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From nanotechnology to picotechnology: What is on the horizon?

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Abstract

Inspired from biological systems, nanotechnology is beginning to revolutionize (and in many cases already has) revolutionized medicine including improved prevention, diagnosis, and treatment of numerous diseases. This talk will summarize efforts over the past decade that have synthesized novel nanoparticles, nanotubes, and other nanomaterials to improve medicine. 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-chemistries will also be emphasized. As the FDA has now approved several nanomaterials for medical applications, recent results from FDA trials will also be discussed. Importantly, this talk will also discuss what further advances we can make in medicine by using picotechnology compared to nanotechnology. In summary, this talk will provide the latest information concerning the design and use of numerous nanomaterials in regenerative medicine while highlighting what is necessary for this field to continue to grow through the exploration of picotechnology.

Biography

Thomas J. Webster's (H index: 50) 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. He has graduated/supervised over 109 visiting faculty, clinical fellows, post-doctoral students, and thesis completing B.S., M.S., and Ph.D. students. 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. Some of these patents led to the formation of 9 companies.