Building Bone with Polymers: An Unconventional Approach

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Abstract:

The current surgical options to address critical sized orthopaedic defects eachhave significant limitations. Versatile, resorbable polymeric materials forscaffold construction with sufficient mechanical properties to minimize supplementary external fixation could be used for numerous clinical applications where off the shelf solutions are not viable.. We have developed resorbable amino acid based poly(ester ureas) that have suitable mechanical properties for load bearingorthopaedic applications. We have also developed a number of translationally relevant functionalization strategies for tethering bioactive peptides and growth factors to polymeric scaffolds. Theproposed osteogenic growth peptide-derivatized scaffolds can provide both mechanical reinforcement and enhance the bioactivity necessary for healing. We will report on our recent chemical derivatization strategies and its utility in a sheep femur defect model.

Short Biosketch:

Matthew L. Becker is an Associate Professor of Polymer Science and Biomedical Engineering at The University of Akron. Professor Becker also leads the industrial-focused Akron Functional Materials Center.

Prior to joining UA, Dr. Becker led projects in Bio-imaging and Tissue engineering at The National Institute of Standards and Technology (NIST) from 2005 to 2009 when he moved to UA. He received in PhD in organic chemistry from Washington University in St. Louis in 2003 under the direction of Professor Karen L. Wooley.

His multi-disciplinary research group focuses on synthesizing macromolecular materials for molecular sensing and regenerative medicine applications.