

# Nanoparticle Modulation of Thrombus Formation

---

## **A method for creating nanoparticles for the modulation of thrombosis, which reduces patient risk of complications and bleeding**

Georgia Tech inventors have developed modified charged nanoparticles (CNPs) to modulate thrombosis formation under arterial conditions of high shear rate. These CNPs work to prevent large vWF proteins in the blood from “unfolding” that cause arteries to occlude. By adding CNPs to the patients’ blood, the time it takes for a blood vessel blockage to form is significantly delayed or the blockage is altogether prevented. CNPs can be designed to have selective anti-thrombotic properties in order to prevent blockages. The advantages of anti-thrombotic therapy with CNPs are that (1) it can be categorized as a device that has selective and reversible effects under relevant hemodynamic conditions with no permanent change to blood and effective for a larger proportion of the intended population, (2) long shelf life, and (3) inexpensive to produce.

### **Summary Bullets**

- **Selective:** Operates only in high shear blood flow as in a stenosis
- **Improved Safety:** Reduces the risk of bleeding complications from slow bleeds

### **Solution Advantages**

- **Selective:** Operates only in high shear blood flow as in a stenosis
- **Improved Safety:** Reduces the risk of bleeding complications from slow bleeds

### **Potential Commercial Applications**

- Anti-thrombotic therapy

### **Background and More Information**

Intra-arterial thrombosis (blood clotting in a vessel) causes heart attacks and strokes, contributing to the high mortality rate of cardiovascular disease. Current therapies used to prevent and treat thrombosis, for example, anticoagulants and antiplatelet drugs, can be ineffective and create complications such as bleeding. Nanoparticles may provide an alternative method for reducing Major Adverse Cardiac Events.

### **Inventors**

- Dr. Cyrus Aidun  
Professor – Georgia Tech School of Mechanical Engineering
- Dr. David Ku  
Regents' Professor - Georgia Tech School of Mechanical Engineering
- Michael Griffin  
Ph.D. Student – Georgia Tech School of Mechanical Engineering

## **IP Status**

:

## **Publications**

[Busting Clots and Clearing Up A Chemical Mystery](#), Georgia Tech Research Horizons - April 12, 2021

## **Images**

Visit the Technology here:

[Nanoparticle Modulation of Thrombus Formation](#)

---

<https://s3.sandbox.research.gatech.edu//print/pdf/node/3614>