Bioprinting

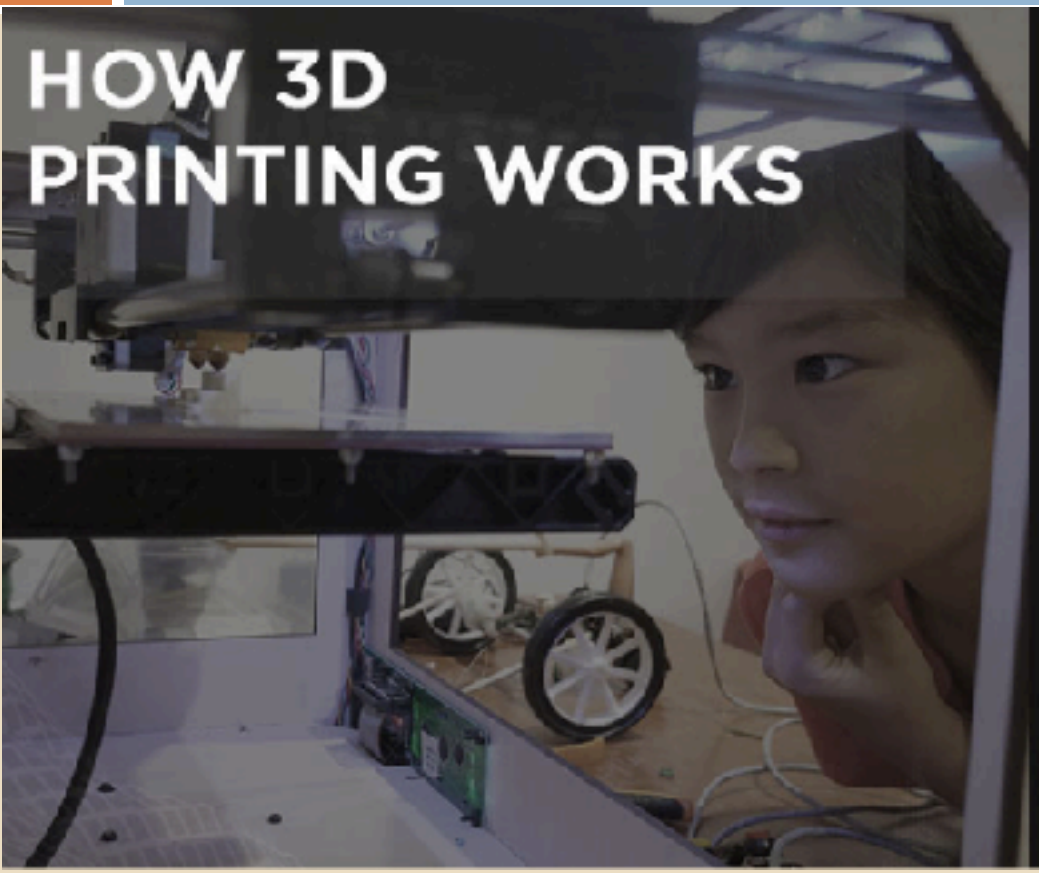
Bioprinting

Broadly: Tissue engineering . . .

Regeneration or replacement of diseased or missing tissue or organs

Bio printing combines various disciplines like: genetic engineering, molecular biology, molecular engineering, systems biology, biophysics, mechanical engineering, electrical engineering, computer engineering, and control engineering.

Let's start with 3D-printing



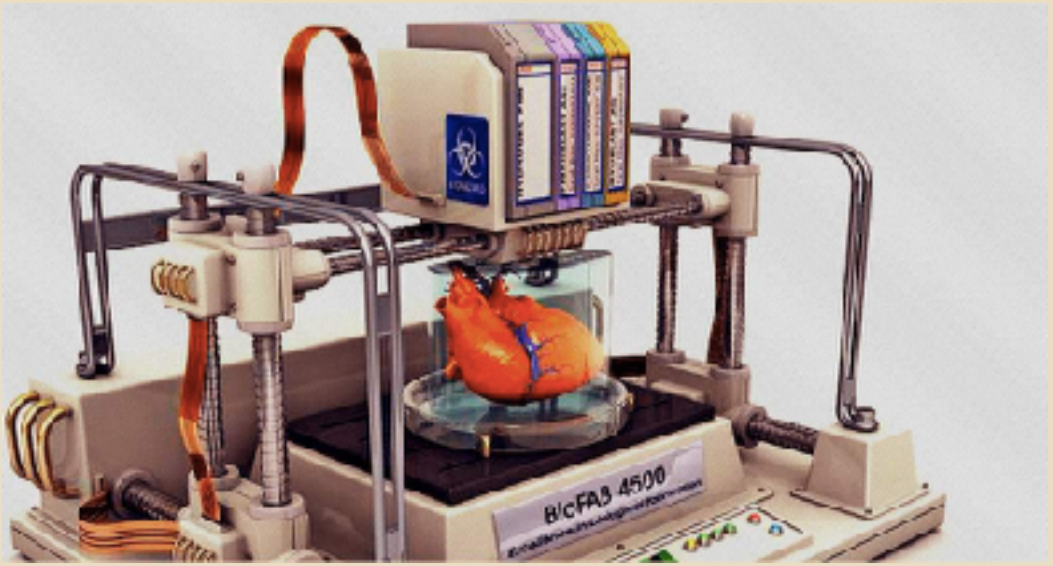
1. Object needs to be designed in 3D and modeled on a computer (CAD)
2. 3D printing of thousands of layers that bonds to a 'solid' item
3. 3D Printers can use metals, alloys, and polymers

3D PRINTERS

$8

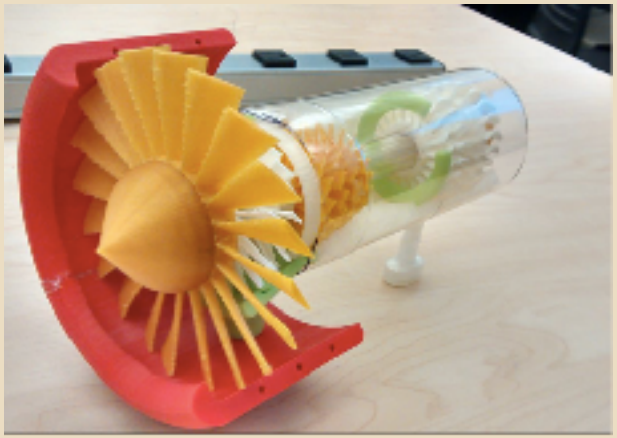
$300

$1,200



$100,000 - 200,000


AMD
Audi



OLLI - Local Motors, Phx

www.youtube.com/watch?v=2DRJ2oUK4-E


SAMSUNG

380 sq ft
24 hrs product time
$32,000

Voila!

3D Printing - Future

3D printing is changing

- manufacturing
- distribution

of goods

For the sake of good order: 4D Printing

https://vimeo.com/58840897

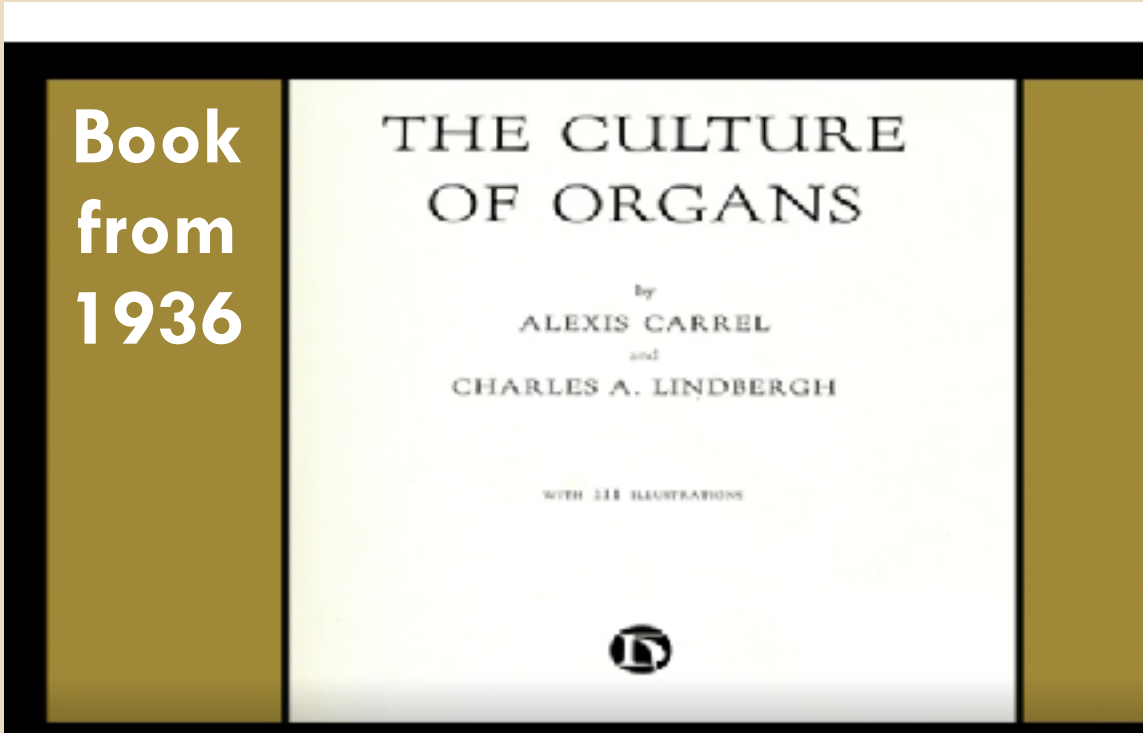
Bioprinting

Back to the beginning:

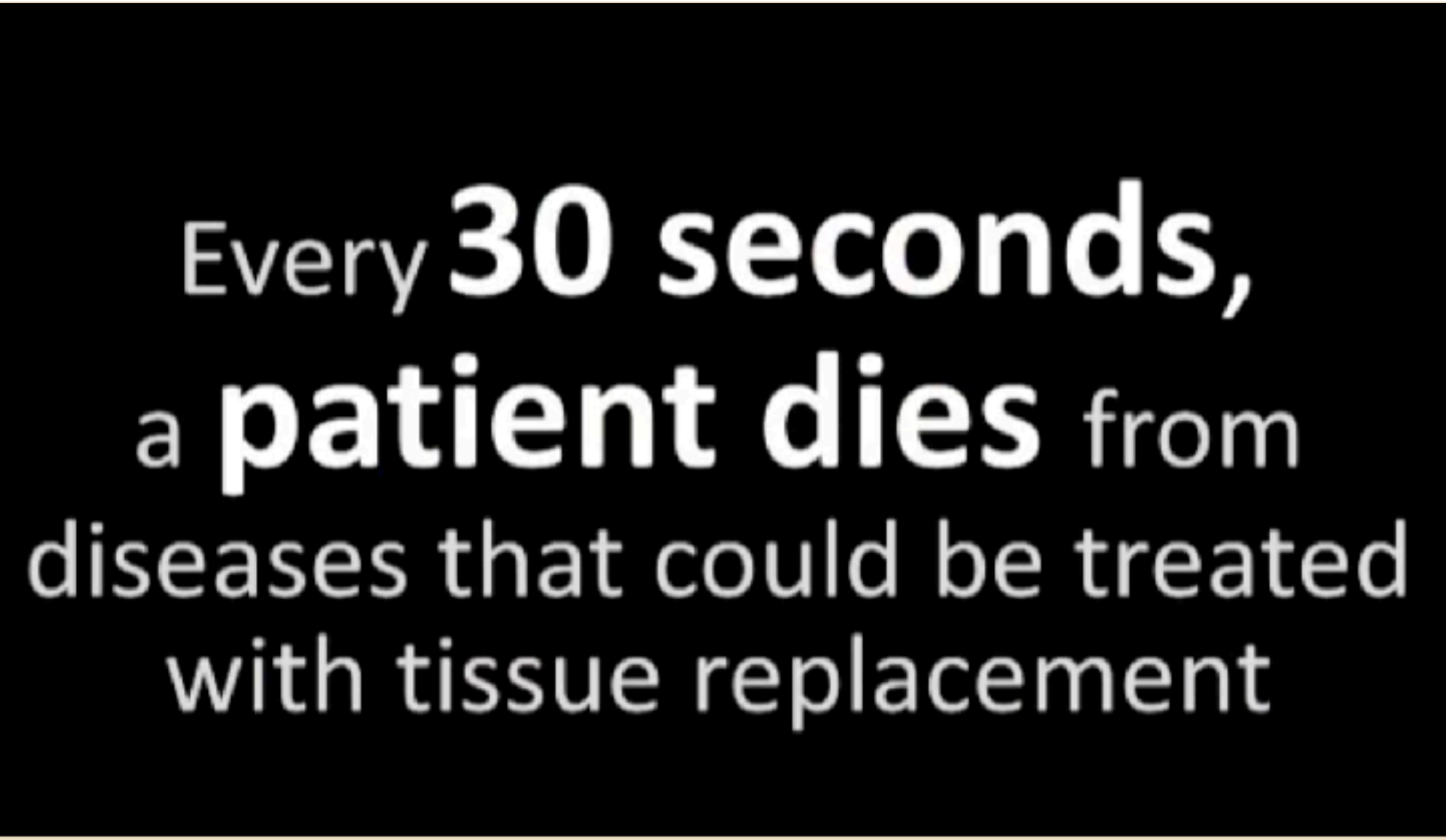
1. Tissue engineering/
   Synthetic cells

2. Scaffold
   techniques

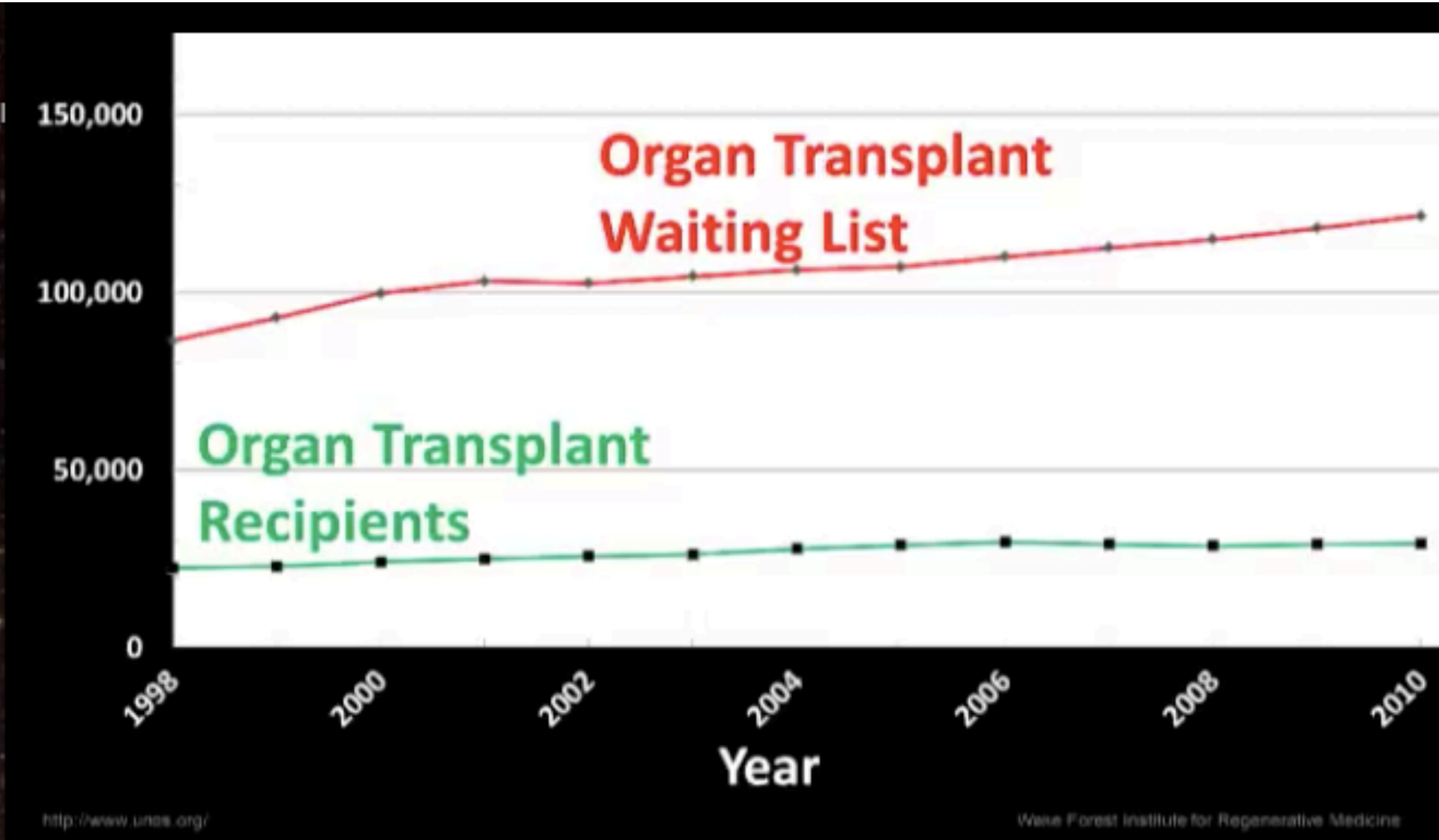
3. Bioprinting



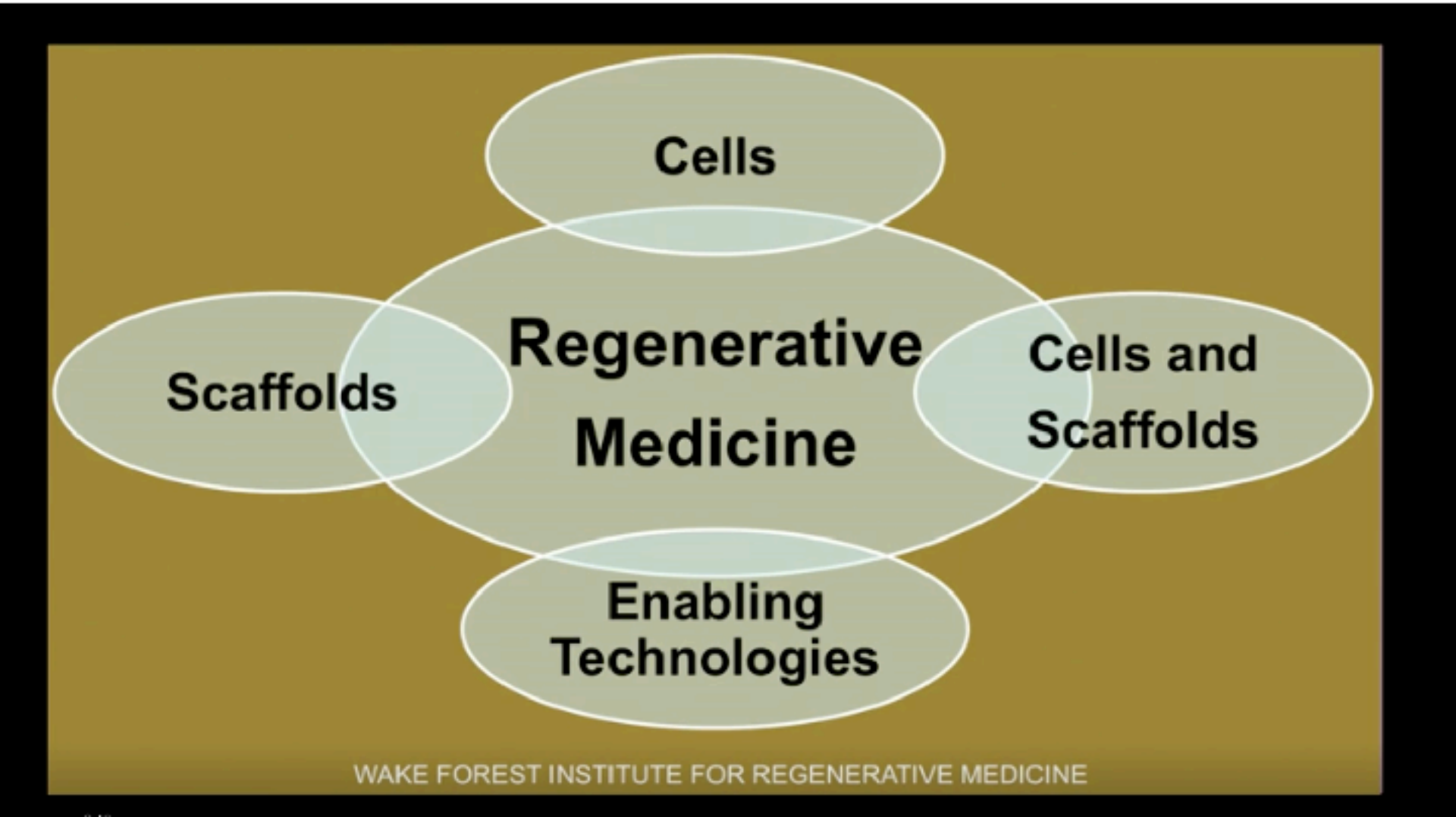
Bioprinting – Social aspect



Bioprinting – Social aspect



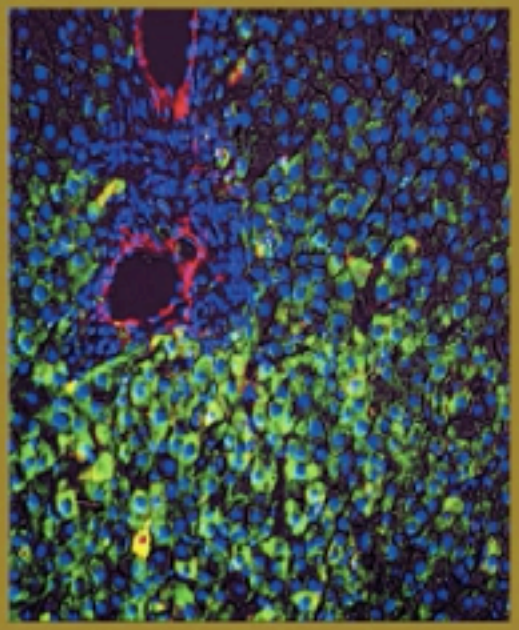
Bioprinting



Bioprinting

Challenges

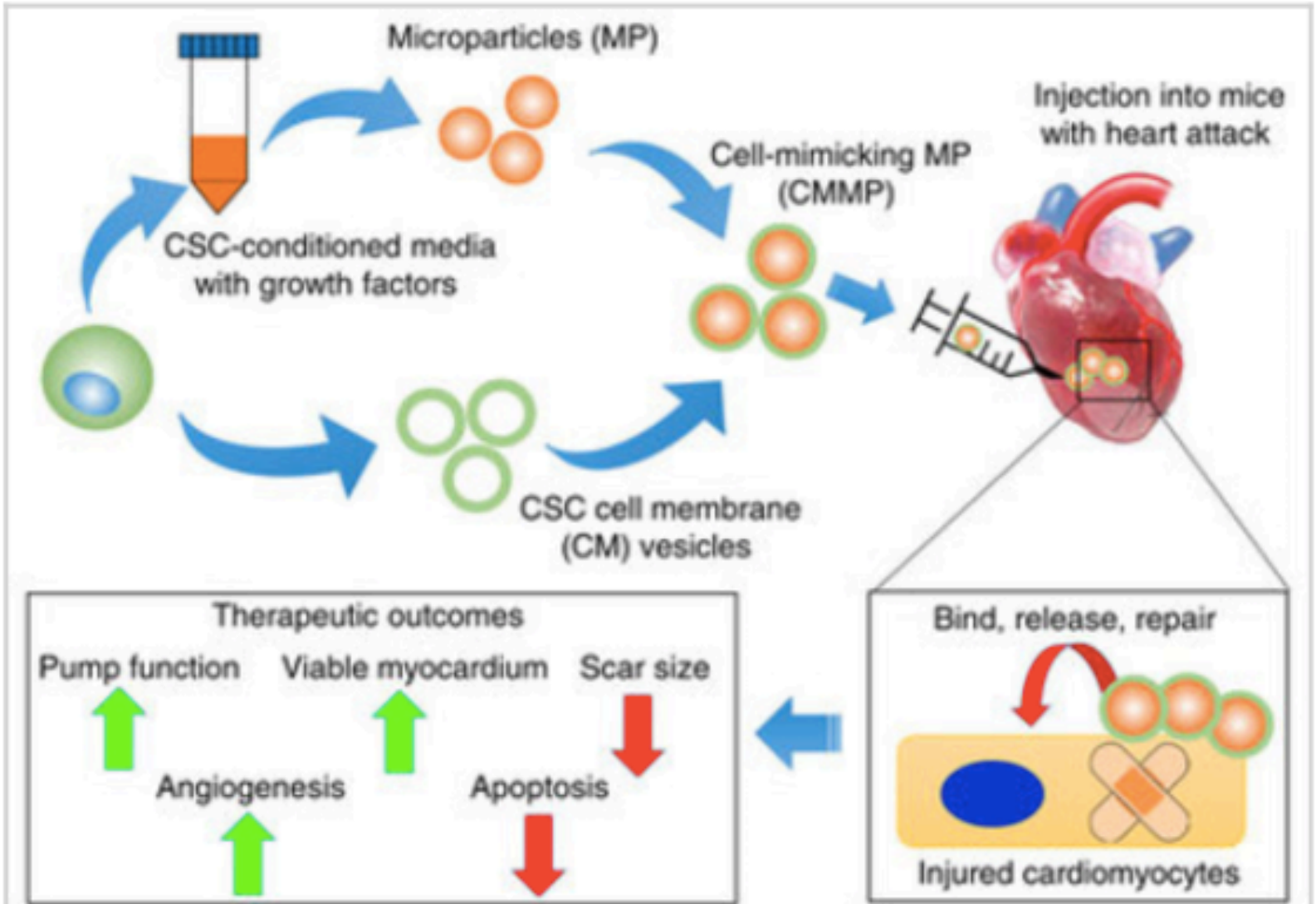
Biomaterials



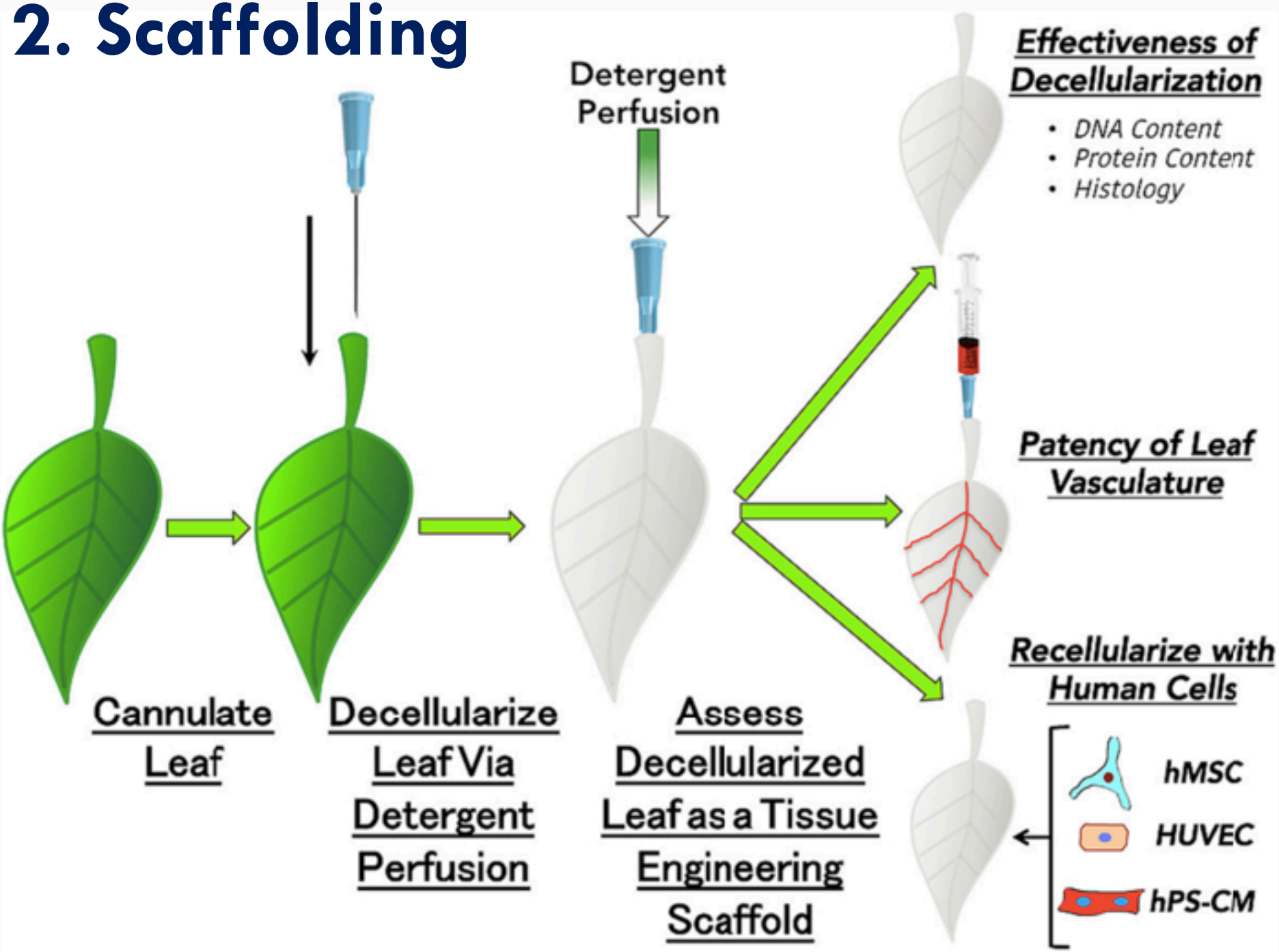
Cells

Blood Supply Channels

1. Synthetic Stem Cells



2. Scaffolding



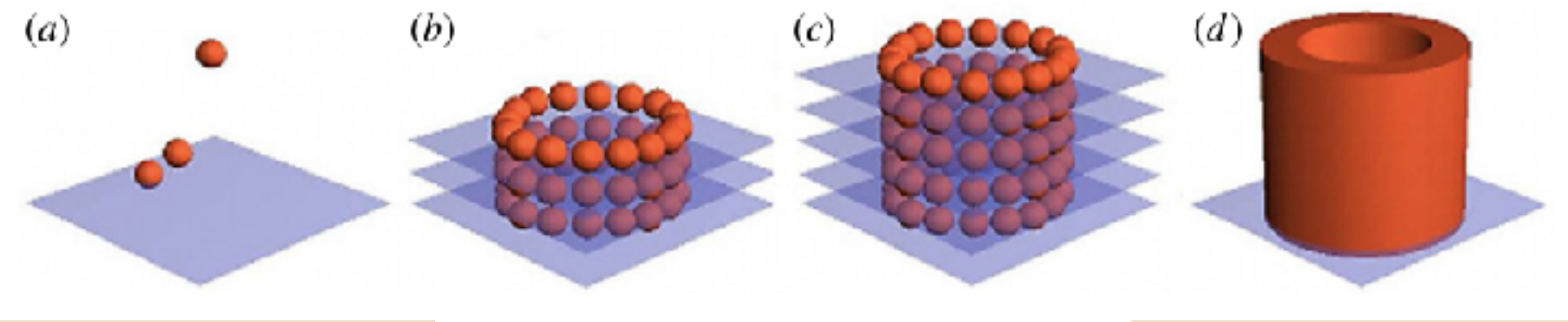
2. Scaffolding

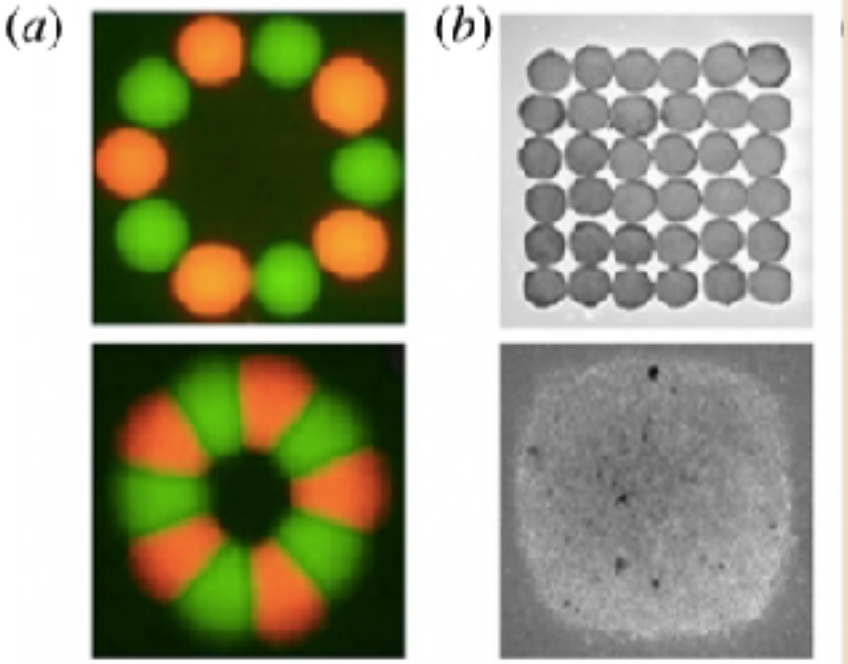
2. Scaffolding

Spinache Leaf

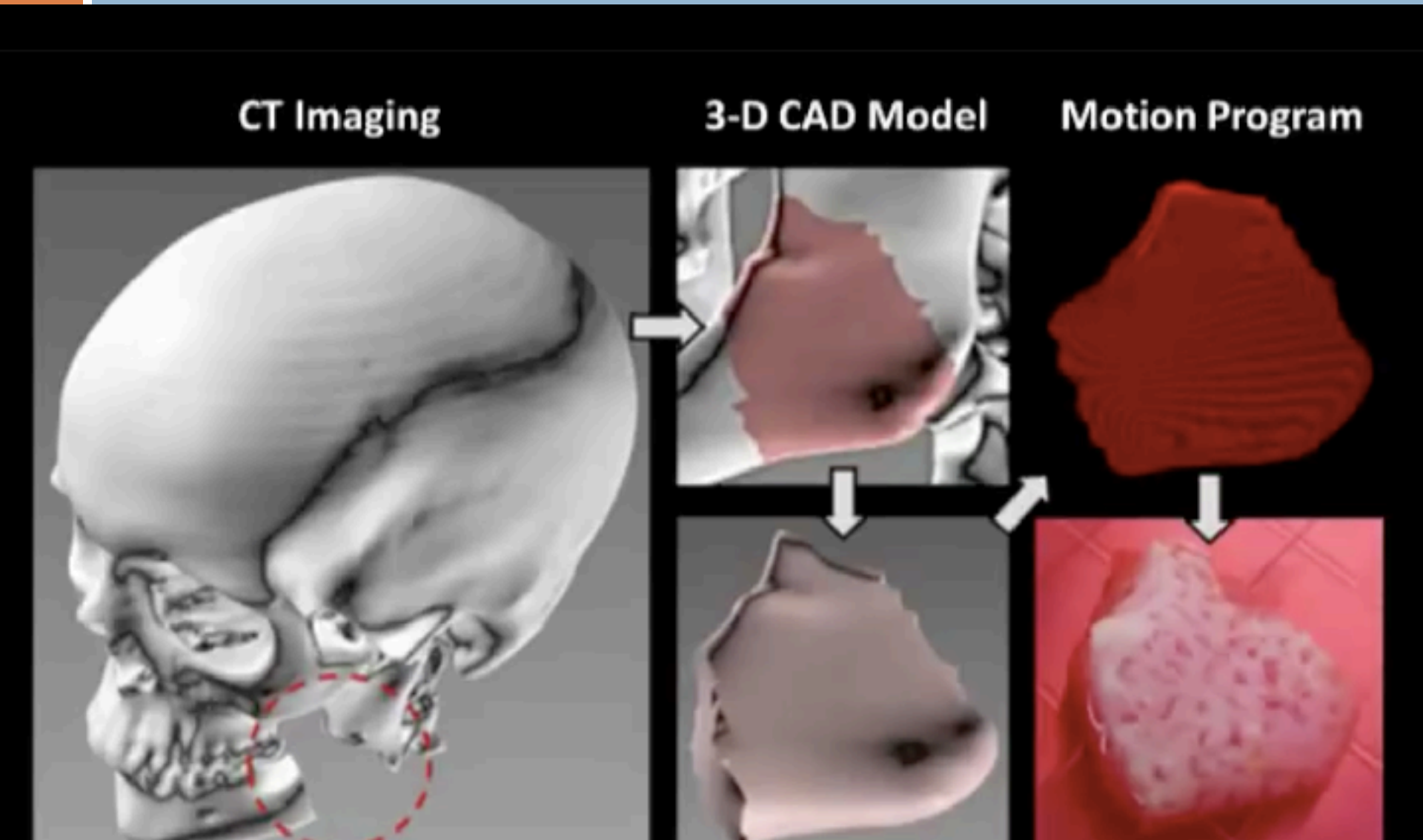
https://www.youtube.com/watch?time_continue=56&v=6iUrxGo9gZs

2. Scaffolding/Printing

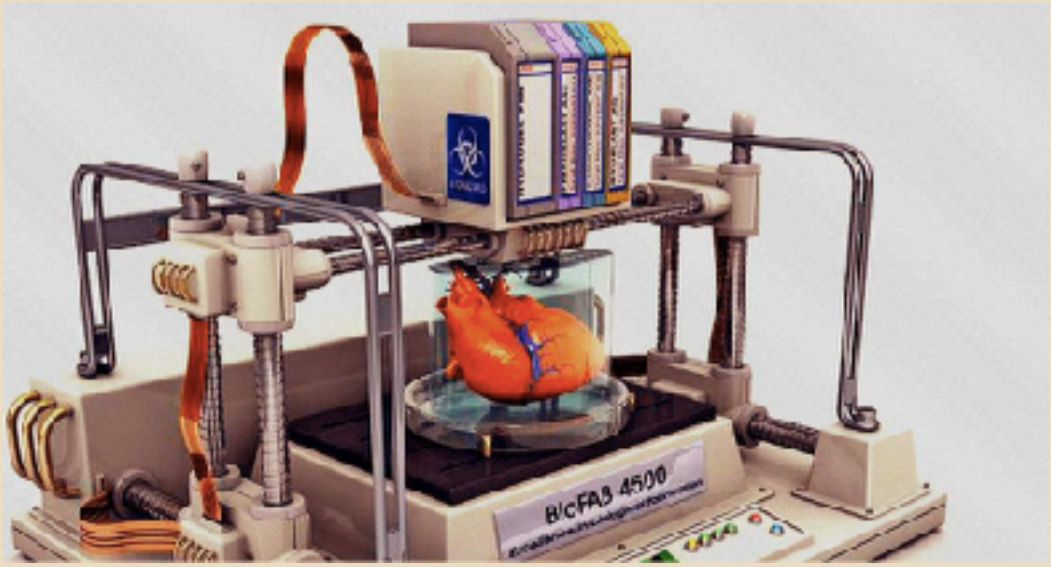




3. Bioprinting



3. Bioprinting



Dr. Anthony Atala, Wake Forest University:
https://www.ted.com/talks/anthony_atala_printing_a_human_kidney
16:30 min

From Synthetic Stem Cells To 3D printed organs

1990-2015 Succesful results:

- arteries
- bladders
- ears
- fingers
- hearts
- kidney
- livers
- muscles
- skin patches (burn wounds)
- trachea
- vaginas
- leather
- meat

What do you think is next?

Bioprinting

The future is here

Thank You!

torben.riise@gmail.com

Bioprinting

Dr. Anthony Atala, Wake Forest University:

https://www.ted.com/talks/anthony_atala_printing_a_human_kidney

16:30 min