

Using nanotechnology and picotechnology for health

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Nanotechnology is beginning to revolutionize medicine including improved prevention, diagnosis, and treatment of numerous diseases. This talk will emphasize implantable and non-implantable devices and will summarize efforts over the past decade that has created novel nanoparticles, nanotubes, and other nanomaterials to improve medicine. It will also introduce new studies in picotechnology that creates implantable materials which outperform nanotechnology. Efforts focused on the use of nanomaterials to minimize immune cell interactions, inhibit infection, and increase tissue growth will be especially emphasized. Tissue systems covered will include the nervous system, orthopedics, bladder, cardiovascular, vascular, and the bladder. Due to complications translating *in vitro* to *in vivo* results, only *in vivo* studies will be emphasized here. Materials to be covered will include ceramics, metals, polymers, and composites thereof. Self-assembled nano- and pico-chemistries will also be emphasized. Efforts to decrease bacterial attachment and growth on surfaces (such as door knobs, bed railings, etc.) will also be covered. In addition, efforts to develop in situ sensors that can measure cell responses and then respond to such cellular responses will be covered. Lastly, tissue adhesives that can be applied directly to tissue (such as skin) to regrow such tissues will be covered. In summary, a wide range of nanomaterial applications in medicine will be summarized in this talk.

Biography

Thomas J. Webster's degrees are in chemical engineering from the University of Pittsburgh (B.S., 1995) and in biomedical engineering from Rensselaer Polytechnic Institute (M.S., 1997; Ph.D., 2000). He is currently the Department Chair and Professor of Chemical Engineering at Northeastern University in Boston. His research explores the use of nanotechnology in numerous applications. To date, his lab group has generated over 9 textbooks, 48 book chapters, 306 invited presentations, at least 403 peer-reviewed literature articles, at least 567 conference presentations, and 32 provisional or full patents. His H index is 49.

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