

## Femtosecond Laser Nanotexturing of Drug-Eluting Stents

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Stents have been used for over a decade to treat coronary arteries affected by stenosis, a state where the arteries are narrowed by the deposition of plaque. But studies have found restenosis can hinder its purpose. Drug-eluting stents (DES) have a significant impact in treating restenosis. DES are embedded with drugs that are released over time after stent is placed within the artery, reducing the chance of plaque deposition around the stent. But DES risks the chance of increased thrombosis, which is a state when blood clots form around the stent because of a change in the blood flow profile. In our research we used femtosecond pulsed lasers to create Nano-textured patterns on a biomaterial, Tantalum and studied the structure. The 'peaks and valley' structure found under the microscope shows potentials to be used as a drug reservoir for the stents. Further studies are being conducted to test the fluid retention characteristics of the material, which can be a cost-effective solution to reduce or completely eliminate in-stent restenosis and thrombosis without the need of post-finishing operations. The interaction of bio-elements with the metallic stents are also being tested to ensure the efficiency of the DES.