

BIOENGINEERING

PRESENTS

Citrate Biomaterial Platform and its Medical Applications



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2101 ENGINEERING V

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ABSTRACT:

In recent years, citrate-based biomaterials have become an intense focus of research in the search of new functional biomaterials for solving pressing medical problems. Citric acid, historically known as an intermediate in the Krebs cycle, is a multifunctional, nontoxic, readily available, and inexpensive cornerstone monomer used in the design of citrate-based biomaterials. In addition to the convenient citrate chemistry for the syntheses of a number of versatile polymers that may be elastomeric or mechanically strong and tough, injectable and photocrosslinkable, fluorescent and MR imaging-able, and/or tissue adhesive, citric acid also presents inherent anti-bacterial and anti-clotting characteristics, which make citrate biomaterials ideal for a number of medical applications. Furthermore, more recently studies have started revealing the intriguing biological regulation of citrates for tissue regeneration, especially for bone regeneration. All these features make citrate biomaterials promising and worth further developing. Herein, a methodology for the design and biomedical applications of citrate biomaterials will be discussed. Specific applications to be discussed include blood vessel, bone, and nerve regeneration, micro/nano-composites for orthopedic devices, bioinspired adhesives for wound healing, materials/cells/tissue bioimaging, immune cell-mediated cancer drug delivery, and point-of-care chloride sensing for cystic fibrosis diagnosis.

BIOGRAPHY:

Dr. Yang received his PhD in Polymer Chemistry and Physics in 2002 at Institute of Chemistry, The Chinese Academy of Science in Beijing. He is currently a full professor at the Department of Biomedical Engineering, The Pennsylvania State University. Dr. Yang has published 94 peer-reviewed journal articles, 9 issued patents, and 8 book chapters. He was a recipient of NSF CAREER Award (2010) and Outstanding Young Faculty Award of College of Engineering at UTA (2011). Dr. Yang was elected to the Fellow of American Institute of Medical and Biological Engineering (AIMBE) (Class of 2016). Dr. Yang serves as an Associate Editor for the journals "Bioactive Materials" and "Frontiers in Biomaterials" and also serves as a standing member for NIH "Biomaterials and Biointerfaces" study section. Dr. Yang is the founding secretary for (Oversea) Chinese Association for Biomaterials (CAB). He has co-founded a biotechnology company, Aleo BME, Inc. and is also serving on the medical advisory board for Acuitive Technologies, Inc.