



matrixelf

Regenerating the future of medicine

**A platform for
autologous (personal)
3D printing of tissues
and organs**

June 2021



The Challenge

- *Every 30 minutes a patient dies while waiting for an organ transplant*
- *Millions of patients are suffering from diseases that involves tissue damage*
- *Huge economic, social and medical burden*



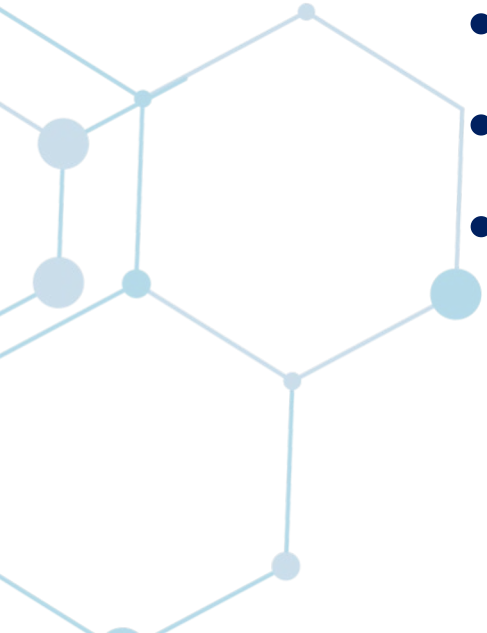
The Challenge

- *Companies in regenerative medicine usually use synthetic materials and/or allogeneic cell (foreign donor)*
- *Immune response and organ rejection*

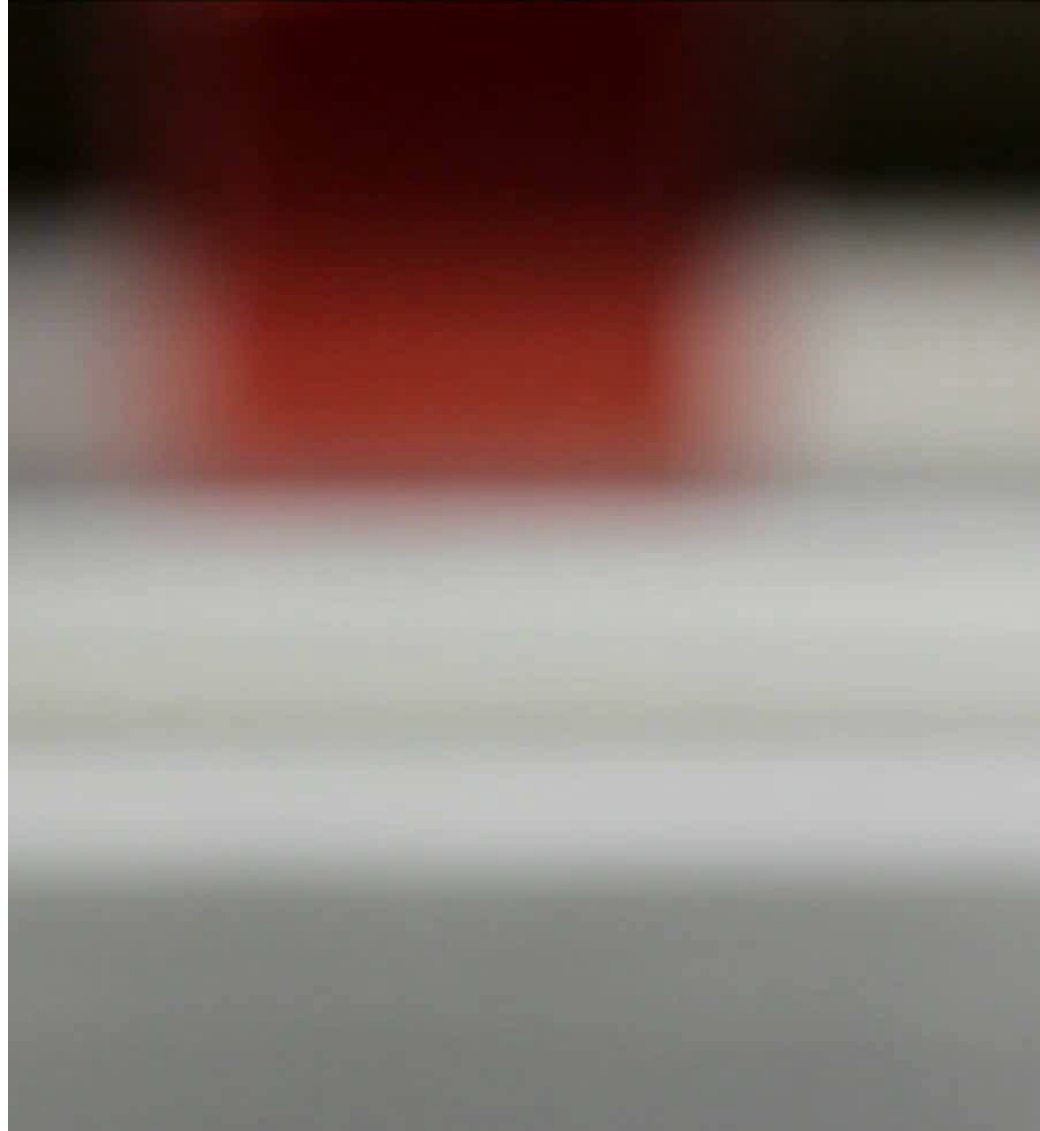


Envision a day...

- *A technology that enables the production of autologous tissues and organs in weeks*
 - *A small biopsy from the patient*
 - *Production of cells and scaffold*
 - *3D personalized thermo-responsive hydrogel*
 - *Printable or injectable*



The first ever 3D printed human heart

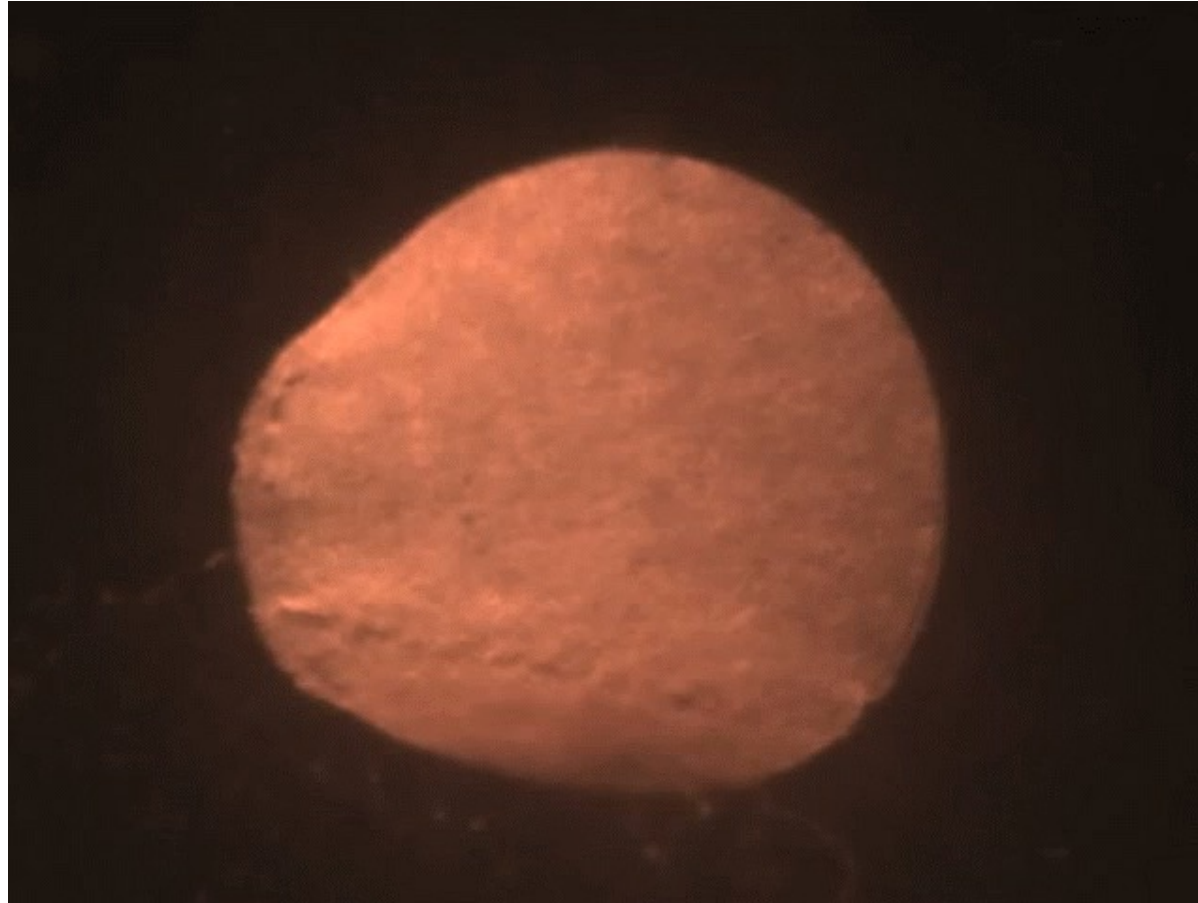


Israeli scientists create world's first 3D-printed heart using human cells

The team created a cell-containing "bioink" and used it to 3D print the organ layer by layer.



Engineered heart patch

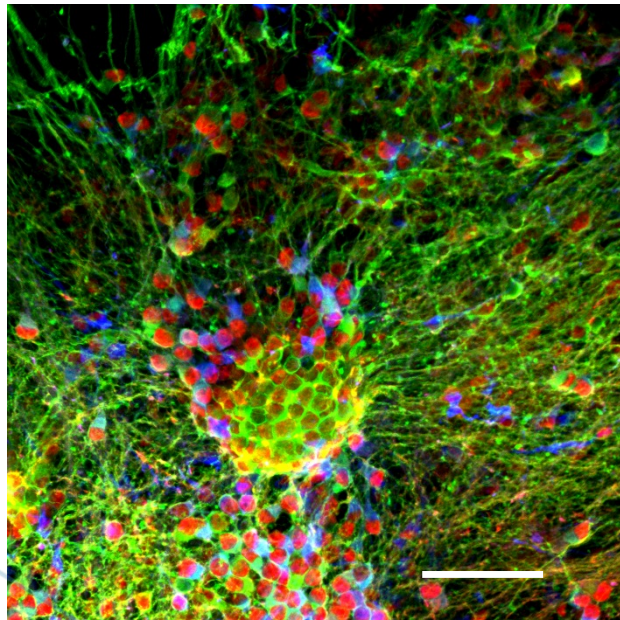


Fleischer et al. Biomaterials. 2013
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Shevach et al. J. Mater. Chem B. 2013
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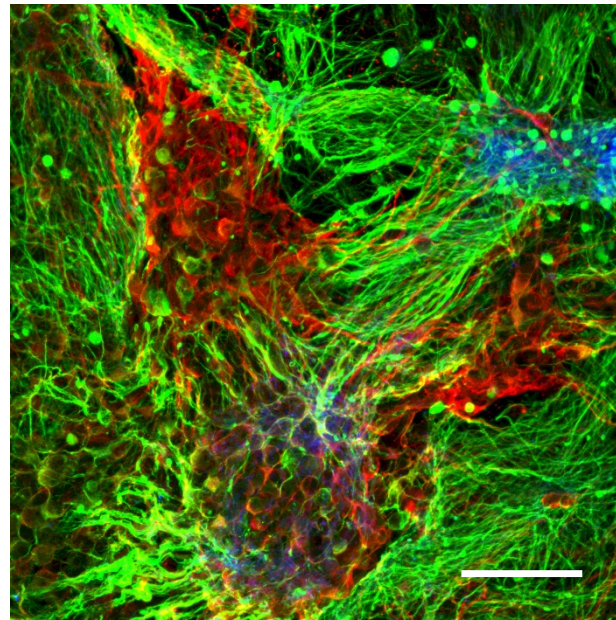


Dopaminergic implants for Parkinson's Disease

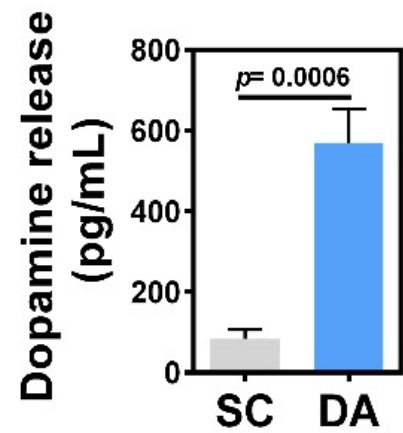
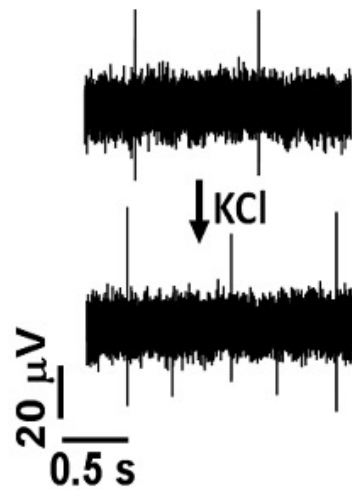
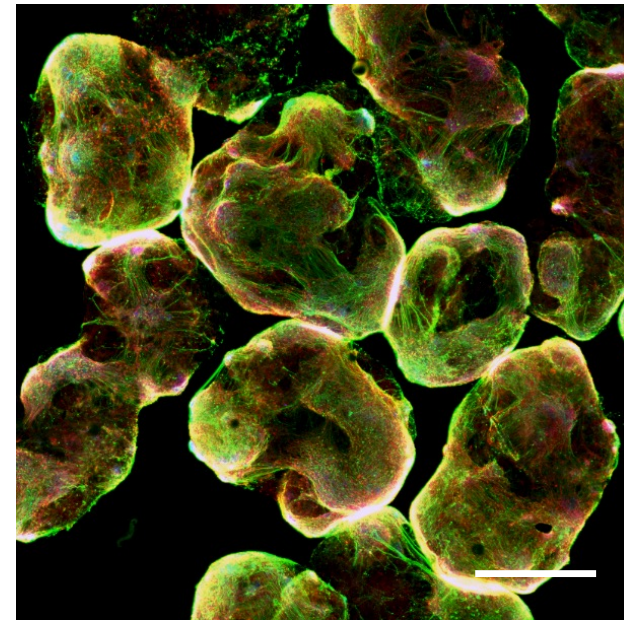
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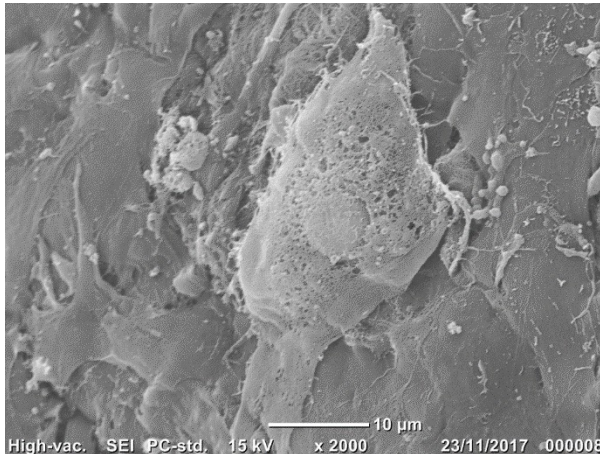
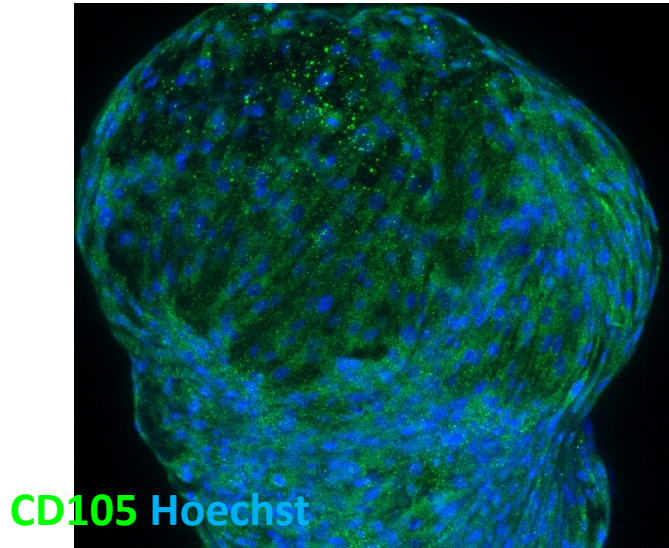
SYP NFM MAP2



NFM SYP MAP2



Orbital implants for Age related Macular Degeneration (AMD)





(credit: NY Times)

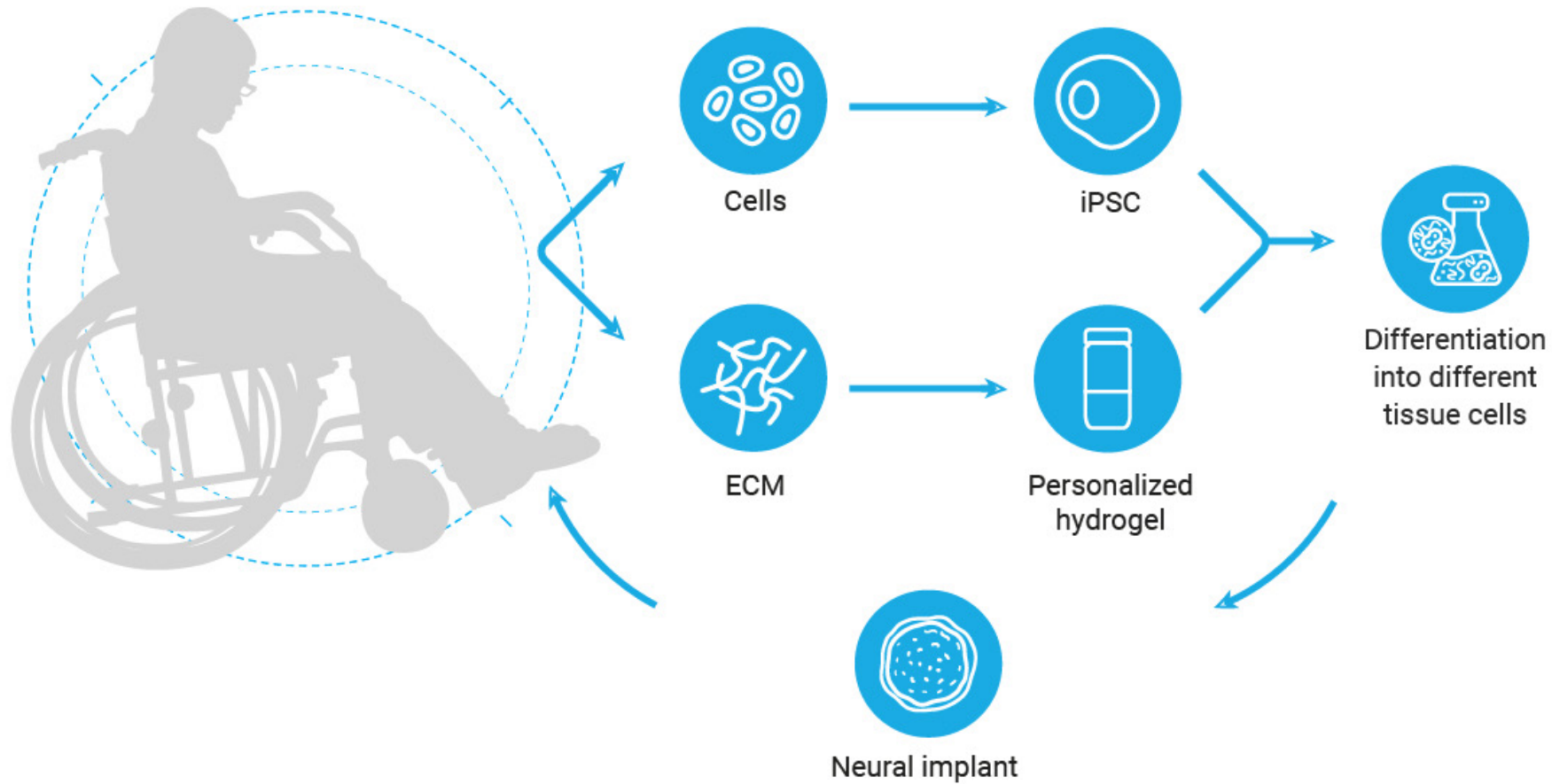
“Humanity has succeeded in reaching space, but we still haven’t managed to bridge the two centimeters of an injured spinal cord.”

Yariv Bash, Co-founder SpaceIL

First Application: Spinal Cord Injury (SCI)

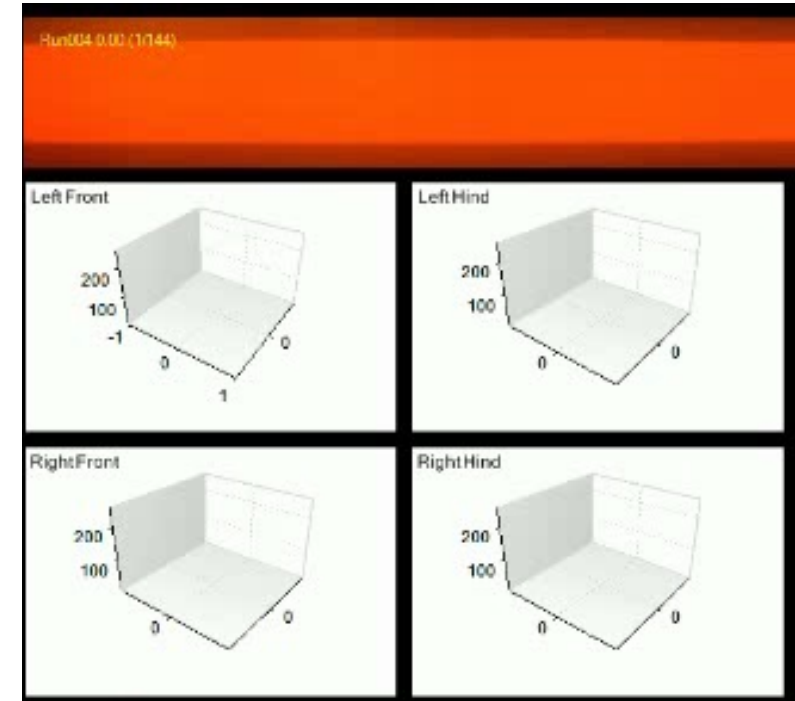
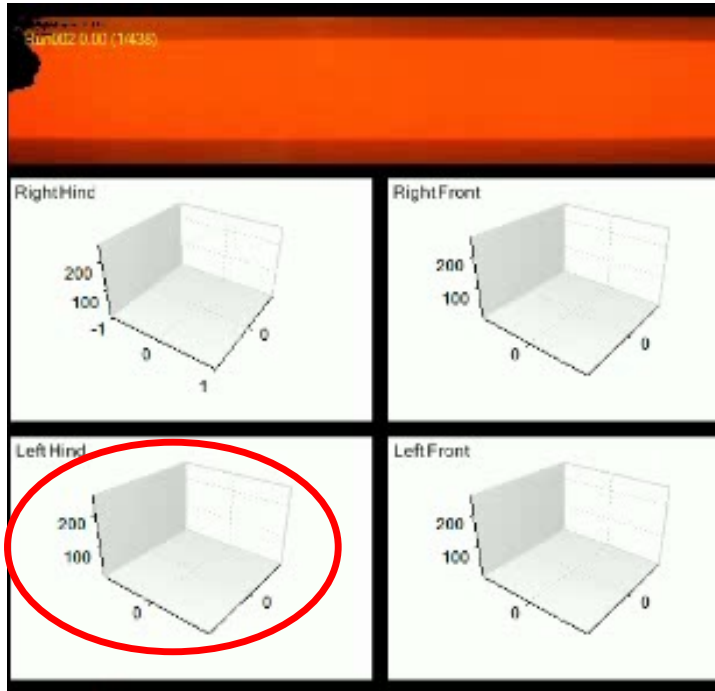
- Approximately **17,000** new cases of acute SCI per year in the US
- Usually means **irreversible** loss of motor, sensory, and autonomic functions
- Estimated cost of care for first year post-SCI: **\$350K-1M**
- Lifetime medical costs for a quadriplegic patient injured at the age of 25 is estimated at **\$4.8M**

Autologous implant for Spinal Cord Injuries (SCI)

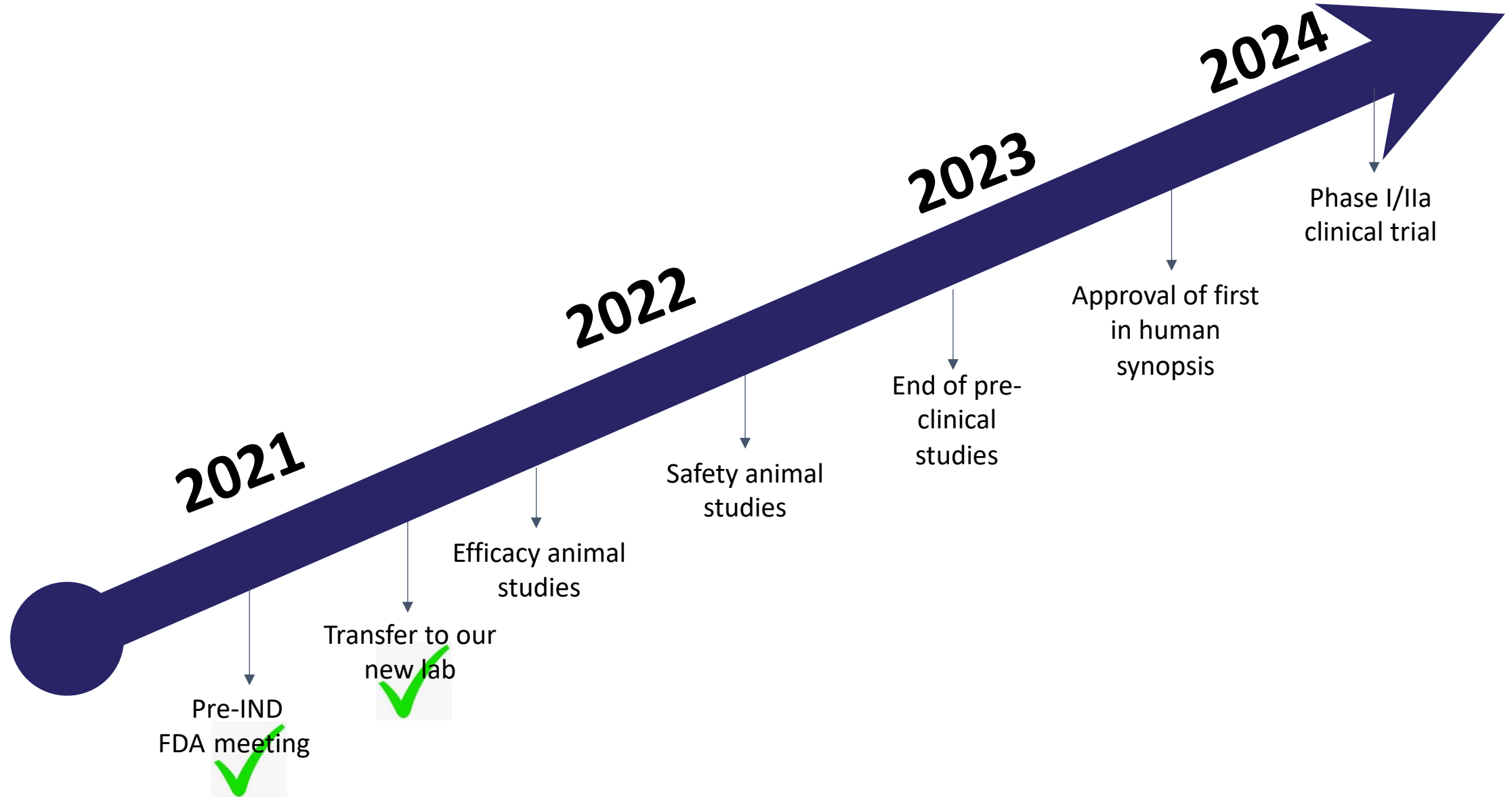


Spinal cord regeneration

Control



Milestones to First in Human



I AM A
FALLING
WALLS
FINALIST
2020



nature research
awards



The team



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RIVKA CARMİ. MD

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Thank you

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