



 Steven B. Nicoll

Steven B. Nicoll
Associate Professor of
Biomedical Engineering
The City College of The
City University of New York

160 Convent Ave.,
Steinman Hall, T-431
Tel: (212) 650-6237
Fax: (212) 650-6727
snicoll@ccny.cuny.edu
[Nicoll Lab \[..\]](#)

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Education

Post-Doc, Biomedical Engineering, Columbia University, New York, NY, 2002
Ph.D., Bioengineering, University of California, Berkeley and San Francisco, CA, 2000
B.S.E., Bioengineering, University of Pennsylvania, Philadelphia, PA, 1994

Research Interests

Professor Nicoll's research program incorporates the principles of cell and molecular biology, materials science, and mechanical engineering toward the development of living tissue surrogates for connective tissue restoration. A prevailing theme in each of the major research thrusts is understanding how environmental stimuli and biomaterial substrates regulate the differentiation of novel progenitor cells (i.e., human dermal fibroblasts, fetal cells) toward specialized connective tissue cell lineages, such as chondrocytes and osteoblasts.

Recent Publications

? Reza, A. T. and Nicoll, S. B. (2010). Serum-free, chemically defined medium with TGF- β 3 enhances functional properties of nucleus pulposus cell-laden carboxymethylcellulose hydrogel constructs. *Biotechnol. Bioeng.*, 105: 384-395.

? Reza, A. T. and Nicoll, S. B. (2010). Characterization of novel photocrosslinked carboxymethylcellulose hydrogels for encapsulation of nucleus pulposus cells. *Acta Biomater.*, 6: 179-186.

? Brink, H. E., Bernstein, J. and Nicoll, S. B. (2009). Fetal dermal fibroblasts exhibit enhanced growth and collagen production in two- and three-dimensional culture in comparison to adult fibroblasts. *J. Tissue Eng. Regen. Med.*, 3: 623-633.

? Yu, V., Damek-Poprawa, M., Nicoll, S. B. and Akintoye, S. O. (2009). Dynamic hydrostatic pressure promotes differentiation of human dental pulp stem cells. *Biochem. Biophys. Res. Commun.*, 386: 661-665.

? Hee, C. K. and Nicoll, S. B. (2009). Endogenous bone morphogenetic proteins mediate $1\alpha,25$ -dihydroxyvitamin D₃-induced expression of osteoblast differentiation markers in human dermal

fibroblasts. *J. Orthop. Res.*, 27: 162-168.

?Chou, A. I., Akintoye, S. O. and Nicoll, S. B. (2009). Photocrosslinked alginate hydrogels support enhanced matrix accumulation by nucleus pulposus cells in vivo. *Osteoarthritis Cartilage*, 17: 1377-1384.

? Chou, A. I. and Nicoll, S. B. (2009). Characterization of photocrosslinked alginate hydrogels for nucleus pulposus cell encapsulation. *J. Biomed. Mater. Res.: Part A*, 91A: 187-194.

? Stalling, S. S., Akintoye, S. O. and Nicoll, S. B. (2009). Development of photocrosslinked methylcellulose hydrogels for soft tissue reconstruction. *Acta Biomater.*, 5: 1911-1918.

?Chou, A. I., Reza, A. T. and Nicoll, S. B. (2008). Distinct intervertebral disc cell populations adopt similar phenotypes in three-dimensional culture. *Tissue Eng., Part A*, 14: 2079-2087.

? Park, S., Nicoll, S. B., Mauck, R. L. and Ateshian, G. A. (2008). Cartilage mechanical response under dynamic compression at physiological stress levels following enzymatic digestion. *Ann. Biomed. Eng.*, 36: 425-434.

?Stalling, S. S. and Nicoll, S. B. (2008). Fetal ACL fibroblasts exhibit enhanced cellular properties compared with adults. *Clin. Orthop. Rel. Res.*, 466: 3130-3137.

? Reza, A. T. and Nicoll, S. B. (2008). Hydrostatic pressure differentially regulates outer and inner annulus fibrosus cell matrix production in 3D scaffolds. *Ann. Biomed. Eng.*, 36: 204-213.

?Chao, P. G., Nicoll, S. B., Bulinski, J. C., Lu, H. H. and Hung, C. T. (2007). Effects of applied DC electric field on ligament fibroblast migration and wound healing. *Conn. Tissue Res.*, 48: 188-197.

?Yerramalli, C. S., Chou, A. I., Miller, G. J., Nicoll, S. B., Chin, K. R. and Elliott, D. M. (2007). The effect of nucleus pulposus crosslinking and glycosaminoglycan degradation on disc mechanical function. *Biomech. Model. Mechanobiol.*, 6: 13-20.

?Chou, A. I., Bansal, A. D., Miller, G. J. and Nicoll, S. B. (2006). The effect of serial monolayer passaging on the collagen expression profile of outer and inner annulus fibrosus cells. *Spine*, 31: 1875-1881.

?Hee, C. K. and Nicoll, S. B. (2006). Induction of osteoblast differentiation markers in human dermal fibroblasts: Potential application to bone tissue engineering. *Proc. IEEE Eng. Med. Biol. Soc.*, 1: 521-524.

?Brink, H. E., Miller, G. J., Beredjikian, P. K. and Nicoll, S. B. (2006). Serum-dependent effects on fetal and adult tendon fibroblast migration and collagen expression. *Wound Repair Regen.*, 14: 179-186.

?Hee, C. K., Jonikas, M. A. and Nicoll, S. B. (2006). Influence of three-dimensional scaffold on the expression of osteogenic differentiation markers by human dermal fibroblasts. *Biomaterials*, 27: 875-884.

?Wheaton, A. J., Dodge, G. R., Elliott, D. M., Nicoll, S. B. and Reddy, R. (2005). Quantification of cartilage biomechanical and biochemical properties via T1ρ MRI. *Magn. Reson. Med.*, 54: 1087-1093.

?Jiang, J., Nicoll, S. B. and Lu, H. H. (2005). Co-culture of osteoblasts and chondrocytes modulates cellular differentiation in vitro. *Biochem. Biophys. Res. Comm.*, 338: 762-770.

?Brink, H. E., Stalling, S. S. and Nicoll, S. B. (2005). Influence of serum on adult and fetal dermal fibroblast migration, adhesion, and collagen expression. *In Vitro Cell. Dev. Biol.*, 41: 252-257.