

Smart Nanosensor-Embedded Stent System for Wireless Surveillance of Restenosis in Coronary Artery Disease

Current stent methods and devices have high a risk for complications

A leading cause of morbidity and mortality in the United States is cardiovascular disease, which accounts for > 420,000 deaths per year, and epidemiological studies have estimated that approximately 44% of cardiovascular disease-related deaths are attributable to coronary artery disease (CAD). Endovascular technologies such as percutaneous transluminal coronary angioplasty and stenting are currently more widely used since they are minimally invasive and less risky. However, there are still relatively high percentages of a life-threatening complication called "restenosis" (i.e., re-narrowing of a coronary artery) after these procedures.

Researchers at the Georgia Institute of Technology are developing an implantable device that can identify restenosis by continuous surveillance of the coronary artery for the long term.

A smart nanosensor-embedded stent system provides long-duration, real-time detection of restenosis

This invention presents a newly developed nanomembrane electronic stent that incorporates a set of ultra-thin stretchable sensors and circuit-free/battery-free wireless systems for continuous surveillance of restenosis along with neointimal proliferation and plaque deposition in the coronary artery. This device has the potential to profoundly decrease the number of healthcare dollars spent on repeated revascularization due to restenosis in CAD.

Summary Bullets

- An electronic stent that incorporates an ultrathin stretchable wireless sensor for continuous surveillance of restenosis along with neointimal proliferation and plaque deposition.
- There is no existing system that offers a clinically practical solution for continuous, real-time detection of both restenosis incidence and progression.
- This device will profoundly decrease the number of healthcare dollars spent on repeated revascularization due to restenosis in CAD.

Solution Advantages

- Continuous, real-time detection of restenosis incidence and progression.
- Surveillance of restenosis for longer durations.
- Reduced patient complications.

Potential Commercial Applications

- Wireless restenosis sensor
- Continuous, real-time detection of restenosis
- Coronary artery disease devices
- Stents

Inventors

- Dr. Woon-Hong Yeo
Assistant Professor – Georgia Tech School of Mechanical Engineering

IP Status

<p>Patent application has been filed.</p>: U.S. App No. 18/278,712

Publications

[New Smart Stent Platform for Wireless Vascular Monitoring Developed by Georgia Tech Researchers](#), - May 19, 2022

Images

Visit the Technology here:

[Smart Nanosensor-Embedded Stent System for Wireless Surveillance of Restenosis in Coronary Artery Disease](#)

<https://s3.sandbox.research.gatech.edu//index.php/print/pdf/node/4248>