Approaches in Cell Therapy and Regenerative Medicine

September 23, 2020 11:00 am - 12:00 pm

11:00am

Towards Druggable Tissue Regeneration

Jeffrey M. Karp
Professor of Medicine, Brigham and Women's Hospital, Harvard Medical School
Principal Faculty, Harvard Stem Cell Institute
Affiliate faculty, Broad Institute and at the Harvard-MIT Division of Health Sciences and Technology

Jeffrey M. Karp
Professor of Medicine, Brigham and Women's Hospital, Harvard Medical School
Principal Faculty, Harvard Stem Cell Institute
Affiliate faculty, Broad Institute and at the Harvard-MIT Division of Health Sciences and Technology

Dr. Jeff Karp is a Professor of Medicine at Brigham and Women's Hospital, Harvard Medical School. He is also a principal faculty member at the Harvard Stem Cell Institute, and an affiliate faculty member at the Broad Institute and at the Harvard-MIT Division of Health Sciences and Technology.

He works in the fields of drug delivery, medical devices, stem cell therapeutics, and tissue adhesives. He has published over 125 peer-reviewed papers, with >21,500 citations, and has given over 300 invited lectures. He has over 100 issued or pending national and international patents. Several technologies developed in his lab have led to multiple products currently in development or on the market and for the launch of eight companies that have raised over $400 million in funding. Technologies include high-tech skincare (Skintifique, products sold in pharmacies throughout EU), tissue adhesives (Tissium, EU Approval in 2017) and 3D printed biomedical devices, immunomodulation with biologically responsive materials (Alivio Tx), small molecule regenerative therapeutics ($FREQ – NASDAQ), cannabinoid therapeutics (Molecular Infusions acquired by Suterra Wellness in 2019), biomedical devices to improve child safety (Landsdowne Labs), needles that automatically stop at their target (Bullseye Therapeutics), and a bioengineered luminal coating for controlled GI targeting (Altrix Bio).

Karp has received >50 awards and honors. Most recently Jeff received the highest award from the Society For Biomaterials for innovation – the Clemson Award for Applied Research. *Boston Magazine* recognized Karp as one of 11 Boston Doctors Making Medical Breakthroughs. The *Boston Business Journal* recognized him as a Champion in Healthcare Innovation and MIT's *Technology Review Magazine* (TR35) also recognized Karp as being one of the top innovators in the world (three members from his laboratory have subsequently received this award). Karp was elected to the American Institute for Medical and Biological Engineering's College of Fellows in 2013, a fellow of the Biomedical Engineering Society (BMES) in 2018, and a Fellow of the Royal Society of Chemistry and the Canadian Academy of Engineering in 2019. His work has been selected by *Popular Mechanic's* as one of the Top 20 New Biotech Breakthroughs that Will Change Medicine. He gave a commencement speech at his high school in 2011, and a TEDMED talk in 2014 on bioinspired medical innovation, and since 2015 has been a member of the TEDMED Editorial Advisory Board. In 2015 and 2016, he received Breakthrough Awards from the Kenneth Rainin Foundation, and in 2015 was a commencement speaker at the University of Toronto Faculty of Dentistry and Pharmacy. Karp also won an internal Shark Tank award judged by Kevin O'Leary (from ABC's Shark Tank). In 2018 Karp gave a TEDx talk on Radical Simplicity. Furthermore, in 2019 Karp was a grade 8 commencement speech at the Talcott Mountain Academy in Connecticut.

In addition to his research goals, Karp is dedicated to developing the careers of the next generation bioengineers at the forefront of regenerative medicine. He was selected as the Outstanding Faculty Undergraduate Mentor among all faculty at MIT and he received the HST McMahon Mentoring award for being the top mentor of Harvard-MIT students. To date, 22 trainees from his laboratory have secured faculty positions.

View full bio

One of the holy grails in medicine is to achieve tissue regeneration. Traditionally involving complex manipulation and manufacturing of cells outside of the body, stem cell approaches are very promising. Avoiding the complexity, we have focused on delivering combinations of small molecules to target stem cells and progenitor cells in the body. Through this work we identified small molecules that can regenerate hair cells in the inner ear to functionally restore hearing. Hearing loss affects hundreds of millions of people and cochlear implants and hearing aids have severe limitations. This platform technology formed the basis for a startup company called Frequency Therapeutics in 2015 that IPOed on the NASDAQ in 2019. The company advances regenerative small molecule therapeutics through targeting and manipulating stem cells and progenitor cells *in situ*.

11:25am	Startups pitches • **Cellino**: Image-guided, laser-driven manufacturing of iPSCs and iPSC-derived tissues • **Kytopen**: The Future in Non-Viral Delivery for Cell Therapy Manufacturing • **Immunai**: Comprehensive mapping of the immune system with single-cell biology and AI Marinna Madrid Marinna Madrid, Co-Founder, Cellino Paulo Garcia CEO and Co-founder, Kytopen Danny Wells Scientific co-founder of Immunai
11:50am	Panel Discussion: Challenges in the field Marinna Madrid, Paulo Garcia, Danny Wells
12:05pm	Breakout Discussions