

Applications

- Addresses unmet need of monitoring thrombin regulators in real-time
- Drug monitoring at bedside to allow for therapy adjustments
- Critical care, surgical and in/out patient monitoring
- Potential to be Point-of-Care device
- Novel platform adaptable for assessing other proteins in blood

Advantages

- Improved patient outcomes due to regulated antithrombin levels
- Easy to use monitor = accurate dosing of antithrombin
- Rapid, accurate and real-time - results in < 5 minutes
- Requires < than 1 cc of biological fluid
- Potential to monitor any direct thrombin inhibitor drug

Inventors

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Market Need

Thrombin is a key protein that plays major roles in coagulation, fibrinolysis, inflammation, angiogenesis, cancer, and other processes. Several inhibitors of thrombin, such as antithrombin (AT), are already used in the clinical setting to prevent excessive clot formation during surgery and after surgery. AT is critical for coagulation and inflammatory homeostasis, and levels are tightly regulated in the body. During acute illness, AT levels are highly variable, especially when large doses of heparin are administered. However, this can cause AT levels to drop precipitously-increasing mortality and morbidity in these already high risk patients.

What is needed is a way to rapidly and accurately monitor AT levels to guide treatment decisions before it's too late!

Technology Summary

VCU researchers have invented the solution to the problem—an easy to use technology that provides real time accurate monitoring of the AT level at the bed-side allowing for appropriate therapeutic titration of the amount of drug being infused = Optimized treatment with fewer complications.

This invention is a monitoring system to assess in vitro and ex vivo levels of proteins and/or drugs that interact with thrombin. It uses metal nanoparticles uniquely developed into nanoprobe coupled with a fluorescent marker that can report on the levels of agents such as AT, dabigatran, hirudins, bivalirudin and others. Upon binding to an agent, the nanoparticle's change in fluorescence is proportional to the level of the agent present in the medium and thus can be accurately quantified.

The invention provides a rapid, at the bedside, simple to use, and low cost test allowing for careful titration of blood proteins such as AT and other thrombin inhibitors.

Technology Status

Testing has been performed on the proposed molecules in clinically relevant settings.

Patent pending: U.S. and foreign rights available.

This technology is available for licensing to industry for further development and commercialization.