

# Technologies Available for LICENSING

OFFICE OF TECHNOLOGY LICENSING

https://licensing.research.gatech.edu | techlicensing@gtrc.gatech.edu

# Needle-like Nanostructures to Deliver Multi-scale **Biomolecules to Non-activated Immune Cells**

# Current methods for gene delivery may result in limited viability and efficacy

Current gene delivery struggles to target primary naïve T and B cells efficiently while maintaining their naïve state, limiting therapeutic efficacy. Existing methods fail to deliver genetic material without cell pre-activation or manipulate multiple miRNAs within the same cell, resulting in reduced viability and efficacy, leading to T cell exhaustion.

This innovation enables efficient delivery of multiple genetic materials to naïve immune cells, preserving their naïve state. It enhances cell viability and modulation post-delivery, inducing specific changes for optimized immune responses, offering superior protection against intracellular pathogens.

# New nanowire platform increase efficacy to improve treatment

This technology utilizes a functionalized nanowire platform to deliver multiple genetic materials, including CRISPR and microRNAs, directly to naïve T and B cells without pre-activation, retaining their naïve state. This approach allows precise control over the immune cells' programming to increase their efficacy in adoptive cell therapy, offering a significant leap forward in treating various maladies through immune system modulation.

## **Summary Bullets**

- This functionalized nanowire platform delivers multiple genetic materials to naïve T and B cells without pre-activation, enhancing their efficacy in adoptive cell therapy.
- The prototype improves gene delivery efficiency while preserving the naïve state of immune cells, increasing cell viability and immune response modulation.
- It offers superior protection against intracellular pathogens and serves as a research tool for immune cell manipulation across various species, ages, and subtypes.

## Solution Advantages

- Efficient gene delivery to naïve immune cells.
- Induced specific changes in treated cells
- Preserve immune cells' naïve state.
- Enhance protection against intracellular pathogens
- Improve cell viability post-delivery

## **Potential Commercial Applications**

- Adoptive T cell therapy
- Research tool for immune cell manipulation across species, ages, and subtypes.
- Enhanced immune protection strategies against intracellular pathogens

#### **Inventors**

- Dr. Ankur Singh
   Associate Professor George W. Woodruff School of Mechanical Engineering and Wallace H. Coulter
   Department of Biomedical Engineering
- Dr. A. Fatih Sarioglu
   Assistant Professor Georgia Tech School of Electrical and Computer Engineering

#### **IP Status**

The patent application has filed:

#### **Publications**

<u>Functionalized nanowires for miRNA-mediated therapeutic programming of naïve T cells</u>, Nature Nanotechnology - 2024

#### **Images**

Visit the Technology here:

Needle-like Nanostructures to Deliver Multi-scale Biomolecules to Non-activated Immune Cells

https://s3.sandbox.research.gatech.edu//print/pdf/node/4332