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Two decades of commercializing nanotechnology for medical devices: Real products helping real humans

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There is an acute shortage of organs due to disease, trauma, congenital defect and most importantly, age related maladies. While tissue engineering (and nanotechnology) has made great strides towards improving tissue growth, infection control has been largely forgotten. Critically, as a consequence, the Centers for Disease Control have predicted more deaths from antibiotic-resistant bacteria than all cancers combined by 2050. Moreover, there has been a lack of translation to real commercial products. This talk will summarize how nanotechnology can be used to increase tissue growth and decrease implant infection without using antibiotics (while getting regulatory approval). Our group has shown that same nanofeatures, Nano-modifications, and nanoparticles can reduce bacterial growth without using antibiotics. This talk will summarize techniques and efforts to create nanofeatures for a wide range of medical devices and tissue engineering applications, particularly those that have received FDA approval and are currently being implanted in humans.

Speaker Biography

Thomas J Webster joined the chemical engineering department in fall 2012. The primary focus of our research is the design, synthesis and evaluation of nanomaterials for various medical applications. This includes self-assembled chemistries, nanoparticles, nanotubes and nanostructured surfaces. Medical applications include inhibiting bacteria growth, inflammation and promoting tissue growth. Tissues of particular interest are bone, cartilage, skin, nervous system, bladder, cardiovascular and vascular. There is also an interest in anti-cancer applications where nanomaterials can be used to decrease cancer cell functions without the use of pharmaceutical agents. There is also a large interest in developing *in situ* sensors which can sense biological responses to medical devices and respond in real time to ensure implant success. Lastly, there is an interest in understanding the environmental and human health toxicity of nanomaterials.

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