Thomas J Webster, Expert Opin Environ Biol 2018, Volume 7
DOI: 10.4172/2325-9655-C3-025

21st International Conference on
Past and Present Research Systems on Green Chemistry
August 27-28, 2018 | Boston, USA

Thomas J Webster

Northeastern University, USA

Was price charles right ? Nanotechnology will create a grey goo surrounding the earth ?

Statement of the problem: Nanotechnology, or the use of materials with at least one dimension less than 100 nm, may provide a non-drug approach to improving disease prevention, diagnosis, and treatment. This is because nanoparticles can have prolonged circulation in the body due to avoidance of immune system clearance, penetrate biofilms and bacteria when conventional drugs cannot, and can target intracellular mammalian cellular internal mechanisms to enhance cell adhesion, proliferation, and differentiation. Moreover, nanoparticles of specific chemistry (such as iron, selenium, magnesium, ceria, zinc and silver) can elevate intra-bacteria levels to kill bacteria without affecting mammalian cell functions. In contrast, synthetic materials used as medical devices today are typically composed of millimeter or micron sized particles and/or fiber dimensions and have no ability to fight bacteria, inhibit scar tissue, and promote tissue growth. Although human cells are on the micron scale, their individual components, e.g. proteins, are composed of nanometer features. By modifying only the nanofeatures on material surfaces without changing surface chemistry, it is also possible to decrease medical infection by increasing the endogenous adsorption of anti-bacterial adhesive proteins onto the medical device surface. Finally, nanomedicine has been shown to stimulate the growth and differentiation of stem cells, which may someday be used to further decrease implant infection since stem cells secrete factors known to kill bacteria. Most importantly, conventional methods of synthesizing nanoparticles often involve the use of harsh chemicals, catalysts, and even toxic chemicals. Yet, contemporary methods of fabricating nanomaterials have shown that one can make more effective nanoparticles for medical applications using green chemistry. This invited talk will highlight some of these advancements and emphasize current green chemistry nanomaterials currently approved by the US FDA for human implantation for medical applications.

Biography

Thomas J Webster's (H index: 84) degrees are in chemical engineering from the University of Pittsburgh (B.S., 1995) and in biomedical engineering from RPI (M.S., 1997; Ph.D., 2000). Prof. Webster has graduated/supervised over 149 visiting faculty, clinical fellows, post-doctoral students, and thesis completing B.S., M.S., and Ph.D. students. He is the founding editor-in-chief of the International Journal of Nanomedicine (5-year impact factor of 5.03). Prof. Webster is a fellow of AIMBE, BMES, IUSBE, and NAI. He also served as the President of SFB. He has appeared on BBC, NBC, ABC, Fox News, and other news outlets talking about medicine.

th.webster@neu.edu

Notes: