Nanoparticle Modulation of Thrombus Formation (#7466)

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.

Benefits/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/Context for This Invention

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.

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More Information

Publications

Busting Clots and Clearing Up A Chemical Mystery, Georgia Tech Research Horizons, April 12, 2021

Lysis of arterial thrombi by perfusion of N,N'-Diacetyl-L-cystine (DiNAC), PLOS One, February 25, 2021

For more information about this technology, please visit:
https://licensing.research.gatech.edu/technology/nanoparticle-modulation-thrombus-formation

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