

# Tissue Engineering

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## Introduction

I will be covering Tissue Engineering. It can be used to build organs needed by injured or sick people. This is important because in the last decade the number of transplants needed has almost doubled while the number of transplants performed has remained almost constant. “Every 30 seconds a patient dies from a disease that could be treated with tissue replacement” and this is a way to fix this problem.

## Methods

Some of the methods for tissue engineering include smart bio materials, scaffold and cells combination, and cell printing.



For smart bio materials, small injuries in the body can be bridged by this material and the body will use it as a bridge to heal it's self rather than closing off from the rest of the body as is the natural reaction. The scaffold and cell technique is where doctors take a piece of the injured organ, about half the size of a postage stamp, and then replicate the cells in the lab. Next they build a scaffold out of bio-degradable, safe materials which will serve as a structure for the cells to grow on. The scaffold is then seeded with a cell solution and placed in a bioreactor to grow. A bioreactor is a machine which is designed to mimic the inside of the human body. The bioreactor is also used to “exercise” the body part being grown. For example a blood vessel has a blood-like substance pumped through is in order to allow it to stretch and essentially act like is will in the body. The part is then transplanted into the patient. In Organ Printing the organ needed is built in AutoCAD and converted into plans which the 3D printer can read. Then, rather than a scaffold the cells are mixed with a sticky liquid and printed layer by layer so there is no scaffold for the cells to grow on. It is then placed in the bioreactor and exercised just like the scaffold/cell type.

## Discussion

This technology has the potential to save so many lives and, though it is still a work in progress, each step gets us closer to the end goal of being able to give each person in need a new organ.

## References

- Anthony Atala: Growing new organs  
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