two practices that could resolve this issue is the development of self organizing muscle tissues called myooids or the training theory in which the cells are trained for the roles that they will ultimately adapt such as skeletal or cardiac functions.

As mentioned previously myooids are self organizing tissues which means there is no artificial scaffolding only a silk tread as an anchor, which acts as an artificial tendon that can be attached to servos in order to measure force and generate stimulus.

It is quite apparent from the data that these engineered fibers respond in the same fashion as normal fibers.

Tissue excitability is another important measurement of proper tissue function. It defines the requirements for a depolarization and thus a contraction.

References

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