

Case Study: GMIT - MET & CAPSOS MEDICAL

Developing innovative technologies to treat chronic total occlusion

A chronic total occlusion (CTO) is arbitrarily defined as a > 3-month-old, total obstruction of a coronary artery. Treatment of CTOs is challenging for endovascular specialists. Historically, long total occlusions were treated with bypass surgery. In recent years, complex tools have been introduced but, while successful, they are costly. To address this, med-tech start-up Capsos Medical collaborated with MET Technology Gateway on an Enterprise Ireland innovation partnership funded project

Based in Galway, Capsos Medical (www.capsosmedical.com) have developed a patented balloon catheter and guidewire combination device called the CapBuster to facilitate the treatment of chronic total occlusions (CTOs).

The CapBuster re-opens the most resistant total occlusion, where a calcified cap has formed on the surface of the blockage. This new device utilises standard tools and techniques used in all angioplasties (procedure to restore blood

flow) in every Cath lab in the world.

Currently 50pc of CTOs are managed with medications, while approximately 40pc are treated with bypass surgery, which is an invasive procedure with high surgical costs associated. No clinically relevant CTOs was commercially available that replicates the specific anatomical challenges relevant to test Capsos Medical's device. So, Capsos Medical collaborated with MET to address the technology gap by developing an in vitro (procedure in a controlled environment outside of a living organism) simulation

system for testing the performance of their product.

Based at Galway-Mayo Institute of Technology's Galway campus, MET (Medical and Engineering Technologies) Gateway offers a range of applied technologies relevant to companies in the product engineering and design application phase, including medical imaging technologies and biomedical engineering technologies. The Gateway personnel offers a unique channel between medical product engineering and an in-depth knowledge of internal anatomy.

"MET researchers gathered the relevant clinical data and designed and developed various CTOs plaque configurations, which were incorporated into clinically relevant coronary vessels," explains Eugene McCarthy, MET Gateway Manager. "Following the vascular replication, MET designed a state-of-the-art customised in vitro simulation system with interchangeable vascular sections which was fluoroscope (a device used to project a radiographic image on a fluorescent screen for visual examination) compatible.

"By providing a highly realistic CTO model and a simulated use environment, the company could carry out design verification studies to evaluate and optimise their prototypes. This customised simulated system accelerated the product development cycle and reduced significant costs associated with pre-clinical animal testing."

The capabilities developed through this project enabled Capsos Medical to design a CTO treatment device that performs in a fashion superior to other products on the market. Since completion of the project, GMIT has maintained a high level of interaction with the company and has generated various models with varying CTO properties.

Brendan McLaughlin, CEO Capsos



Medical, says: "This project enabled Capsos to test our CTO treatment device, the CapBuster, in an environment that accurately simulates challenging in-vivo conditions. It also helped us to evaluate and refine our designs rapidly and effectively, shortening the development cycle and therefore reducing the development cost."

For more information on the MET Gateway at GMIT, visit www.metcentre.ie