Kyriacos A. Athanasiou, Ph.D., Ph.M.

Clinical Interests

Professor Athanasiou's research is to understand and enhance the healing processes of cartilage. Successful cartilage regeneration continues to be the most vexing problem in musculoskeletal medicine. Following trauma (such as sports injuries) or pathologic affliction (such as osteoarthritis), cartilage is unable to heal itself in a way that would allow it to function properly under its strenuous and biomechanically difficult environment.

Of particular interest in our efforts are 1) hyaline articular cartilage, found in diarthrodial joints such as the knee, hip, and shoulder, 2) menisci, in the knee and temporomandibular joint (TMJ), and 3) fibrocartilage in the TMJ. Our approach entails the use of biodegradable scaffolds designed to incorporate suitable bioactive agents and signals to regenerate cartilage. We also place particular emphasis on certain aspects of scaffold design and overall approach. These include 1) biomechanical characterization of cartilage, 2) cell adhesion to substrata, and 3) attachment and effects of growth factors on chondrocytes.

Title

Chair, Department of Biomedical Engineering
Distinguished Professor

Specialty

Orthopaedic Surgery

Department

Orthopaedic Surgery

Division

Orthopaedic Research

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Education

Ph.M., Columbia University, New York, New York, 1988
Ph.D., Columbia University, New York, New York, 1989
M.S., Columbia University, New York City, New York, 1985
B.S., New York Institute of Technology, Old Westbury, New York, 1984

Professional Memberships

American Academy of Orthopaedic Surgeons
American Institute for Medical and Biological Engineering (AIMBE)
American Institute of Chemical Engineers (AICHE)

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American Society of Biomechanics (ASB)
American Society of Mechanical Engineers (ASME)
American Society of TMJ Surgeons (affiliate member) -- Invited
Biomedical Engineering Society (BMES)
Cyprus Association of Professional Engineers
Cyprus Society of Biomedical Engineering and Medical Physics
Orthopaedic Research Society (ORS)
Society for Biomaterials (SFB)
Tissue Engineering Society

Select Recent Publications

Huey DJ, Sanchez-Adams J, Willard VP, Athanasiou KA. Immunogenicity of bovine and leporine articular chondrocytes and meniscus cells. *Tissue Eng Part A*. 2012 Mar;18(5-6):568-75. Epub 2011 Nov 4.

Sanchez-Adams J, Athanasiou KA. Dermis isolated adult stem cells for cartilage tissue engineering. *Biomaterials*. 2012 Jan;33(1):109-19. Epub 2011 Sep 28.

Kalpakci KN, Kim EJ, Athanasiou KA. Assessment of growth factor treatment on fibrochondrocyte and chondrocyte co-cultures for TMJ fibrocartilage engineering. *Acta Biomater*. 2011 Apr;7(4): 1710-8. Epub 2010 Dec 23.

Makris EA, Hadidi P, Athanasiou KA. The knee meniscus: structure-function, pathophysiology, current repair techniques, and prospects for regeneration. *Biomaterials*. 2011 Oct;32(30):7411-31. Epub 2011 Jul 18.

Bhatavadekar NB, Hu J, Keys K, Ofek G, Athanasiou KA. Novel application of cytodetachment technology to the analysis of dental implant surfaces. *Int J Oral Maxillofac Implants*. 2011 Sep-Oct; 26(5):985-90.

Eleswarapu SV, Chen JA, Athanasiou KA. Temporal assessment of ribose treatment on self-assembled articular cartilage constructs. *Biochem Biophys Res Commun*. 2011 Oct 22;414(2):431-6. Epub 2011 Sep 28.

Eleswarapu SV, Responte DJ, Athanasiou KA. Tensile properties, collagen content, and crosslinks in connective tissues of the immature knee joint. *PLoS One*. 2011;6(10):e26178. Epub 2011 Oct 13.

Sanchez-Adams J, Willard VP, Athanasiou KA. Regional variation in the mechanical role of knee meniscus glycosaminoglycans. *J Appl Physiol*. 2011 Dec;111(6):1590-6. Epub 2011 Sep 8.

Willard VP, Arzi B, Athanasiou KA. The attachments of the temporomandibular joint disc: A biochemical and histological investigation. *Arch Oral Biol*. 2011 Nov 28.

Wong ML, Leach JK, Athanasiou KA, Griffiths LG. The role of protein solubilization in antigen

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removal from xenogeneic tissue for heart valve tissue engineering. *Biomaterials*. 2011 Nov;32(32): 8129-38. Epub 2011 Jul 31.

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