Tissue Engineering of the Heart

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I. INTRODUCTION

The problem that is being solved by engineering tissue that can be injected into a damaged heart is that less people will die. Right now there are not enough donor hearts to supply all of those patients in need of a heart. Therefore researchers need to come up with a new way to help all of those patients who do not have a donor heart and that is by creating a new heart or at least part of it. By growing new parts of the heart to inject into the patient engineers hope to help thousands of more people.

II. METHODS

This technology dates back to 1897 when cells were first grown outside of the body. Throughout the 1900’s several scientist tried to grow different types of cells, learning from their many experiences in the lab. In 1998, there was a major breakthrough in tissue engineering when scientists discovered the ability of the stem cells. From then on, scientists and researchers have been working with the stem cells to learn and identify the different capabilities they have.

Currently there are many things known about repairing a damaged heart by means of engineered tissue. Today they use a scaffold that is made out of biodegradable material and place cells on it. These cells are from the patient that the new tissue is for. This is to insure that the new tissue that is injected will not be rejected by the recipient. Once the cells are placed on the scaffold, the whole thing is placed into a bioreactor, which provides the cells with an environment in which scientists can monitor and control the nutrients and waste products of the cells. Once they have grown enough, they are injected into the damaged part of the heart with a needle. In about 4 weeks the scaffold will be completely dissolved and the new tissue will be functioning just as old tissue. Scientists usually use stem cells but there are other types that may be used as well.

IV. DISCUSSION

There are only a few limitations that scientists have seen so far. One important limitation is that there is a large variation between the heart tissue that it will be fusing with and the cells that are being grown. Also there are limitations because of the lack of ability in the newly generated tissue. These limitations are being worked on and advanced upon all the time. In the future, I see this technology growing greatly and soon scientists will be able to grow whole organs and repair anything in the body. There have been some studies where scientists have grown whole jawbones and an artificial bladder that was successfully transplanted into a human. Based on this it is clear that more artificial organs will soon be developed. Technology is advancing at such a great rate that I don’t think it will take long for this to happen.

References