

# Albert J. Banes, Ph.D.



## ALBERT JOSEPH BANES *CURRICULUM VITAE*

### Personal Information

1821 Coleman Loop Road  
Hillsborough, NC 27278  
(919) 644-0066

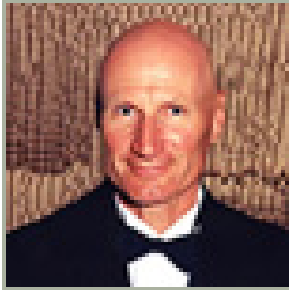
### Education

<b>Postdoctoral Fellow, National Institutes of Health</b> Department of Microbiology, Duke University, Durham, NC Sponsor: Dr. Ralph Smith	1974-1976
<b>Ph.D. in Microbiology</b> Health Sciences Division, Virginia Commonwealth University, Richmond, VA	1971-1974
<b>M.S. in Developmental Biology</b> University of Richmond, Richmond, VA	1969-1971
<b>B.A. in Biology</b> Lehigh University, Bethlehem, PA	1965-1969

### Professional Experience -- Employment History

<b>President</b> Flexcell Holding Corporation LLC Hillsborough, NC 27278	<b>2014-present</b>
<b>Professor Emeritus</b> , Joint Department of Biomedical Engineering North Carolina State University, Raleigh, NC University of North Carolina at Chapel Hill, Chapel Hill, NC	2013-present
<b>Professor</b> , Joint Department of Biomedical Engineering North Carolina State University, Raleigh, NC University of North Carolina at Chapel Hill, Chapel Hill, NC	2000-2013
<b>President</b> MedTrain Technologies LLC Hillsborough, NC 27278	2005-present
<b>Adjunct Professor</b> , Curriculum of Applied and Materials Sciences University of North Carolina at Chapel Hill, Chapel Hill, NC	2000-2013
<b>President and Scientific Director</b> Flexcell International Corporation, Hillsborough, NC	1986-present

**ALBERT JOSEPH BANES**  
*CURRICULUM VITAE*



**Albert J. Banes, Ph.D.**  
**President**

<b>Adjunct Professor</b> , Department of Periodontics, School of Dentistry University of North Carolina at Chapel Hill, Chapel Hill, NC	1983-2013
<b>Member</b> , Dental Research Center University of North Carolina at Chapel Hill, Chapel Hill, NC	1981-2013
<b>Professor</b> , Department of Orthopaedics, School of Medicine Director, Orthopaedic Research Laboratories (resigned as Director in 2003) Director, Cytomechanics Laboratory University of North Carolina at Chapel Hill, Chapel Hill, NC	1995-2005
<b>Professor and Research Director</b> , Division of Plastic Surgery North Carolina J.C. Burn Center University of North Carolina at Chapel Hill, Chapel Hill, NC	1990-1995
<b>Assistant Professor</b> , Department of Surgery University of North Carolina at Chapel Hill, Chapel Hill, NC	1978-1983
<b>Associate Member</b> , Dental Research Center University of North Carolina at Chapel Hill, Chapel Hill, NC	1978-1981
<b>Research Associate</b> , Department of Microbiology Medical College of Virginia, Richmond, VA	1976
<b>Adjunct Faculty</b> , Department of Biology Virginia Commonwealth University, Richmond, VA	1975-1977
<b>Laboratory Instructor</b> , Microbiology University of Richmond, Richmond, VA	1973-1977

**Honors and Awards**

Session Chair ISLT Arezzo, Italy Biological Augmentation (Stem cells, PRP) for Tendon and Ligament Healing. A. Banes and S. Brue	2013
Invited Keynote Speaker McGowan Regenerative Medicine Retreat Nemacolin Woodlands, Farmington, PA	2014
Invited Keynote speaker British Matrix Society Cardiff, Wales	2013
Invited Keynote Speaker, International Congress on Fascia, Vancouver, BC,	2012

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

Co-Chair and Keynote Speaker, ABES 2011 Meeting, Nemocolin Woodlands, PA	2011
Scientific Advisory Board Member, Orthopaedics Hospital for Special Surgery, NY	2010-2013
Invited Speaker, "Cellular Signaling and Mechanotransduction" Session on "Tendons: The Connection Between Bone and Muscle" at the 40 <sup>th</sup> International Sun Valley Workshop on Skeletal Biology, Sun Valley, ID.	2010
Scientific Advisory Board Member, BRP grant Dr. David Butler, University of Cincinnati	2009-present
Invited Speaker, Department of Biomedical Engineering, University of Pennsylvania, Host, Dr. Louis Soslowsky, Research Director, Dept of Orthopaedics, BME.	2009
Invited speaker, Mechanisms of Mechanosensitivity in Connective Tissue Cells, SPRBM, Hawaii, Jan, 2009.	2009
Invited talk and session moderator, Bioreactors in Tissue Engineering, NATERMIS, San Diego, CA.	2009
Invited Speaker, Cell-Based Therapies and Tissue Engineering 2009, "Mechanotransduction in Connective Tissue Cells: Incorporation in Bioreactors", Cleveland, Ohio, short course by Dr. Arnold Caplan.	2009
Invited Distinguished Professor Lecture "Mechanotransduction Mechanisms in Connective Tissue Cells", University of Pennsylvania, Philadelphia, PA, Dr. Louis Soslowsky PhD, Director of Research in Orthopaedics, host	2009
Board Member Society for Physical Regulation in Medicine and Biology	2008
NIH Tissue Engineering Evaluation Consensus Meeting. Member and speaker on biologic evaluation parameters. Organizers Dr. David Butler, School of Engineering, U. Cincinnati, Dr. Jack Lewis, School of Engineering, U. Minnesota; Dr. Cyril Frank MD, Chair Orthopaedic Surgery, U. Calgary.	2008
Member, Panel Discussion on "How to write a competitive NIH grant" Physical Regulation in Biology and Medicine meeting, Honolulu, HA.	2008
Keynote speaker on Purinoceptor Regulation of Mechanical Load Responses. Physical Regulation in Biology and Medicine meeting, Honolulu, HA.	2008-2009
Invited Speaker, by Dr. Robert Sah, UCSD, Symposium on Tissue Engineering in Connective Tissues.	2008

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

Invited Speaker, Symposium on Mechanisms of Mechanotransduction in Connective Tissues, Dr. Michael Kjaer, University of Copenhagen.	2008
Invited Keynote Speaker, by Dr. Savio Woo, University of Pittsburgh, Bioengineering, Tissue Engineering Symposium, talk, "Mechanotransduction".	2008
Panelist, "Musculoskeletal Tissue Engineering Design Evaluation" Hilton Head Island, SC.	2007
Elected as a Fellow of the American Institute for Medical Biological Engineering	2007
Invited Speaker, "Biological Design/Evaluation Criteria" Gordon Research Conference on Musculoskeletal Biology & Bioengineering, Proctor Academy, Andover, NH.	2006
Panelist, "Scientist To Entrepreneur" NIEHS Career Fair, RTP, NC.	2006
Invited Guest Lecturer and Invited Speaker University of Texas, San Antonio, Biomedical Engineering Department, Jeff Thompson, Instructor.	2006
Invited Speaker, <i>Mechanical strain and the phenotypic characterization of the tenocyte</i> , Tendon and Ligament Remodelling and Regeneration, BSMB Satellite Symposium, Queens College, Cambridge.	2006
Scientific Advisory Board Member CRANN Univeristy of Dublin, IR	2006-2009
Chair of the Tendon/Ligament Topic Committee Orthopaedics Research Society; Committee responsible for the sub-areas of Biology, Biomechanics, and Healing of Tendons and Ligaments.	2006-2007
Co-Chair at Gordon Research Conference Tendons and Ligaments Session. Opening remarks	2004
One of three keynote speakers at Mechanotransduction Meeting Dr. Steve Goldstein organizer	1999
Mechanical Activity Subgroup Meeting Moderator (with Dr. Carol Otey) ASCB meeting, San Francisco, CA; 200 participants	1999
AAOS Invited Lecturer Tissue Engineering Symposium, Tendon Tissue Engineering, Tampa, FL	1998
Invited Lecturer Mechanical Activity, Tissue Engineering Symposium Keystone Symposium, Copper Mt., CO	1998
Invited Lecturer	1998

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

University of Wyoming, Department of Zoology, Dr. Scott Boitano

Invited Distinguished Professor Lecturer Hospital for Special Surgery Orthopaedics, New York City, NY, invited by Dr. Adele Boskey	1997
Distinguished Professor Lecturer Yale University School of Medicine, Orthopaedics, invited by Dr. Caren Gundberg ( <i>How Tendon Cells Respond to Mechanical Strain by Cyclin Induction</i> )	1996
Program Committee, Wound Healing Society	1992
Program Committee, American Burn Association, UNC	1988-1991
Elected to the Editorial Board of the <i>Journal of Burn Care and Rehabilitation</i>	1987-1990
Member, FDA ad hoc Committee for the Nomenclature of Wound Dressings	1986
Scientific Advisory Committee, Dental School, UNC	1984
First Dr. W. Reams Biomedical Lecturer University of Richmond, Richmond, VA	1982
UNC Medical Faculty Grants Committee, Grant <i>Effects of exercise in vivo and mechanical stimulation in vitro on the biochemistry of tendons and tendon cells in culture</i>	1981
Award from the American Society for Surgery of the Hand Project: <i>Effect of exercise in vivo and mechanical stimulation in vitro on the biochemistry of tendons and tendon cells in culture</i>	1980
NIH Post-Doctoral Fellowship (IF 22 AM02159)	1974-1976

**Bibliography**

***Book Chapters***

1. Wall, M., Dymont, N., Bodle, J., Volmer, J, Loba, E, Cederlund, A, Fox, A and Banes A. Cell signaling in tenocytes: response to load and ligands in health and disease. Part 1, Chapter 8, in, *Metabolic Influences on Risk for tendon disorders*, ed. Paul W. Ackermann and David Hart. Springer 2016.
2. Banes AJ, Tsuzaki M, Wall M, Qi J, Yang X, Bynum D, Karas S, Hart DA, Nation A, Fox AM, Almekinders LC. The Molecular Biology of Tendinopathy: Signaling and Response Pathways in Tenocytes. In: *Tendinopathy in Athletes* (Volume XII of the Encyclopedia of Sports Medicine), edited by Woo S, Renstrom P, Arnoczky S. Ames, IA: Blackwell Publishing, 2007.
3. Banes AJ, Qi J, Fox AM, Bynum D, Lalush D, Almekinders L. Tendon biomarkers in mouse and man: comparisons of tendon to muscle and bone and potential targets for gene therapy. In: *Tendon Pathology*, edited by Maffulli N, Almekinders L. Springer, 2006.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

4. Banes AJ, Wall ME, Garvin J, Archambault J. Cytomechanics: signaling to mechanical load in connective tissue cells and role in tissue engineering. In: *Functional Tissue Engineering*, edited by Guilak F, Butler D, Goldstein R, Mooney D. New York, NY: Springer-Verlag, p. 318-334, 2003.
5. Archambault JM, Banes AJ, Herzog W. Research Methodology and Animal Modeling in Tendinopathy. In: *Tendon Injuries: Basic Science and Clinical Medicine*, edited by Maffulli N, Renstrom P, Leadbetter WB. London: Springer, p. 279-286, 2005.
6. Banes AJ, Horesovsky G, Tsuzaki M, Lawrence WT, Brown T, Weinhold P, Kenamond C, Benjamin M, Ralphs J, McNeilly C, Burt J, Miller L. Connexin 43 is mechanosensitive in avian flexor tendon cells. In: *The Biology of the Synovial Joint*, edited by Caterson B, Archer C, Benjamin M, Ralphs J. Amsterdam, Netherlands: Harwood Academic Publishers, p. 279-99, 1999.
7. Banes AJ, Hu P, Xiao H, Sanderson MJ, Boitano S, Brigman B, Fischer T, Tsuzaki M, Brown T, Almekinders L, Lawrence WT. Tendon cells of the epitenon and internal tendon compartment communicate mechanical signals through gap junctions and respond differentially to mechanical load and growth factors. In: *Repetitive Motion Disorders of the Upper Extremity*, edited by Gordon S, Blair SJ, Fine LJ. Illinois: American Academy of Orthopaedic Surgeons, p. 231-246, 1995.
8. Banes AJ, Sanderson M, Boitano S, Hu P, Brigman B, Tsuzaki M, Fischer T, Lawrence WT. Mechanical load +/- growth factors induce [Ca<sup>2+</sup>]<sub>i</sub> release, cyclin D1 expression and DNA synthesis in avian tendon cells. In: *Cell Mechanics and Cellular Engineering*, edited by Mow VC, Guilak F, Tran Son Tay R, Hochmuth R. New York: Springer Verlag, p. 210-232, 1994.
9. Banes AJ. Mechanical strain and the mammalian cell. In: *Physical Forces and the Mammalian Cell*, edited by Frango J. San Diego, CA: Harcourt, Brace, Jovanovich Publishers, Academic Press, p. 81-123, 1993.
10. Banes AJ, Link GW. Quantitation of radioactive PTC derivatives of collagen crosslinks using reversed phase chromatography and flow scintillation detection. In: *Progress in HPLC (Radioactive Flow-Through Detection in HPLC)*, edited by Parvez, et al. Vol. 3, p. 57-58, 1988.
11. Gelberman RL, Goldberg V, An K, Banes AJ. Biology and biochemistry of tendon repair. (1987) NIH Workshop on Soft Tissue Repair.
12. Banes AJ, Link GW, Yamauchi M, Mechanic GL, Peterson HD. Temporal changes in collagen crosslink formation at the focus of trauma and at sites distant to a wound. In: *The Pathophysiology of Combined Injury and Trauma*, p. 257-73, 1987.
13. Mechanic GL, Banes AJ, Henmi M, Yamauchi M. Possible collagen structural control of mineralization. In: *2nd Intl Conf on the Chem and Bio of Mineralized Tissues*. Birmingham, AL: EBSCO Media, Inc, p. 98-102, 1985.
14. Boyde A, Banes AJ, Dillaman RM, Mechanic GL. A morphological study of an avian bone disorder caused by myeloblastosis-associated virus. In: *Proceedings of the Second Conference on Matrix Vesicle Calcification*, edited by Anderson HC, Howell DS. Paris, France: SNPMD Publishers, 1978.

### **Refereed Articles**

#### Original research

1. Wall, M., Butler, D., El Haj, A., Bodle, J., Loba, E. and Banes, A. Key developments that impacted the field of mechanobiology and mechanotransduction. J. orth Res. Special issue on Mechanobiology, invited paper, accepted 2017.
2. Banes, A.J. Out of Academics Annals of Biomedical Engineering. 41: #9, 10926-1938, 2013.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

3. Qi J, Dmochowski JM, Banes AN, Tsuzaki M, Bynum D, Patterson M, Creighton A, Gomez S, Tech K, Cederlund A, Banes AJ. Differential expression and cellular localization of novel isoforms of the tendon biomarker tenomodulin. (2012) *J Applied Physiology* 113(6):861-871.
4. Qi J, Chi L, Bynum D, Banes AJ. Gap junctions in IL-1 $\beta$  -mediated cell survival response to strain. (2011) *J App Phys* 110(5):1425-1431.
5. Qi J, Chi L, Wang J, Sumanasinghe R, Wall M, Tsuzaki M, Banes AJ. Modulation of collagen gel compaction by extracellular ATP is MAPK and NF-kB pathways dependent. (2009) *Experimental Cell Research* 315(11):1990-2000. Epub 2009 Feb 23.
6. Hanson AD, Marvel SW, Bernacki SH, Banes AJ, van Aalst J, Loba E. Osteogenic effects of rest inserted and continuous cyclic tensile strain on hASC lines with disparate osteodifferentiation capabilities. (2009) *Annals of Biomedical Engineering* 37(5):955-965. Epub 2009 Feb 20.
7. Qi J, Chi L, Labeit S, Banes AJ. Nuclear Localization of the Titin Z1Z2Zr Domain and Role in Regulating Cell Proliferation. (2008). *Am J Physiol Cell Physiol*. 295(4):C975-C985. Epub 2008 Aug 6.
8. Butler DL, Lewis JL, Frank CB, Banes AJ, etal. Evaluation criteria for musculoskeletal and craniofacial tissue engineering constructs: a conference report. Functional Tissue Engineering Conference Group. (2008) *Tissue Eng Part A* 14(12):2089-2104.
9. Devkota AC, Tsuzaki M, Almekinders LC, Banes AJ, Weinhold PS. Distributing a fixed amount of cyclic loading to tendon explants over longer periods induces greater cellular and mechanical responses.(2007) *J Orthop Res* 25: 1078-1086.
10. Wall ME, Otey C, Qi J, Banes AJ. Connexin 43 is localized with actin in tenocytes. (2007) *Cell Motil Cytoskeleton* 64(2):121-130.
11. Wall ME, Weinhold PS, Siu T, Brown TD, Banes AJ. Comparison of cellular strain with applied substrate strain in vitro. (2007) *J Biomech* 40(1):173-181. Epub 2006 Jan 5.
12. Qi J, Chi L, Faber J, Koller B, Banes AJ. ATP reduces gel compaction in osteoblast-populated collagen gels. (2007) *J Appl Physiol* 102(3):1152-1160. Epub 2006 Nov 22.
13. Qi J, Fox AM, Alexopoulos LG, Chi L, Bynum D, Guiliak F, Banes AJ. IL-1 $\beta$  decreases the elastic modulus of human tenocytes. (2006) *J Appl Physiol* 101(1):189-195. Epub 2006 Apr 20.
14. Qi J, Chi L, Maloney M, Yang X, Bynum D, Banes AJ. Interleukin-1 $\beta$  increases elasticity of human bioartificial tendons. (2006) *Tissue Eng* 12(10):2913-2925.
15. Siddhivarn C, Banes A, Champagne C, Riche EL, Weerapradist W, Offenbacher S. Prostaglandin D2 pathway and peroxisome proliferator-activated receptor  $\gamma$ -1 expression are induced by mechanical loading in an osteoblastic cell line. (2006) *J Periodontal Res* 41(2):92-100.
16. Parsons KK, Maeda N, Yamauchi M, Banes AJ, Koller BH. Ascorbic acid-independent synthesis of collagen in mice. (2005) *Am J Physiol Endocrinol Metab* 290(6):E1131-E1139. Epub 2005 Dec 13.
17. Tsuzaki M, Bynum D, Almekinders L, Faber J, Banes AJ. Mechanical loading stimulates ecto-ATPase activity in human tendon cells. (2005) *J Cell Biochem* 96(1):117-125.
18. Wall ME, Banes AJ. Early responses to mechanical load in tendon: role for calcium signaling, gap junctions and intercellular communication. (2005) *J Musculoskelet Neuronal Interact* 5(1):70-84. Dr. Jaroslav Halper DVM Ph.D. guest editor.
19. Jones BF, Wall ME, Carroll RL, Washburn S, Banes AJ. Ligament cells stretch-adapted on a microgrooved substrate increase intercellular communication in response to a mechanical stimulus. (2005) *J Biomech* 38(8):1653-1664.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

20. Wall ME, Faber JE, Yang X, Tsuzaki M, Banes AJ. Norepinephrine-induced calcium signaling and expression of adrenoceptors in avian tendon cells. (2004) *Am J Physiol Cell Physiol* 287(4):C912-C918. Epub 2004 Jun 16.
21. Triantafillopoulos IK, Banes AJ, Bowman KF, Maloney M, Garrett WE, Karas SG. Nandrolone decanoate and load increase remodeling and strength in human supraspinatus bioartificial tendons. (2004) *Am J Sports Med* 32(4):934-943.
22. Fischer TH, Brittain J, Trabalzini L, Banes AJ, White GC, Smith CJ, Nichols TC. The RAS-binding domain of RAL GDS-like protein-2 as a ras inhibitor in smooth muscle cells. (2003) *Biochem Biophys Res Commun* 305(4):934-940.
23. Tsuzaki M, Bynum D, Almekinders L, Yang X, Faber J, Banes AJ. ATP modulates load-inducible IL-1 $\beta$ , COX 2, and MMP-3 gene expression in human tendon cells. (2003) *J Cell Biochem* 89(3):556-562.
24. Garvin J, Qi J, Maloney M, Banes AJ. Novel system for engineering bioartificial tendons and application of mechanical load. (2003) *Tissue Eng* 9(5):967-979.
25. Yamazaki S, Weinhold PS, Graff RD, Tsuzaki M, Kawakami M, Minchew JT, Banes AJ. Annulus cells release ATP in response to vibratory loading in vitro. (2003) *J Cell Biochem* 90(4):812-818.
26. Banes AJ, Qi J., Maloney M, Almekinders L, and Bynum D. Bioartificial tendons: a model 3D system for testing tenocyte responses to drugs, cytokines and mechanical load ex vivo. (2003) AAOS monograph and web publication.
27. Tsuzaki M, Guyton G, Garrett W, Archambault J, Herzog W, Almekinders L, Bynum D, Yang X, Banes AJ. IL-1 $\beta$  induces COX2, MMP-1, -3 and -13, ADAMTS-4, IL-1 $\beta$  and IL-6 in human tendon cells. (2003) *J Orthop Res* 21(2):256-264.
28. Zhang H, Facemire CS, Banes AJ, Faber JE. Different  $\alpha$ -adrenoceptors mediate migration of vascular smooth muscle cells and adventitial fibroblasts in vitro. (2002) *Am J Physiol Heart Circ Physiol* 282(6):H2364-H2370.
29. Larson CM, Kelley SS, Blackwood AD, Banes AJ, Lee GM. Retention of the native chondrocyte pericellular matrix results in significantly improved matrix production. (2002) *Matrix Biol* 21(4):349-359.
30. Yamazaki S, Banes AJ, Weinhold P, Tsuzaki M, Kawakami M, Minchew JT. Vibratory loading decreases extracellular matrix and matrix metalloproteinase gene expression in rabbit annulus cells. (2002) *Spine J* 2(6):415-420.
31. Archambault J, Tsuzaki M, Herzog W, Banes AJ. Stretch and interleukin-1 $\beta$  induce matrix metalloproteinases in rabbit tendon cells in vitro. (2002) *J Orthop Res* 20(1):36-39.
32. Archambault JM, Elfervig-Wall MK, Tsuzaki M, Herzog W, Banes AJ. Rabbit tendon cells produce MMP-3 in response to fluid flow without significant calcium transients. (2002) *J Biomech* 35(3):303-309.
33. Elfervig MK, Graff RD, Lee GM, Kelley SS, Sood A, Banes AJ. ATP induces Ca<sup>2+</sup> signaling in human chondrons cultured in three-dimensional agarose films. (2001) *Osteoarthritis Cartilage* 9(6):518-526.
34. Elfervig MK, Minchew JT, Francke E, Tsuzaki M, Banes AJ. IL-1 $\beta$  sensitizes intervertebral disc annulus cells to fluid-induced shear stress. (2001) *J Cell Biochem* 82(2):290-298.
35. Banes AJ, Lee G, Graff R, Otey C, Archambault J, Tsuzaki M, Elfervig M, Qi J. Mechanical forces and signaling in connective tissue cells: cellular mechanisms of detection, transduction and responses to mechanical deformation. (2001) *Current Opinions in Orthopedics* 12:389-396.
36. Fermor B, Weinberg JB, Pisetsky DS, Misukonis MA, Banes AJ, Guilak F. The effects of static and intermittent compression on nitric oxide production in articular cartilage explants. (2001) *J Orthop Res* 19(4):729-737.



**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

37. Graff RD, Lazarowski ER, Banes AJ, Lee GM. ATP release by mechanically loaded porcine chondrons in pellet culture. (2000) *Arthritis Rheum* 43(7):1571-1579.
38. Tsuzaki M, Brigman BE, Yamamoto J, Lawrence WT, Simmons JG, Mohapatra NK, Lund PK, Van Wyk J, Hannafin JA, Bhargava MM, Banes AJ. Insulin-like growth factor-I is expressed by avian flexor tendon cells. (2000) *J Orth Res* 18(4):546-556.
39. Brown TD, Bottlang M, Pedersen DR, Banes AJ. Development and experimental validation of a fluid/structure-interaction finite element model of a vacuum-driven cell culture mechanostimulus system. (2000) *Comput Methods Biomech Biomed Engin* 3(1):65-78.
40. Hsieh AH, Tsai CM, Ma QJ, Lin T, Banes AJ, Villarreal FJ, Akeson WH, Sung KL. Time-dependent increases in type-III collagen gene expression in medical collateral ligament fibroblasts under cyclic strains. (2000) *J Orthop Res* 18(2):220-227.
41. Banes AJ, Weinhold P, Yang X, Tsuzaki M, Bynum D, Bottlang M, Brown T. Gap junctions regulate responses of tendon cells ex vivo to mechanical loading. (1999) *Clin Orthop Relat Res* 367 Suppl:S356-S370.
42. Banes AJ, Horesovsky G, Larson C, Tsuzaki M, Judex S, Archambault J, Zernicke R, Herzog W, Kelley S, Miller L. Mechanical load stimulates expression of novel genes in vivo and in vitro in avian flexor tendon cells. (1999) *Osteoarthritis Cartilage* 7(1):141-153.
43. Brown TD, Bottlang M, Pedersen DR, Banes AJ. Loading paradigms--intentional and unintentional--for cell culture mechanostimulus. (1998) *Am J Med Sci* 316(3):162-168.
44. Upchurch GR, Loscalzo J, Banes AJ. Changes in the amplitude of cyclic load biphasically modulate endothelial cell DNA synthesis and division. (1997) *Vasc Med* 2(1):19-24.
45. Clements ML, Banes AJ, Faber JE. Effects of mechanical loading on vascular  $\alpha$ 1D- and  $\alpha$ 1B- adrenergic receptor expression. (1997) *Hypertension* 29(5):1156-1164.
46. McNielly CM, Banes AJ, Benjamin M, Ralphs JR. Tendon cells in vivo form a three dimensional network of cell processes linked by gap junctions. (1996) *J Anat* 189(Pt 3):593-600. Erratum in: *J Anat* (1997) 190(Pt 3):477-478.
47. Cooley JE, Briggaman RA, Cronce DJ, Banes AJ, O'Keefe EJ. Hailey-Hailey disease keratinocytes: normal assembly of cell-cell junctions in vitro. (1996) *J Invest Dermatol* 107(6):877-881.
48. Calderon M, Lawrence WT, Banes AJ. Increased proliferation in keloid fibroblasts wounded in vitro. (1996) *J Surg Res* 61(2):343-347.
49. Lawrence WT, Banes AJ. Plastic surgery research. (1996) *Clin Plast Surg* 23(1):173-182.
50. Banes AJ, Tsuzaki M, Yamamoto J, Fischer T, Brigman B, Brown T, Miller L. Mechanoreception at the cellular level: the detection, interpretation, and diversity of responses to mechanical signals. (1995) *Biochem Cell Biol* 73(7-8):349-365. Special Issue on Cytomechanics.
51. Banes AJ, Tsuzaki M, Hu P, Brigman B, Brown T, Almekinders L, Lawrence WT, Fischer T. PDGF-BB, IGF-I and mechanical load stimulate DNA synthesis in avian tendon fibroblasts in vitro. (1995) *J Biomech* 28(12):1505-1513. Special Issue on Cytomechanics.
52. Almekinders LC, Banes AJ, Bracey LW. An in vitro investigation into the effects of repetitive motion and nonsteroidal antiinflammatory medication on human tendon fibroblasts. (1995) *Am J Sports Med* 23:119-123.
53. Gilbert JA, Weinhold PS, Banes AJ, Link GW, Jones GL. Strain profiles for circular cell culture plates containing flexible surfaces employed to mechanically deform cells in vitro. (1994) *J Biomech* 27(9):1169-1177.
54. Brigman BE, Hu P, Yin H, Tsuzaki M, Lawrence WT, Banes AJ. Fibronectin in the tendon-synovial complex: quantitation in vivo and in vitro by ELISA and relative mRNA

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

- levels by polymerase chain reaction and northern blot. (1994) *J Orthop Res* 12(2):253-261.
55. Almekinders LC, Banes AJ, Ballenger CA. Effects of repetitive motion on human fibroblasts. (1993) *Med Sci Sports Exerc* 25(5):603-607.
  56. Pedersen DR, Bottlang M, Brown TD, Banes AJ. Hyperelastic constitutive properties of polydimethylsiloxane cell culture membranes. (1993) *BED Ad Bioengin ASME* 26:607-609.
  57. Banes AJ, Baird C, Dorofi D, Calderone M, Upchurch G, Amaya G, Keagy B. Cyclic mechanical load and growth factors stimulate endothelial and smooth muscle cell DNA synthesis and cell division. (1993) *Eur Resp Rev* 3:618-622.
  58. Tsuzaki M, Yamauchi M, Banes AJ. Tendon collagens: extracellular matrix composition in shear stress and tensile components of flexor tendons. (1993) *Connect Tissue Res* 29(2):141-152.
  59. Pedersen DR, Brown TD, Banes AJ. Mechanical behavior of a new substratum for strain-induced cell culture experiments. (1992) *Proc NACOB II, Second North American Congress on Biomechanics* 355-356.
  60. Cooley JE, Banes AJ, Lawrence WT. An in vitro model for Hailey-Haley Disease. (1992) *Journal of Orthopaedic Research* 98(492):34.
  61. Calderone MS, Banes AJ, Lawrence WT. Response of keloid and normal dermal fibroblasts to wounding in vitro. (1992) *Surg Forum* 43:685-687.
  62. Vadiakas GP, Banes AJ. Verapamil decreases cyclic load-induced calcium incorporation in ROS 17/2.8 osteosarcoma cell cultures. (1992) *Matrix* 12(6):439-447.
  63. Gilbert JA, Banes AJ, Link GW, Jones GL. Video analysis of membrane strain: an application in cell stretching. (1990) *Exp Tech* Sept/Oct 33-45.
  64. Banes AJ, Link GW, Gilbert JW, Tran Son Tay R, Monbureau O. Culturing cells in a mechanically active environment. (1990) *Am Biotechnol Lab* 8(7):12-22.
  65. Buckley MJ, Banes AJ, Jordan RD. The effects of mechanical strain on osteoblasts in vitro. (1990) *J Oral Maxillofac Surg* 48(3):276-282.
  66. Sumpio BE, Banes AJ, Link GW, Iba T. Modulation of endothelial cell phenotype by cyclic stretch: inhibition of collagen production. (1990) *J Surg Res* 48(5):415-420.
  67. Upchurch GR, Banes AJ, Wagner WH, Ramadan F, Link GW, Henderson RH, Johnson G. Differences in secretion of prostacyclin by venous and arterial endothelial cells grown in vitro in a static versus a mechanically active environment. (1989) *J Vasc Surg* 10(3):292-298.
  68. Gilbert JA, Banes AJ, Link GW, Jones GL. Surface strain of living cells in a mechanically active in vitro environment. (1989) *ANSYS*, p 13.2-13.7, *ANSYS Conf Proc*, ed. David E. Dietrich, Swanson Analysis Systems, Houston, PA.
  69. Hoyle MR, Banes AJ, Bernard S, Thomas CG. Effects of 2-deoxy-5-fluorouridine on regenerating liver following partial hepatectomy in the rat. (1988) *J Surg Res* 45:181-186.
  70. Gelberman RL, Goldberg V, An K, Banes AJ. Biology and biochemistry of tendon repair injury and repair of the musculoskeletal soft tissues. (1988) *AAOS and NIAMSD*, Park Ridge, IL, pp 4-40.
  71. Wagner WH, Henderson RH, Hicks HE, Banes AJ, Johnson G. Differences in morphology, growth rate, and protein synthesis between cultured arterial and venous endothelial cells. (1988) *J Vasc Surg* 8(4):509-519.
  72. Sumpio BE, Banes AJ. Prostacyclin synthetic activity in cultured aortic endothelial cells undergoing cyclic mechanical deformation. (1988) *Surgery* 104(2):383-389.
  73. Buckley MJ, Banes AJ, Levin LG, Sumpio BE, Sato M, Jordan R, Gilbert J, Link GW, Tran Son Tay R. Osteoblasts increase their rate of division and align in response to cyclic, mechanical tension in vitro. (1988) *Bone Miner* 4(3):225-236.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

74. Levin L, Banes AJ, Bergenholtz G. A method for the isolation of viable cells from human dental pulp. (1988) *J Cell and Tissue Culture Methods* 11:23-26.
75. Sumpio BE, Banes AJ. Response of porcine aortic smooth muscle cells to cyclic tensional deformation in culture. (1988) *J Surg Res* 44(6):696-701.
76. Sumpio BE, Banes AJ, Link GW, Johnson G. Enhanced collagen production by smooth muscle cells during repetitive mechanical stretching. (1988) *Arch Surg* 123(10):1233-1236.
77. Sumpio BE, Banes AJ, Buckley M, Johnson G. Alterations in aortic endothelial cell morphology and cytoskeletal protein synthesis during cyclic tensional deformation. (1988) *J Vasc Surg* 7(1):130-138.
78. Banes AJ, Link GW. Quantitation of radioactive PTC derivatives of collagen crosslinks using reversed phase chromatography and flow detection. Progress in HPLC, Radioactivity Flow-Through Detection. (1988) In *HPLC* 4:57-78.
79. Banes AJ, Link GW, Bevin AG, Peterson HD, Gillespie Y, Bynum D, Watts S, Dahners L. Tendon synovial cells secrete fibronectin in vivo and in vitro. (1988) *J Orthop Res* 6(1):73-82.
80. Banes AJ, Donlon K, Link GW, Gillespie Y, Bevin AG, Peterson HD, Bynum D, Watts S, Dahners LE. Cell populations of tendon: a simplified method for isolation of synovial cells and internal fibroblasts: conformation of origin and biological properties. (1988) *J Orthop Res* 6(1):83-94.
81. Sumpio BE, Banes AJ, Levin LG, Johnson G. Mechanical stress stimulates aortic endothelial cells to proliferate. (1987) *J Vasc Surg* 6(3):252-256.
82. Banes AJ, Link GW, Yamauchi M, Mechanic GL, Peterson HD. Temporal changes in collagen crosslink deformation at the focus of trauma and at sites distant to a wound. (1987) *AFFRI Symposium on Pathophysiology of Combined Injury and Trauma*, 257-273.
83. Mechanic GL, Young DR, Banes AJ, Yamauchi M. Nonmineralized and mineralized bone collagen in bone of immobilized monkeys. (1986) *Calcif Tissue Int* 39(2):63-68.
84. Woodley DT, Kalabec T, Banes AJ, Link W, Prunieras M, Liotta L. Adult human keratinocytes migrating over nonviable dermal collagen produce collagenolytic enzymes that degrade type I and type IV collagen. (1986) *J Invest Dermatol* 86(4):418-423.
85. Banes AJ, Link GW, Beckman WC, Camps JL, Powers SK. High-performance liquid chromatographic quantitation of rhodamines 123 and 110 from tissues and cultured cells. (1986) *J Chromatogr* 356(2):301-309.
86. Dahners LE, Banes AJ, Burrige KW. The relationship of actin to ligament contraction. (1986) *Clin Orthop Relat Res* 210:246-251.
87. Banes AJ, Compton DW, Bornhoeft J, Hicks H, Link GW, Bevin AG, Lawrence WT, Peterson HD. Biologic, biosynthetic, and synthetic dressings as temporary wound covers: a biochemical comparison. (1986) *J Burn Care Rehabil* 7(2):96-104.
88. Mechanic GL, Banes AJ, Henmi M, Yamauchi M. Possible collagen structural control of mineralization. (1985) *Second International Conference on the Chemistry and Biology of Mineralized Tissues*, ed. W Butler. EBSCO-Media Incorp, Birmingham, AL, pp 98-102.
89. Hicks H, Banes AJ. The in vivo biosynthesis of embryonic proteins after maternal administration of phenytoin in the mouse. (1985) *Proc Soc Exp Biol Med* 180(3):483-487.
90. Hicks H, Spaulding PM, Banes AJ. The water, DNA, collagen and noncollagen protein contents in embryos after maternal administration of a teratogenic dose of phenytoin. (1985) *Toxicol Lett* 25(1):41-46.
91. Link GW, Keller PL, Stout RW, Banes AJ. Effects of solutions used for storage of size-exclusion columns on subsequent chromatography of peptides and proteins. (1985) *J Chromatogr* 331(2):253-264.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

92. Banes AJ, Link GW, Snyder LR. Comparisons of reversed-phase columns for the separation of tryptic peptides by gradient elution. Correlation of experimental results and model prediction. (1985) *J Chromatogr* 326:419-431.
93. Gilbert JA, Eylers J, Banes AJ. A new instrument to assess animal joint stiffness in vitro. (1985) *J Biomed Mater Res* 19(5):601-605.
94. Banes AJ, Gilbert J, Taylor D, Monbureau O. A new vacuum-operated stress-providing instrument that applies static or variable duration cyclic tension or compression to cells in vitro. (1985) *J Cell Sci* 75:35-42.
95. Hicks HE, Johnston M, Banes A.J. Maternal phenytoin administration affects DNA and protein synthesis in embryonic primary palates. (1983) *Teratology* 28(3):389-397.
96. Banes AJ, Yamauchi M, Mechanic GL. Nonmineralized and mineralized compartments of bone: the role of pyridinoline in non-mineralized collagen. (1983) *Biochem Biophys Res Commun* 113(3):975-981.
97. Banes AJ, Yamauchi M, Moody RT. Reversed-phase high-performance liquid chromatography method for separation of collagen tryptic peptides. (1983) *J Chromatogr* 272(2):366-372.
98. Banes AJ, Dingledein P, Thiet M, Spitznagel E, Bevin AG, Compton DW, Salisbury RE. Wound dressings: a biochemical comparison of viable and non-viable allografts in control and burned rats. (1983) *J Burn Care and Rehab* 4(3):165-175.
99. Yamauchi M, Banes AJ, Kuboki Y, Mechanic GL. A comparative study of the distribution of the stable crosslink, pyridinoline, in bone collagens from normal, osteoblastoma and vitamin D-deficient chicks. (1981) *Biochem Biophys Res Commun* 102(1):59-65.
100. Boyde A, Banes AJ, Mechanic GL. The association of MAV-2(0) virus with the mineralization process in chick bone. (1981) *J Scanning Electromicros.*
101. Eylers J, Banes AJ, Salisbury RE. Short term immobilization causes joint stiffness without biochemical changes in juvenile and adult chickens. (1981) *IRCS Medical Sciences* 9:372.
102. Banes AJ, Spitznagel E, Enterline D, White K, Salisbury RE. Viable and non-viable skin grafts have similar effects on wound bed macromolecular synthesis. (1981) *IRCS Medical Sciences* 9:131.
103. Banes AJ, Enterline D, Bevin AG, Salisbury RE. Effects of trauma and partial devascularization on protein synthesis in the avian flexor profundus tendon. (1981) *J Trauma* 21(7):505-512.
104. Banes AJ, Mechanic GL. Collagen and noncollagen protein synthesis in chick limb bud cells infected with a virus that causes osteoblastoma. (1981) *Metab Bone Dis Relat Res* 3(2):81-89.
105. Banes AJ, Mechanic GL, Bevin AG, Salisbury RE. Altered patterns of collagen synthesis in the thermally injured host. (1980) *J Burn Care and Rehab* 1:24-30.
106. Banes AJ, Coleman PH. La crosse virus production and export have a colchicine-sensitive step. (1980) *Cell Biol Int Rep* 4(12):1117-1123.
107. Banes AJ, Enterline D, Bevin AG, Mechanic GL. Effects of trauma and devascularization on collagen synthesis following flexor tendon injury. (1980) *Surg Forum* XXXI:546-548.
108. Banes AJ, Nebes S, Smith RE, Mechanic GL. DMSO normalizes collagen synthesis in MAV-2(0)-infected chick embryo cells. (1979) *Gen Pharmacol* 10(6):521-523.
109. Boyde A, Banes AJ, Dillaman RM, Mechanic GL. A morphological study of an avian bone disorder caused by myeloblastosis-associated virus. (1978) *Metab Bone Dis Relat Dis* 1:235-242.
110. Banes AJ, Smith RE, Mechanic GL. Increased collagen synthesis in myeloblastosis-associated virus-infected chicken embryo fibroblasts. (1978) *Biochem Biophys Res Commun* 82(2):723-726.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

111. Banes AJ, Bernstein PH, Smith RE, Mechanic GL. Collagen biochemistry of osteopetrotic bone: I. Quantitative changes in bone collagen cross-links in virus-induced avian osteopetrosis. (1978) *Biochem Biophys Res Commun* 81(4):1390-1397.
112. Banes AJ, Smith RE. Biological: characterization of avian osteopetrosis. (1977) *Infect Immun* 16(3):876-884.

### Published & Conference abstracts

1. **BIOARTIFICIAL MUSCLE CONSTRUCTS : 3 DIMENSIONAL CO-CULTURE IN THE PRESENCE OF MECHANICAL STRESS AND OVERSTRESS AS A MODEL OF TENDON AND MUSCLE INJURY AND REPAIR.** Jon Volmer<sup>1</sup>, Aisley Amegashie<sup>1</sup>, Ben Levin<sup>1</sup>, David Grant<sup>1</sup>, Albert J. Banes<sup>1,2</sup>. <sup>1</sup>Flexcell International Corp. Hillsborough, NC 27278, <sup>2</sup>Orthopaedics, UNC Chapel Hill, NC,
2. **THERMACOL: A NOVEL HYDROGEL WITH THERMALLY CONTROLLED GELATION AND MATERIAL PROPERTIES FOR ENGINEERING BIOARTIFICIAL TISSUES.** Albert J. Banes<sup>1,2</sup>, Jon Volmer<sup>1</sup>, David Grant<sup>1</sup>, Aisley Amegashie<sup>1</sup>, Michelle Wall<sup>1</sup>, Ben Levin<sup>1</sup>, and Elizabeth Lobo<sup>2</sup>. <sup>1</sup>Flexcell International Corp. Hillsborough, NC 27278, <sup>2</sup>Joint Dept. Biomedical Engineering, NCSU/UNC, Raleigh, NC, <sup>3</sup>Orthopaedics, UNC Chapel Hill, NC.
3. **A Collagen Hydrogel, Mechanical Conditioning and Ascorbic Acid for Engineering Bioartificial Tendons.** Albert J. Banes<sup>1,2</sup>, Charles McGee<sup>1</sup>, David Grant<sup>1</sup>, Aisley Amegashie<sup>1</sup>, Jon Volmer<sup>1</sup>, Michelle Wall<sup>1</sup>, Ruwan Sumanisinghe<sup>1</sup>, Ashley Banes<sup>1</sup>, Don Bynum<sup>3</sup>, Anna Cederlund<sup>4</sup>, Ben Levin<sup>1</sup>, Jie Qi<sup>1</sup>, Jeff Thompson<sup>5</sup> and Elizabeth Lobo<sup>2</sup>. <sup>1</sup>Flexcell International Corp. Hillsborough, NC 27278, <sup>2</sup>Joint Dept. Biomedical Engineering, NCSU/UNC, Raleigh, NC, <sup>3</sup>Orthopaedics, UNC Chapel Hill, NC, <sup>4</sup>Upsalla U, Sweden, <sup>5</sup>Prosthodontics dept., Nova Southeastern University, Fort Lauderdale, FL.
4. Banes, A.J., Tendon Biomarkers and Tendinopathy. ISLT 2013, Arezzo, Italy
5. Banes AJ, Qi J, Dmochowski JM, Banes AN, Norman W, Kim J, Addison K, Bynum D, Patterson M, Creighton A. Tenomodulin associates with chromatin at mitosis in tenocytes and HeLa cells. (podium) *59th Annual Meeting of the Orthopaedic Research Society, San Antonio, TX, January 26-29, 2013.*
6. Qi J, Banes AN, Dmochowski JM, Norman W, Kim J, Bynum D, Patterson M, Creighton A, Banes AJ. Nuclear localization and chromatin association of tenomodulin in human and equine tenocytes. *59th Annual Meeting of the Orthopaedic Research Society, San Antonio, TX, January 26-29, 2013.*
7. Qi J, Banes AN, Dmochowski JM, Norman W, Kim J, Bynum D, Patterson M, Creighton A, Banes AJ. Nuclear localization and chromatin association of tenomodulin in human and equine. *Proceedings of the 14th Annual North Carolina Tissue Engineering and Regenerative Medicine Conference, Raleigh, NC, September 10, 2012.*
8. Kim J, Norman W, Qi J, Banes AJ. The tendon biomarker tenomodulin is expressed at tenocyte levels in cancer cells derived from a uterine carcinoma (HeLa). *Proceedings of the 14th Annual North Carolina Tissue Engineering and Regenerative Medicine Conference, Raleigh, NC, September 10, 2012.*
9. Norman W, Kim J, Qi J, Banes AJ. Human and equine tenocytes localize tenomodulin to chromatin during mitosis. *Proceedings of the 14th Annual North Carolina Tissue Engineering and Regenerative Medicine Conference, Raleigh, NC, September 10, 2012.*
10. Wimmer C, Addison K, Frazier C, Qi J, Banes AJ. Novel wound tear model for 3D bioartificial constructs in vitro. (podium) *Proceedings of the 14th Annual North Carolina Tissue Engineering and Regenerative Medicine Conference, Raleigh, NC, September 10, 2012.*
11. Banes AJ, Qi J, Dmochowski JM, Banes AN, Norman W, Kim J, Addison K, Bynum D, Patterson M, Creighton A. Tenomodulin isoform I associates with chromatin during mitosis. *Musculoskeletal and Bioengineering Gordon Research Conference, August 5-10, 2012.*

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

12. Qi J, Dmochowski JM, Banes AN, Tsuzaki M, Bynum D, Patterson M, Creighton A, Gomez S, Banes AJ. Cellular localization of tenomodulin isoforms. *Experimental Biology, San Deigo, CA, April 2012*.
13. Banes AJ, Qi J, Sumanasinghe R, Tsuzaki M, Yeung N, Banes A, Dmochowski J, Wall M. The tendinome: gene expression profile of tenocytes in development, maturation, response to injury, repair and pathology. 3<sup>rd</sup> International *Fascia Research Congress, Vancouver, BC, March 28-30, 2012, Keynote Speaker*.
14. Qi J, Dmochowski JM, Banes AN, Tsuzaki M, Bynum D, Patterson M, Creighton A, Gomez S, Banes AJ. Differential expression and cellular localization of novel isoforms of the tendon biomarker tenomodulin.
15. Cederlund A, Qi J, Banes AJ. Dose-dependent effect of 2-phosphoascorbate on material properties of 3D porcine tenocyte-populated bioartificial tendon. *ASCB 2011 Denver, CO, December 3-7, 2011*.
16. Banes A, Banes AJ, Qi J, Dmochowski J, Bynum D, Schramme M, Patterson M. Tenomodulin is down-regulated in wounded and strained bioartificial equine tendons in vitro. *57<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 2011*.
17. Dmochowski J, Qi J, Banes A, Banes AJ, Smith R, Nixon A. Differential expression of tenomodulin isoforms in human tissues. *57<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 2011*.
18. Dmochowski JM, Qi J, Banes A, Bynum D, Patterson M, Banes AJ. Strain modulates tenomodulin isoform 1 expression and nuclear localization in porcine tenocytes. *57<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, Long Beach, CA, January 2011*.
19. Banes AN, Qi J, Tsuzaki M, Dmochowski JM, Schramme M, Nixon A, Smith R, Yeung N, Sumanasinghe R, Banes AJ (2011). Tenomodulin regulation in equine bioartificial tendons in vitro. *International Symposium on Ligaments & Tendons IX, Long Beach, CA, January 12, 2011*.
20. Dmochowski JM, Qi J, Tsuzaki M, Banes AN, Bynum D, Patterson M, Gomez S, Banes AJ (2011). Characterization and expression of tenomodulin isoforms in human tendon. *International Symposium on Ligaments & Tendons IX, Long Beach, CA, January 12, 2011*.
21. Qi J, Tsuzaki M, Sumanasinghe R, Lobo E, Banes AJ. Chitosan-doped collagen hydrogels: Reduced 3D gel compaction by stem cells. *The 50th American Society for Cell Biology Annual Meeting, Philadelphia, PA, December 2010*
22. Dmochowski JM, Qi J, Banes AN, Bynum D, Petterson M, Gomez A, Banes AJ. Strain modulates tenomodulin isoform 1 expression and nuclear localization in porcine tenocytes. *NCTERM, RTP, NC. November 12, 2010*.
23. Banes AN, Qi J, Dmochowski JM, Schramme M, Bynum D, Patterson M, Banes AJ. Tenomodulin is down-regulated in wound and strained bioartificial equine tendons in vitro. *NCTERM, RTP, NC. November 12, 2010*.
24. Banes AJ, Qi J, Tsuzaki M, Sumanasinghe R, Wall M (2009). Mechanosensation in connective tissue cells. *SPRBM 27th Annual Meeting, Oahu, Hawaii*.
25. Qi J, Chi L, Wang J, Sumanasinghe R, Wall M, Tsuzaki M, Banes AJ. Development of an *in vitro* model for tendinopathy. *International Symposium on Ligaments & Tendons IX, #48, Las Vegas, NV, February 21, 2009*.
26. Qi J, Wang J, Sumanasinghe R, Wall M, Tsuzaki M, Bynum D, Banes AJ. Primary cilia are modulated by serum, interleukin-1 $\beta$  and strain in human tenocytes. *55<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, #35, Las Vegas, NV, February 22-25, 2009*.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

27. Qi J, Chi L, Wang J, Sumanasinghe R, Wall M, Tsuzaki M, Banes AJ, ATP augments osteoblastic response to mechanical stretch by modulating cell prestress. *The 48<sup>th</sup> American Society for Cell Biology Annual Meeting. Dec 13-17, 2008. San Francisco, CA.*
28. Sumanasinghe RD, Qi J, Wang J, Tsuzaki M, Wall M, Pfeiler W, Loba E, Hart DA, Banes AJ. An in vitro Achilles tendon tissue engineering model: construct compaction, cell orientation and local strain distribution. *Institute of Biological Engineering 2008 Annual Conference, Chapel Hill, NC, March 6-9, 2008.*
29. Qi J, Chi L, Wang J, Wall M, Sumanasinghe R, Tsuzaki M, Banes AJ. Regulation of mechanosensitivity in osteoblasts: role of NF- $\kappa$ B pathway. *Institute of Biological Engineering 2008 Annual Conference, Chapel Hill, NC, March 6-9, 2008.*
30. Wang J, Qi J, Wall M, Sumanasinghe R, Tsuzaki M, Banes AJ. The influences of fluid-induced shear stress in osteoblasts cultured in microchannels. *Institute of Biological Engineering 2008 Annual Conference, Chapel Hill, NC, March 6-9, 2008.*
31. Qi J, Chi L, Wang J, Sumanasinghe R, Wall M, Tsuzaki M, Banes AJ (2008). An in vitro tendinopathy model and potential role of interleukin-1 $\beta$  in the treatment of tendinopathy. *NCTERM Conference, Durham, NC.*
32. Banes AJ. Enabling technology: application of strain or shear to cells and tissues for tissue engineering. *Institute of Biological Engineering 2008 Annual Conference, Chapel Hill, NC, March 6-9, 2008.*
33. Hanson AD, Marvel S, Bernacki SH, Banes AJ, Loba EG. Mechanical loading of adipose-derived adult stem cells enhances osteogenesis. *54th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, March 1-5, 2008.*
34. Pfeiler TW, Sumanasinghe RD, Banes AJ, Loba EG. Finite element modeling of 3D human mesenchymal stem cell-seeded collagen matrices. *54th Annual Meeting of the Orthopaedic Research Society, San Francisco, CA, March 1-5, 2008.*
35. Qi J, Chi L, Wang J, Sumanasinghe R, Tsuzaki M, Bynum D, Banes AJ. IL-1b-induced up-regulation of elastin in human tenocytes is tension-dependent. *54th Annual Meeting of the Orthopaedic Research Society, #769, San Francisco, CA, March 1-5, 2008.*
36. Qi J, Chi L, Bynum D, Banes AJ. Cell-cell connection is necessary for cellular survival under mechanical loading. *International Symposium on Ligaments & Tendons VIII, Palo Alto, CA, March 2008.*
37. Wang J, Qi J, Wall ME, Sumanasinghe R, Tsuzaki M, Banes AJ. Single human tenocytes respond to flow in a novel microfluidic device. *International Symposium on Ligaments & Tendons VIII, #27, Palo Alto, CA, March 2008.*
38. Tsuzaki M, Qi J, Wall ME, Thompson JY, Fox AM, Koller B, Banes AJ. Functional deficiency of CX43 gap junctions in tenocytes from P2Y2 purinoceptor knockout mice. *International Symposium on Ligaments & Tendons VIII, #24, Palo Alto, CA, March 2008.*
39. Sumanasinghe RD, Qi J, Wang J, Tsuzaki M, Wall M, Pfeiler W, Loba E, Hart DA, Banes AJ. Cell orientation and local strain distribution in an in vitro Achilles tendon tissue engineering model. *International Symposium on Ligaments & Tendons VIII, #54, Palo Alto, CA, March 2008.*
40. Qi J, Chi L, Wang J, Wall M, Sumanasinghe R, Tsuzaki M, Banes AJ. ATP reduces the contraction of MC3T3-E1 cell-populated collagen gels by regulating NF- $\kappa$ B activity. *The Society for Physical Regulation and Medicine's 26th Annual Scientific Conference, Miami, FL, January 2008.*
41. Wang J, Qi J, Wall ME, Sumanasinghe R, Tsuzaki M, Banes AJ. Novel microsystem for studying shear stress affects on a single cell. *The Society for Physical Regulation and Medicine's 26th Annual Scientific Conference, Miami, FL, January 2008.*
42. Qi J, Chi L, Banes A. Overexpression of titin Z1Z2Zr domains in MG63 stimulates cell growth by activating WNT/beta-catenin pathway. *47<sup>th</sup> Annual meeting of the American Society for Cell Biology, Washington, DC, December 1-5, 2007.*

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

43. Wang J, Tsuzaki M, Qi J, Wall ME, Sumanasinghe R, Banes AJ. A novel microfluidic system for single cell shear stress experimentation. *47<sup>th</sup> Annual meeting of the American Society for Cell Biology, #1208, Washington, DC, December 1-5, 2007.*
44. Tsuzaki M, Fox A, Qi J, Wall ME, Wang J, Sumanasinghe R, Banes AJ. Cell-cell communication in P2Y2 KO tenocytes is impaired due to faulty Cx43 trafficking. *47<sup>th</sup> Annual meeting of the American Society for Cell Biology, #917, Washington, DC, December 1-5, 2007.*
45. Pfeiler TW, Sumanasinghe RD, Banes AJ, Loba EG. Anchor design for an improved three dimensional tensile strain bioreactor. *North Carolina Tissue Engineering and Regenerative Medicine Annual Meeting, Winston Salem, NC, September 21, 2007.*
46. Sumanasinghe RD, Qi J, Wang J, Tsuzaki M, Wall M, Loba E, Banes AJ. A new tissue engineering model to study Achilles tendon regeneration. *North Carolina Tissue Engineering and Regenerative Medicine Annual Meeting, Winston Salem, NC, September 21, 2007.*
47. Qi J, Chi L, Bynum D, Banes AJ. Expression of filaggrin in human tenocytes. *53<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society, San Diego, CA, February 11-13, 2007.*
48. Qi J, Chi L, Bynum D, Banes AJ. Ascorbate increases the strength of BATs by differentially regulating the expression of type I collagen and elastin. *North Carolina Tissue Engineering and Regenerative Medicine Meeting, Raleigh, NC, August 25, 2006.*
49. Qi J. Connexin 43 may be involved in IL-1 $\beta$ -mediated cell survival in human tenocytes. *46<sup>th</sup> Annual meeting of the American Society for Cell Biology, San Diego, CA, December 10-13, 2006.*
50. Qi J, Chi L, Bynum D, Banes A. Mechanical load down-regulated titin expression in human tenocytes. *52<sup>nd</sup> Annual Meeting of the Orthopaedic Research Society, Chicago, IL, March 18-21, 2006.*
51. Fox A, Piascik J, Thompson J, Koller B, Banes A. The role of P2Y1 and P2Y2 receptors in the structure-function relationship of mouse tail tendons. *52<sup>nd</sup> Annual Meeting of the Orthopaedic Research Society, Chicago, IL, March 18-21, 2006.*
52. Qi J, Chi L, Banes AJ. Cortical and gap junction distribution of human titin carboxyl terminus and co-localization with actin. *The American Society for Cell Biology, 45<sup>th</sup> Annual Meeting, San Francisco, CA, December 10-14, 2005.*
53. Qi J, Chi L, Alexopoulos L, Guilak F, Bynum D, Banes AJ. IL-1 $\beta$  spares cell viability in response to mechanical loading by reducing cell stiffness in bioartificial tendons. *North Carolina Tissue Engineering Interest Group, 2005 Annual Meeting, Research Triangle Park, NC, October 14, 2005.*
54. Wang J, Kheradpir K, Qi J, Loba EG, Grant E, Banes AJ. New bioreactor system for long-term vascular graft culture: applications for blood vessel studies. *FASEB, San Diego, CA, April 2-5, 2005.*
55. Wall ME, Weinhold TS, Brown TD, Banes AJ. Strain magnitudes at the cell and substrate level in vitro. *Institute of Biological Engineering (IBE), Athens, GA, March 4-6, 2005.*
56. Fox AM, Jones B, Koller BH, Banes AJ. Reduced load response in tenocytes from P2Y<sub>1</sub>/P2Y<sub>2</sub> purinoreceptor null mice. *Orthopaedic Research Society, Washington D.C., February 20-23, 2005.*
57. Qi J, Alexopoulos L, Guilak F, Bynum D, Banes AJ. IL-1 $\beta$  reduced the modulus of human tendon internal fibroblasts. *Orthopaedic Research Society, Washington D.C., February 20-23, 2005.*
58. Wall ME, Otey C, Banes AJ. Connexin 43 co-localizes with actin in tenocytes. *Orthopaedic Research Society, Washington D.C., February 20-23, 2005.*
59. Wall ME, Weinhold PS, Siu T, Brown T, Banes AJ. Comparison of cellular strain with



# ALBERT JOSEPH BANES

## CURRICULUM VITAE

- applied substrate strain in vitro. *Orthopaedic Research Society, Washington D.C., February 20-23, 2005.*
60. Jones BF, Yang X, Koller B, Banes AJ. P2Y<sub>1</sub>/P2Y<sub>2</sub>-null tendons exhibit a decreased intracellular calcium response uniaxial strain and ATP. *Orthopaedic Research Society, Washington D.C., February 20-23, 2005.*
  61. Nation A, Qi J, Hart DA, Bynum D Karas S, Seeherman H, Banes AJ. IL-1 $\beta$ -driven MMP 1 in tenocytes: one leg of a functional remodeling unit in tendon. *Orthopaedic Research Society, Washington D.C., February 20-23, 2005.*
  62. Qi J, Chi L, Banes AJ. A potential nuclear location signal in titin. *American Society for Cell Biology, Washington D.C., December 4-8, 2004.*
  63. Fox AM, Jones B, Koller BH, Banes AJ. Purinoreceptor null murine tenocytes exhibit restricted load response. *American Society for Cell Biology, Washington D.C., December 4-8, 2004.*
  64. Nation A, Qi J, Hart D, Seeherman H, Bynum D, Banes AJ. Determination of tenoblast phenotype induced by Il-1b. *American Society for Cell Biology, Washington D.C., December 4-8, 2004.*
  65. Tsuzaki M, Bynum D, Almekinders L, Faber J, Banes AJ (2004). Mechanical load upregulates ATP hydrolysis by human tendon cells. *ISL&T-IV, San Francisco, CA.*
  66. Jones BF, Yang X, Koller B, Banes AJ. P2Y<sub>1</sub>/P2Y<sub>2</sub>-null tendons exhibit a decreased intracellular calcium response uniaxial strain and ATP. *American Society for Cell Biology, Washington D.C., December 4-8, 2004.*
  67. Nation AL, Qi J, Hart D, Karas SG, Bynum D, Yang X, Tsuzaki M, Banes AJ. Regulated MMP production in response to IL-1 $\beta$  in tenocytes. *Biomedical Engineering Society, # 86, Philadelphia, PA, October 13-16, 2004.*
  68. Jones BF, Yang X, Banes AJ. Mechanical Strain Induces Calcium Signaling in Bioartificial Tissues *Biomedical Engineering Society, Philadelphia, PA, October 13-16, 2004.*
  69. Fox AM, Qi J, Guilak F, Alexopoulos LG, Youn I, Yang X, Banes AJ. The role of titin in connective tissue cell strain sensitivity. *Biomedical Engineering Society, Philadelphia, PA, October 13-16, 2004.*
  70. Banes AJ. Ligaments and tendons. *Symposium on Connective Tissue, American Society of Biomechanics, Portland, OR, September 8-12, 2004.*
  71. Banes AJ. The extracellular matrix-conversion of mechanical loading into functional adaptation: role for physiological and pathophysiological adaptation in health and disease. *Invited by Michael Kjaer MD, DSC, Professor, University of Copenhagen, Denmark, August 19-21, 2004.*
  72. Banes AJ, Qi J, Otey C, Bynum DK, Almekinders L, Guilak F, Alexopolous L, Chua M, Chi L, Yang X, Granzier H, Labeit S. Wild type titin and a truncated isoform are expressed in human tendon cells: does titin regulate cell stiffness? *The Fourth International Symposium on Ligaments and Tendons, San Francisco, CA, March 6, 2004.*
  73. Qi J, Chi L, Banes AJ. IL-1 $\beta$  increases the transcription of elastin in HTIF-populated bioartificial tendons. *The Fourth International Symposium on Ligaments and Tendons, San Francisco, CA, March 6, 2004.*
  74. Qi J, Chi L, Bynum DK, Banes AJ. Effects of knocking down titin message level on cytoskeletal proteins in human tenocytes. *The Fourth International Symposium on Ligaments and Tendons, San Francisco, CA, March 6, 2004.*
  75. Qi J, Chi L, Banes AJ. IL-1 $\beta$  increased the elasticity of human tenocyte-populated bioartificial tendons (BATs). *Orthopaedic Research Society, San Francisco, CA, March 7-10, 2004.*

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

76. Banes AJ, Qi J, Granzier H, LaBeit S, Otey C, Yang X, Bynum D, Chua M, Alexopoulos L, Williams G, Guilak F. Titin, a giant elastic protein in muscle: role in elastic recoil in tendon cells? *Orthopaedic Research Society, San Francisco, CA, March 7-10, 2004.*
77. Qi J, Chi L, King S, Banes AJ. Expression of titin in tendon and its regulation by IL-1 $\beta$ . *American Society for Cell Biology, San Francisco, CA, December 13-17, 2003.*
78. Banes AJ, Qi J, Granzier H, LaBeit S, Otey C, Yang X, Bynum D, Chua M, Alexopoulos L, Williams G, Guilak F. Connective tissue cells express titin. *American Society for Cell Biology, San Francisco, CA, December 13-17, 2003.*
79. Banes AJ, Yang X, Qi J. Mechanical loading modulates matrix remodeling and MMP expression in human bioartificial tendons. *Second Annual Meeting of the European Tissue Engineering Society, Genova, September 3-6, 2003.*
80. Qi J, Chi L, King S, Banes AJ. The modulation of three-dimensional culture contraction by IL-1 $\beta$ . *North Carolina Tissue Engineering Interest Group Meeting, Raleigh, NC, June 20, 2003.*
81. Maloney M, Qi J, King S, Banes AJ. Automated system for imaging artificial tissue constructs in a controlled environment. *North Carolina Tissue Engineering Interest Group Meeting, Raleigh, NC, June 20, 2003.*
82. Qi J, Maloney M, Banes AJ. Ascorbate Stimulates CTGF expression and increases strength in Avion tendon cell-populated bioartificial tendons. *ETG, Pittsburgh, PA, March 17-19, 2003.*
83. Tsuzaki M, Bynum D, Almekinders L, Faber J, Banes AJ (2004). Mechanical loading stimulates ATP release and hydrolysis by human tendon cells. *50<sup>th</sup> ORS Annual Meeting, #826, San Francisco, CA.*
84. Tsuzaki M, Bynum D, Almekinders L, Faber J, Graff R, Banes AJ (2003). Human tendon cells release ATP in response to load or UTP. *ISL&T-III, New Orleans, LA .*
85. Flick J, Devkota A, Tsuzaki M, Banes AJ, Almekinders L, Weinhold P (2003). Cyclic loading alters biomechanical properties and secretion of PGE<sub>2</sub> and NO from tendon explants. *ISL&T-III, New Orleans, LA.*
86. Bowman Jr. KF, Banes AJ, Spencer K, Tsuzaki M, Guyton G, Archambault J, Herzog W (2002). IL-1 $\beta$  induces MMPs, which degrades collagen in rabbit Achilles tendons. *48<sup>th</sup> ORS Annual Meeting, #591, Dallas, TX.*
87. Bowman K, Tsuzaki M, Karas S, Triantofillopoulis I, Banes AJ. Cyclic mechanical loading increases matrix expression in avian tendons ex vivo. *Orthopaedic Research Society, 2003.*
88. Banes AJ, Qi J, Yang X, Almekinders L, Bynum D. Human tendon cells express multiple titin isoforms with long spring elements. *International Symposium on Ligaments and Tendons, New Orleans, LA, February 1, 2003.*
89. Siddhivarn C, Banes AJ, Tsuzaki M, Qi J, Champagne C, Offenbacher S (2003). Mechanical loading stimulates the expression of BMPs and PPAR $\gamma$ -1 in the osteoblastic cell line MC3T3-E1. *31<sup>st</sup> AADR Annual Meeting and Exposition, #27808, San Antonio, TX.*
90. Siddhivarn C, Banes AJ, Champagne C, Tsuzaki M, Offenbacher S (2003). Differential gene expression in osteoblastic cell line (MC3T3-E1) by mechanical load. *81<sup>st</sup> IADR General Session and Exhibition, #37186, Goteborg, Sweden.*
91. Banes AJ, Garvin J, Qi J, Bynum D, Almekinders L. Bioartificial tendons: a model 3D system for testing tenocyte responses to drugs, cytokines and mechanical load ex vivo. *American Academy of Orthopaedics Surgeons, Sponsored Tissue Engineering Meeting, Santa Fe, NM, January 2003 (Invited Talk, Podium presentation).*

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

92. Qi J, Banes AJ. ATP modulates osteoblast-populated collagen gels through P<sub>2</sub>Y receptors. *American Society for Cell Biology, San Francisco, CA, December 14-18, 2002.*
93. Banes AJ, Archambault J, Tsuzaki M, Wall ME, Garvin J. Tendon loading models and cellular responses regulating signaling and gene expression. *Society for Integrative Biology, Anaheim, CA, January 2002. Symposium, Tendon: Bridging the Gap, chaired by Tom Koob and Adam Summers, invited talk and abstract, podium presentation.*
94. Evans G, Garvin J, Qi J, Maloney M, Banes AJ. The effects of uniaxial cyclic loading on the biomechanical properties of bioartificial tendon stimulates (BATs). *Georgia Institute of Technology, Tissue Engineering Meeting, Atlanta, GA, November 2002.*
95. Banes AJ, Maloney M, Evans G, Qi J. Ascorbate stimulates CTGF expression and increases strength in avian tendon cell-populated bioartificial tendons (BATS). *Cold Spring Harbor Symposium on Tissue Engineering, November 2002, Podium presentation.*
96. Banes AJ, Archambault J, Tsuzaki M, Wall M, Garvin J. Regulating signaling and gene expression in tendon cells with mechanical load. *Biomedical Engineering Society, Houston, TX, November 2002, Podium presentation.*
97. Brackhan J, Banes AJ, Cascio WE. Bioengineering of an experimental bioartificial heart muscle. *World Congress Biomechanics, Calgary, Alberta, Canada, August, 2002, podium presentation.*
98. Banes AJ, Archambault J, Tsuzaki M, Wall M, Garvin J. Cellular responses regulating mechanical signaling and gene expression in tendon cells. *World Congress Biomechanics, Calgary, Alberta, Canada, August, 2002, podium presentation.*
99. Banes AJ. Mechanical load pathways. *Musculoskeletal and Orthopaedics Sciences Gordon Conference, Andover, NH, August 2002.*
100. Qi J, Jen G, Banes AJ. ATP modulation of matrix remodeling in 3D osteoblast cultures. *North Carolina Tissue Engineering Interest Group Meeting, RTP, NC, June 7, 2002.*
101. Yamazaki S, Banes AJ, Weinhold P, Tsuzaki M, Kawakami M, Minchew JT. The effect of vibration on DNA synthesis in rabbit annulus disc cells. *Transactions of the SICOT/SIROT XXII World Congress, #0321, San Diego, CA, February 2002.*
102. Russo A, Minchew J, Banes AJ, Elfervig M, Tsuzaki M, Yamazaki S, Weinhold P. The effect of vibration on annulus cell signaling. *Transactions of the 2002 Annual Meeting of the American Academy of Orthopaedic Surgeons, February 2002.*
103. Russo A, Minchew J, Banes AJ, Elfervig M, Tsuzaki M, Yamazaki S, Weinhold P. The effect of vibration on annulus cell signaling. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, #817, Dallas, TX, February 2002.*
104. Tsuzaki M, Bynum D, Almekinders L, Guyton G, Yang X, Banes AJ. ATP modulates load-inducible IL-1 beta and COX2 expression in human tendon cells. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, #592, Dallas, TX, February 2002.*
105. Yamazaki S, Banes AJ, Weinhold PS, Tsuzaki M, Kawakami M, Minchew JT. Vibratory loading decreases extracellular matrix and matrix metalloproteinase gene expression in rabbit annulus cells. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, #818, Dallas, TX, February 2002.*
106. Qi J, Chi L, Jen G, Banes AJ. The cystic fibrosis transmembrane conductance regulator gene is mechanosensitive. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 2002.*
107. Hooker J, Qi J, Banes AJ. Fluid flow increases expression of nebulin in tendon internal fibroblasts. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 2002.*
108. Garvin J, Baldwin N, Banes AJ. Novel culture system for the development of a

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

- bioartificial tendon. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 2002.*
109. Qi J, Samuhel K, Johns J, Banes AJ. Expression of Desmocollin 3, a cell adhesion protein, is upregulated by stretch and laminar flow but suppressed by oscillating flow and flow reversal. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 2002.*
  110. Tsuzaki M, Bynum D, Almekinders L, Guyton G, Yang X, Banes AJ. ATP modulates load-inducible IL-1 Beta and COX2 expression in human tendon cells. *Transactions of the 48<sup>th</sup> Annual Meeting of the Orthopaedic Research Society, February 2002.*
  111. Yamazaki S, Tsuzaki M, Weinhold P, Graff R, Banes AJ, Minchew JT. Signaling responses to vibratory loading of annulus cells in vitro. *International Society for the Study of the Lumbar Spine, Edinburgh, Scotland, June 2001.*
  112. Hooker J, Qi J, Banes AJ. Nebulin but not titin is regulated by fluid flow in connective tissue cells. *American Society for Cell Biology, 41<sup>st</sup> Annual Meeting, Washington D.C., December 8-12, 2001.*
  113. Yang X, Elfervig M, Faber J, Banes AJ. Norepinephrine and cyclic stretching sensitize tendon cells to a mechanical stimulus. *American Society for Cell Biology, 41<sup>st</sup> Annual Meeting, Washington D.C., December 8-12, 2001.*
  114. Qi J, Banes AJ. Purinoceptor P2X1 is involved in mechano-signal transduction in MC3T3-E1 cells. *American Society for Cell Biology, 41<sup>st</sup> Annual Meeting, Washington D.C., December 8-12, 2001.*
  115. Renfrow P, Banes AJ. Validation of a device to perform compression loading of cultured cells. *Biomedical Engineering Society, 2001.*
  116. Jones J, Banes AJ. Osteoblast gene responses to laminar, oscillating and fluid flow reversals *Biomedical Engineering Society, 2001.*
  117. Samuhel K, Qi J, Chi L, Li Y, Jen G, Banes AJ. Desmocollin cell junction mRNA is upregulated in 2D stretched osteoblasts. *Biomedical Engineering Society, 2001.*
  118. Yamazaki S, Tsuzaki M, Banes AJ, Minchew JT. Vibratory loading in rabbit annulus cells influences extracellular matrix gene expressions. *The North American Spine Society 16<sup>th</sup> Annual Meeting, Seattle, WA, October 31-November 3, 2001.*
  119. Elfervig M, Archambault J, Herzog W, Bynum D, Banes AJ. Mechanical stretching induces increased intracellular Ca<sup>2+</sup> in human tendon cells. *Orthopaedic Research Society, 2001.*
  120. Elfervig M, Lotano M, Tsuzaki M, Faber J, Banes AJ. Fluid-induced shear stress modulates Cx-43 expression in avian tendon cells but does not induce a Ca<sup>2+</sup> signal. *Orthopaedic Research Society, 2001.*
  121. Banes AJ. Mechanical conditioning enhances cell attachment rate: implications for seeding tissue engineered matrices. *Pittsburgh Tissue Engineering Symposium, April 16-19, 2000.*
  122. Tsuzaki M, Guyton G, Garret W, Sung K, Archambault J, Almekinders L, Bynum D, Hsieh A, Banes AJ. Interleukin-1Beta stimulates expression of Cox II and MMP I in human tendon epitenon cells. *Transactions of the Orthopaedic Research Society, 2000.*
  123. Weinhold P, Minchew J, Banes AJ, Tsuzaki M, Yu J. The effect of 6HZ vibration on DNA synthesis in human annular disc cells. *Transactions of the Orthopaedic Research Society, 2000.*
  124. Graff RD, Lazarowki ER, Banes AJ, Lee GM. ATP release by mechanically loaded chondrocytes in pellet culture. *Transactions of the Orthopaedic Research Society, 2000.*
  125. Volckmann E, Banes AJ, Weinhold P, Brown TD, Tsuzaki M. Load-induced mitogenesis in avian FDP tendons cyclically loaded 3 times for 5 minutes in an 8 hour period over 3 days. *Transactions of the Orthopaedic Research Society, 2000.*

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

126. Guyton GP, Francke E, Elfervig M, Tsuzaki M, Bynum D, Banes AJ. IL-1Beta receptor activation signals through the Ca<sup>++</sup> messenger pathway in human tendon cells. *Transactions of the Orthopaedic Research Society, 2000.*
127. Minchew J, Francke E, Elfervig M, Tsuzaki M, Banes AJ. Human annulus cells express IL-1Beta RI receptors and respond to IL-1Beta by an external calcium dependent pathway. *Transactions of the Orthopaedic Research Society, 2000.*
128. Francke E, Banes AJ, Elfervig M, Archambault J, Brown T, Bynum D. Fluid-induced shear stress increases [Ca<sup>2+</sup>]<sub>ic</sub> in cultured human tendon epitenon cells. *Transactions of the Orthopaedic Research Society, 2000.*
129. Elfervig M, Francke E, Archambault J, Tsuzaki M, Bynum D, Brown TD, Banes AJ. Fluid-induced shear stress activates human tendon cells to signal through multiple Ca<sup>2+</sup> dependent pathways. *Transactions of the Orthopaedic Research Society, 2000, # 179.*
130. Elfervig M, Minchew J, Francke E, Tsuzaki M, Banes AJ. Human annulus cells treated with IL-1Beta are sensitized to shear stress in vitro. *Transactions of the Orthopaedic Research Society, 2000.*
131. Minchew JT, Francke E, Elfervig M, Tsuzaki M, Banes AJ. Human annulus cells express IL-1β R1 receptors and respond to IL-1β by an external calcium dependent pathway. *Transactions of the Orthopaedic Research Society, 2000.*
132. Minchew JT, Francke E, Elfervig M, Tsuzaki M, Banes AJ. Human annulus cells treated with IL-1Beta are sensitized to shear stress in vitro. *Transactions of the Orthopaedic Research Society, 2000.*
133. Minchew J, Francke E, Elfervig M, Tsuzaki M, Banes AJ. Human annulus cells signal through interacellular calcium in response to shear stress in vitro. *Transactions of the Orthopaedic Research Society, 2000.*
134. Hsieh AH, Tsai CMH, Ma QJ, Akesson WH, Banes AJ, Sung KLP. Type III collagen mRNA levels increase with cyclic mechanical strain in MCL fibroblasts. *Transactions of the Orthopaedic Research Society, 2000.*
135. Yu J, Banes AJ, Otey C. Cyclic stretching stimulates subsequent cell attachment and spreading to matrix. (2000) UNC, Chapel Hill, NC.
136. Elfervig MK, Archambault J, Bynum D, Banes AJ. Human flexor tendon cells are more shear sensitive than rabbit tendon cells. *39<sup>th</sup> American Society for Cell Biology Annual Meeting, Washington, DC, December 1999.*
137. Banes AJ, Zoladz S, Brown T, Sood A, Anderson D, Otey C. Uniaxial and biaxial strain cause Actin polymerization and GFP-α-Actinin I recruitment to focal adhesions in SW3T3 and MC3T3-E1 cells. (2000) UNC, Chapel Hill, NC.
138. Banes AJ, Yu J, Otey C. Cyclic strain in vitro mechanically conditions cells to attach and spread. (2000) UNC, Chapel Hill, NC.
139. Anderson D, Yu J, Sood A, Banes AJ. Cyclic stretching conditions endothelial cells to resist a shear stress challenge. (2000) UNC, Chapel Hill, NC.
140. Minchew JT, Champion ER, Elfervig MK, Sood A, Tsuzaki M, Weinhold PS, Banes AJ. Gap junction inhibition blocks mechanical load responsiveness in human annulus cells. *North American Spine Society, Chicago, IL, October 1999.*
141. Minchew JT, Elfervig MK, Sood A, Tsuzaki M, Weinhold PS, Banes AJ. ATP blocks mechanical load responsiveness in human annulus cells. *Scoliosis Research Society, San Diego, CA, September 1999.*
142. Francke E, Elfervig M, Sood A, Anderson D, Bynum D, Brown T, Weinhold P, Banes AJ. Fluid-induced shear stress increases [Ca<sup>2+</sup>]<sub>ic</sub> in human tendon epitenon cells. *ISME, Nashville, TN, 1999.*
143. Elfervig MK, Sood A, Lee G, Graff R, Francke E, Banes AJ. ATP-induced signaling in human chondrons cultured in 3 dimensional gels. *ISME, Nashville, TN, 1999.*

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

144. Brown T, Banes AJ, Bottlang M, Pedersen DR. Nutrient depth and waveform abruptness as determinants of reactive fluid shear stresses in a vacuum-driven cell culture mechanostimulus system. (1999) College of Medicine Research, U. Iowa.
145. Banes AJ, Francke E, Elfervig M, Sood A, Weinhold P, Tsuzaki M, Bynum DK, Brown T. Gap junction-dependent and independent Ca<sup>2+</sup> signaling: roles in downstream gene responses in tendons and cultured cells subjected to tension and shear stress. *International Society of Biomechanics, XVIIIth Congress, Calgary Canada, August 8-13, 1999.*
146. Minchew JT, Elfervig MK, Sood A, Tsuzaki M, Weinhold PS, Banes AJ. ATP blocks mechanical load responsiveness in human annulus cells. *North American Spine Society, Chicago, IL, 1999.*
147. Minchew JT, Weinhold PS, Banes AJ. Purinoceptor expression in human disc cells. *North Carolina Orthopaedic Association, Myrtle Beach, SC, 1999.*
148. Minchew JT, Weinhold PS, Banes AJ. Purinoceptor expression in human disc cells. *American Academy of Orthopaedic Surgeons, Anaheim, CA, February 1999.*
149. Minchew JT, Sood A, Weinhold PS, Banes AJ. Purinoceptor activity in cultured human annulus fibrosus cells. *Trans of the 45<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 24(2):1038, 1999.
150. Brown TD, Banes AJ, Bottlang M, Pedersen DR. Nutrient depth and waveform abruptness as determinants of reactive fluid stresses in a vacuum-driven cell culture mechanostimulus system. *Trans of the 45<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 24(1):10, 1999.
151. Bynum DK, Tsuzaki M, Yang X, Sood A, Brown T, Ross A, Weinhold P, Banes AJ. Inhibiting intercellular communication blocks wound-induced mitogenesis in flexor tendons. *Trans of the 45<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 24(1):44, 1999.
152. Champion E, Minchew JT, Boitano S, Sood A, Banes AJ. Response to mechanical stimulation in vitro in human annulus cells is blocked by a specific gap junction inhibitor, gap 27. *Trans of the 45<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 24(1):200, 1999.
153. Sood A, Bynum D, Boitano S, Weinhold P, Tsuzaki M, Brown T, Banes AJ. Gap junction blockade inhibits Ca<sup>2+</sup> signaling in vitro and mechanical load-induced mitogenesis and collagen synthesis in avian tendons *ex vivo*. *Trans of the 45<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 24(2):1083, 1999.
154. Muccio J, Tsuzaki M, Yang X, Banes AJ. Influence of strain rate on gap junction expression in osteoblast-like cells. *Trans of the 45<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 24(1):33, 1999.
155. Banes AJ, Tsuzaki M, Yang X, Faber J, Bottlang M, Pedersen D, Brown T. Equibiaxial strain and norepinephrine activate CRE DNA binding protein and expression of connexin 43. *Trans of the 45<sup>th</sup> Annual Meeting of the Orthopaedic Research Society*, 1999.
156. Minchew JT, Sood A, Tsuzaki M, Francke E, Banes AJ. Interleukin-1 $\beta$  receptor activity in cultured human annulus cells. *North Carolina Orthopaedic Association, Asheville, NC, October 1998.*
157. Banes AJ, Tsuzaki M, Yang X, Faber J, Bottlang M, Pedersen D, Brown T. Equibiaxial strain and norepinephrine activate CRE DNA binding protein and expression of connexin 43. *3<sup>rd</sup> World Congress of Biomechanics, Sapporo, Japan, August 2-8, 1998, 215a.*
158. Larson CM, Kelley SS, Blackwood AD, Banes AJ, Lee G. Retention of the chondrocyte *in vivo*-formed pericellular matrix results in significantly improved matrix production. *First North Carolina Tissue Engineering Symposium, June 1998.*

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

159. Weinhold P, Anderson D, Brown T, Bottlang M, Banes AJ. A device for the dynamic tensile loading of multiple tissue explants in culture. *First North Carolina Tissue Engineering Symposium, June 1998*.
160. Banes AJ, Weinhold P, Pedersen D, Anderson D, Tsuzaki M, Yang X, Brown T. A device to apply cyclic mechanical load to tendon *ex vivo*. *First North Carolina Tissue Engineering Symposium, June 1998*.
161. Banes, A.J., Weinhold, P., Pedersen, D., Anderson, D., Tsuzaki, M., Yang, X. and Brown, T. Cyclic mechanical load increases DNA synthesis in tendon *ex vivo*. *First North Carolina Tissue Engineering Symposium, June 1998*.
162. Anderson D, Guilak F, Banes AJ. An instrument to provide compressive loading to cartilage *ex vivo*. *First North Carolina Tissue Engineering Symposium, June 1998*.
163. Bhargava MM, Hannafin JA, Warren RF, Bynum D, Tsuzaki M, Banes AJ. Effect of cytokines on the migration of human tendon surface cells and inner fibroblasts. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(1):93, 1998.
164. Brown TD, Bottlang M, Pedersen DR, Banes AJ. Flow field visualization in confirmation of a finite element model of nutrient medium reactive stress in a pressure-differential-driven cell culture mechanostimulus system. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(2):987, 1998.
165. Ralphs JR, Banes AJ, Benjamin M. Tendon cells in vivo contain prominent longitudinal actin stress fibres, linked cell to cell via anchoring junctions. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(2):630, 1998.
166. Larson CM, Kelley SS, Blackwood AD, Banes AJ, Lee GM. Retention of the chondrocyte's native pericellular matrix results in significantly improved matrix production in vitro. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(1):448, 1998.
167. Banes AJ, Tsuzaki M, Yang X, Faber J, Bottlang M, Pedersen D, Brown T. Equibiaxial strain activates AP-1 and CRE transcription factors but not NF-kB or SSRE and upregulates cx43 mRNA in tendon cells in vitro. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(1):182, 1998.
168. Tsuzaki M, Yang X, Faber J, Benjamin M, Ralphs J, Sanderson M, Boitano S, Banes AJ. Norepinephrine upregulates connexin 43 gene expression in tendon cells subjected to equibiaxial cyclic strain. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(2):626, (1998).
169. Kenamond C, Boitano S, Francke E, Sood A, Yang X, Faber J, Bynum D, Banes AJ. Cyclic strain activates tendon cells and primes them for a second mechano-stimulus to increase intracellular calcium. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(1):92, 1998.
170. Francke E, Sood A, Kenamond C, Yang X, Faber J, Boitano S, Bynum D, Sanderson M, Banes AJ. ATP stimulates an increase in intracellular calcium in human tendon cells via purinergic receptors and temporally blocks gap junction signalling. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(1):91, 1998.
171. Francke E, Sood A, Kenamond C, Yang X, Faber J, Boitano S, Bynum D, Sanderson S, Banes AJ. A human tendon cells express purinergic receptors temporarily blocked by ATP in a mechanical load response. *Trans of the 44<sup>th</sup> Annual Meeting of the Orthopaedic Research Society* 23(1):91, 1998.
172. Tsuzaki M, Yang X, Faber J, Benjamin M, Ralphs J, Sanderson M, Boitano S, Banes AJ. Norepinephrine and mechanical strain increase cx 43 message and intercellular communication. *American Society for Cell Biology*, 1997.
173. Tsuzaki M, Yang X, Burt J, Benjamin M, Ralphs J, Weinhold P, Bynum D, Banes AJ. Avian tendon cells express multiple connexins but acute mechanical load reduces cell-

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

- cell coupling. *Transactions of the 43<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society* 22(1):712, 1997.
174. Kenamond C, Weinhold P, Bynum D, Tsuzaki M, Benjamin M, Ralphs J, McNeilly C, Banes AJ. Human tendon cells express connexin-43 and propagate a calcium wave in response to mechanical stimulation. *Transactions of the 43<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society*, 22(1):179-80, 1997.
175. Gao J, Benjamin M, Banes AJ, Hill B, Messner K, Ralphs JR. Regional differences in cell shape and gap junction expression in the Achilles tendon relate to fibrocartilage differentiation. *Transactions of the 43<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society* 22(1):449, 1997.
176. Bynum D, Almekinders L, Benjamin M, Ralphs J, McNeilly C, Yang X, Kenamond C, Weinhold P, Tsuzaki M, Banes AJ. Wounding *in vivo* and PDGF-BB *in vitro* stimulate tendon surface cell migration and loss of connexin-43 expression. *Transactions of the 43<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society* 22(1):26-5, 1997.
177. Brown TD, Pedersen DR, Bottlang M, Banes AJ. Fluid-structure interactions as a determinant of nutrient medium reactive stress in mechanically stimulated cultures. *Transactions of the 43<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society* 22(1):175-30, 1997.
178. Brigman B, Tsuzaki M, Schaller M, Fischer T, Brown T, Horesovsky G, Miller L, Benjamin M, Ralphs J, McNeilly C, Banes AJ. A mechanosensory protein complex: paxillin, c-SRC and FAK associate and activate in response to mechanical load. *Transactions of the 43<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society* 22(1):711, 1997.
179. Banes AJ, Horesovsky G, Noel S, Judex S, Archambault J, Benjamin M, Ralphs J, McNeilly C, Zernicke R, Herzog W, Miller L. Mechanical load stimulates expression of novel genes *in vivo* and *in vitro* in avian flexor tendon cells. *Transactions of the 43<sup>rd</sup> Annual Meeting of the Orthopaedic Research Society* 22(1):710, 1997.
180. Banes AJ, Kenamond C, Bynum D, Tsuzaki M, Benjamin M, Ralphs J, Boitano S, Brown T. Human tendon cells propagate a calcium wave via cx 43 gap junctions in response to mechanical stimulation. *Scanning Microscopy 1997 Meeting, Extracellular Matrix and Molecular Diseases*, 1997.
181. Horesovsky G, Banes AJ, Noel S, Miller L. A novel cartilage gene in human chondrons. *18<sup>th</sup> American Society of Bone and Mineral Meeting*, 1996.
182. Banes AJ, Horesovsky G, Noel S, Miller L. Novel gene sequences induced in mechanically stimulated avian tendon cells *in vitro*. *18<sup>th</sup> American Society of Bone and Mineral Meeting*, M344, p S267, 1996.
183. Ralphs JR, McNeilly CM, Hayes AJ, Banes AJ, Benjamin M. Three dimensional modeling of tendon cell shape *in vivo* using confocal microscopy-cell-cell communication and the role of gap junctions (podium presentation). *Orthopaedic Research Society*, 1996.
184. Bottlang M, Brown T, Banes AJ. High frequency oscillations of flexible cell culture membranes driven by cyclic vacuum pulses. *Orthopaedic Research Society*, 1996.
185. Brigman B, Fischer T, Tsuzaki M, Brown T, Miller L, and Banes AJ. Mechanical load activates tendon cell pp60src phosphorylation: role in a proposed mechanosensory complex (podium presentation). *Orthopaedic Research Society*, 1996.
186. Banes AJ, Tsuzaki M, Yamamoto J, Lawrence WT, Bynum DK, Almekinders L, Burt J, Ralphs J, Benjamin M. Connexin expression is upregulated by mechanical load in avian and human tendon cells (podium presentation). *Orthopaedic Research Society*, 1996.
187. Banes AJ, Tsuzaki M, Yamamoto J, Lawrence WT, Bynum DK, Almekinders L, Burt J, Ralphs J, Benjamin M. Avian and human tendon cell connexin types are altered by mechanical load. *J Cell Biol*, 1995.



**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

188. Banes AJ, Tsuzaki M, Lawrence WT, Ralphs J, Benjamin M, Pedersen D, Brown T. Gap junction connexin expression is up-regulated by cyclic mechanical load in avian tendon cells. *9<sup>th</sup> Intl Congress of Biorheology*, 1995.
189. Banes AJ, Tsuzaki M, Brigman B, Almekinders L, Bynum D, Lawrence WT. Human and avian flexor tendon cells: hierarchy of growth factor responses. *Plastic Surg Res Council*, 1995.
190. Keene A., Hu P, Tsuzaki M, Lawrence WT, Banes AJ. Mechanical load upregulates connexin-43 expression in MC3T3E1 Osteoblasts. *Plastic Surg Res Council*, 1995.
191. Banes AJ, Xiao H, Hu P, Brigman B, Tsuzaki M, Van Wyk J, Fischer T, Lawrence WT. Cyclic mechanical load and growth factors act synergistically to stimulate DNA synthesis in tendon cells. *Orth Res Soc*, 1995.
192. Tsuzaki M, Chikamatsu E, Yamamoto J, Fischer T, Lawrence T, Banes AJ. A and D cyclins bind to protein A and may contain an immunoglobulin-like domain. '95 *Experimental Biology Meeting* D-66 #6175, Atlanta, GA, 1995.
193. Yoon K, Tsuzaki M, Keene A, Lawrence WT, Banes AJ. Mechanical strain stimulates cyclin D expression in MC3T3-E1 cells. '95 *Experimental Biology Meeting* D-65 #6174, Atlanta, GA, 1995.
194. Banes AJ, et al. Cell cycle kinetics and stimulation of DNA synthesis in tendon synovial and internal fibroblasts released from quiescence by serum or growth factors. 1994.
195. Banes AJ, Hu P, Tsuzaki M, Yamamoto J, Lawrence WT. Avian tendon TSC and TIF cells express CXN-43 mRNA and Protein. *American Society for Cell Biology*, 1994.
196. Banes AJ, Hu P, Xiao H, Sanderson MJ, Boitano S, Brigman B, Fischer T, Tsuzaki M, Brown T, Almekinders L, Lawrence WT. Tendon cells of the epitenon and internal tendon compartment communicate mechanical signals through gap junctions and respond differentially to mechanical load and growth factors. *AAOS Repetitive Motion Meeting, Bethesda, MD, June 1994*.
197. Banes AJ, Sanderson M, Boitano S, Hu P, Brigman B, Tsuzaki M, Fischer T, Lawrence WT. Mechanical load +\ growth factors induce [Ca<sup>2+</sup>]<sub>i</sub> release, cyclin D1 expression and DNA synthesis in avian tendon cells. *World Congress of Biomechanics*, 1994.
198. Chikamatsu E, Nimura Y, Yamamoto J, Hu P, Fischer T, Lawrence T, Tsuzaki M, Brown T, Banes AJ. Cyclin D1 expression in hSMC is stimulated by cyclic mechanical load in a dose-dependent manner. *The Physiologist* 37:#4,A-9,10.6, 1994.
199. Yamamoto J, Chikamatsu E, Fischer T, Iwasaki T, Lawrence T, Tsuzaki M, Banes AJ. Mechanical load alters expression of the inositol 1,4,5-trisphosphate receptor mRNA expression in human smooth muscle cells. *The Physiologist* 37:#4, A-9,10.4, 1994.
200. Keene A, Hu P, Lawrence WT, Banes AJ. Mechanical load upregulates connexin-43 expression in MC3T3 osteoblasts. APS Conference: Mechanotransduction and the regulation of growth and differentiation. *The Physiologist* 37:#4,A-9,10.5, 1994.
201. Brigman B, Shapiro I, Lawrence WT, Banes AJ. Mechanical loading of tendon cells increases phospholipid secretion *in vitro*. *Orth Res Soc*, 1994.
202. Tsuzaki M, Brigman B, Xiao H, Lawrence WT, Banes AJ. IGF-I and TGF- $\beta$  drive tendon cell DNA synthesis. *Orth Trans* 18(2): 371, 1994.
203. Hu P, Xiao H, Brigman B, Lawrence WT, Banes AJ. G1 D cyclins are differentially regulated in tendon epitenon and internal fibroblasts. *Orth Res Soc*, 1994.
204. Baird C, Keagy B, Stamm E, Sanderson M, Boitano S, Banes AJ. Mechanically loaded human smooth muscle cells yield a [Ca<sup>2+</sup>]<sub>i</sub> flash whose propagation is gap junction-dependent. *Am Soc for Cell Biol*, 1993.
205. Okamoto T, Dorofi D, Hu P, Tsuzaki M, Keagy B, Banes AJ. Mechanical load stimulates integrin  $\alpha$ v $\beta$ 3 mRNA and protein in human umbilical vein endothelial cells. *ASCB (Suppl Mol Biol Cell)* 4: 406A (#2357), 1993.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

206. Brigman B, Tsuzaki M, Lawrence WT, Banes AJ. Mechanical load stimulates protein phosphorylation in tendon cells. *ASCB (Suppl Mol Biol Cell)* 4: 361A (#2093), 1993.
207. Xiao H, Hu P, Banes AJ, Lawrence WT. Cyclin D1 mRNA is serum-inducible in both normal human dermal and keloid cells. *Am Soc for Cell Biol*, 1993.
208. Hu P, Xiao H, Brigman B, Lawrence WT, Banes AJ. Serum, growth factors and mechanical load stimulate cyclin D1 mRNA and protein in quiescent tendon cells. *Am Soc Cell Biol*, #93205, 1993.
209. Brown R, Brigman B, Baird C, Banes AJ, Keagy B. Covalent linkage of proteins to collagen in vascular grafts. *Surgical Forum*, 1993.
210. Baird CW, Banes AJ, Brigman BE, Dorofi D, Boitano S, Sanderson M, Keagy B. Mechanical perturbation of single smooth muscle cells stimulates intracellular calcium release that is propagated to surrounding cells. *Surgical Forum*, 1993.
211. Banes AJ, Baird C, Tsuzaki M, Keagy B, Sanderson M, Boitano S. Tendon synovial and internal fibroblasts respond rapidly to mechanical load with IP and Ca bursts communicated to adjacent cells, followed by DNA synthesis. *38<sup>th</sup> Annual Meeting Plastic Surgery Research Council, Houston, TX*, p. 25-29, 1993.
212. Brigman B, Fischer T, Lawrence WT, Banes AJ. The effect of mechanical load and growth factors on mitogenesis and tyrosine phosphorylation in tendon synovial cells *in vitro*. *38<sup>th</sup> Annual Meeting Plastic Surgery Research Council, Houston, TX*, p. 21-23, 1993.
213. Banes AJ, Brigman B, Tsuzaki M, Baird C, Sanderson M, Boitano S, Lawrence T, Hu P, Almekinders L, Brown T, Pedersen D, Gilbert J, Fischer T. Role of mechanical challenge in tendon cell; 2nd messenger signalling and mitogenic response of growth factors. *Workshop of the International Society for Fracture Repair. In Vitro Models for the Study of Fracture Healing*, p. 21-22, 1993.
214. Tsuzaki M, Xiao H, Lawrence WT, Banes AJ. Stimulatory and inhibitory fractions from synovial and internal compartments of tendon or conditioned medium from isolated cells. *'93 Experimental Biology Meeting D-137 #2173, New Orleans, LA*, 1993.
215. Bellar H, Banes AJ, Baird C, Koruda M. TGFb1 decreases IGF-1 and EGF stimulated mitogenesis in cells from human peritoneal wall and adhesions. *Exp Biol*, 1993.
216. Baird C, Banes AJ, Bellar H, Keagy B. Interleukin-1a, PDGF BB, IGF-1 and smooth muscle cell conditioned media in conjunction with cyclic mechanical load stimulate DNA synthesis in target SMC. *Exp Biol*, 1993.
217. Brigman B, Baird C, Hu P, Lawrence WT, Banes AJ. Fibronectin and TGFb in flexor tendon and synovium. *Exp Biol*, 1993.
218. Almekinders L, Banes AJ, Bracey LW. The effects of repetitive motion on tendon fibroblasts. *Orth Res Soc*, 1993.
219. Brigman B, Hu P, Yin H, Tsuzaki M, Lawrence WT, Banes AJ. Fibronectin mRNA quantitation in flexor tendon synovial and internal fibroblasts. *Orthop Trans* 17 (3): 39, 1993
220. Banes AJ, Brigman B, Baird C, Yin H, Tsuzaki MT, Almekinders L, Lawrence WT. Stimulation of DNA synthesis in tendon synovial and internal fibroblasts released from quiescence by serum, growth factors or mechanical loading. *Orthop Trans* 17 (3): 835, 1993.
221. Sinback N, Baird C, Banes AJ, Keagy B. cAMP and cGMP are differentially produced in aortic endothelial and tendon synovial cells subjected to acute mechanical loading *in vitro*. *Am Soc Cell Biol*, 1992.
222. Solomon G, Dimeo F, Lawrence WT, Smith C, Banes AJ. Modulation of DNA synthesis by nicotine, cotinine and cigarette smoke condensates in endothelial, bone marrow stem and 3T3 target cells. *Am Soc Cell Biol*, 1992.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

223. Baird CW, Banes AJ, Amaya G, Dorofi D, Keagy B. SMC DNA synthesis is stimulated by conditioned medium from mechanically loaded and injured EC *in vitro*. *Am Soc Cell Biol*, 1992.
224. Banes AJ, Brigman B, Tsuzaki M, Almekinders L, Lawrence WT. Is mechanical load a surrogate progression factor for tendon fibroblasts *in vitro*? *Am Soc Cell Biol*, 1992.
225. Cooley J, Banes AJ, O'Keefe E. An *in vitro* model for Hailey-Hailey Disease. *Journal of Invest Derm* 98:34, #492, 1992.
226. Keene A, Banes AJ. The effect of cyclic load on induction of matrix protein message in osteosarcoma cells. *Southern Connective Tissue Society, Chapel Hill, NC, May 1992*.
227. Calderon MS, Baird CW, Lawrence WT, Keagy B, Banes AJ. Mechanical load and wounding *in vitro* induce PDGF-A chain message in human endothelial cells. *Southern Connective Tissue Society, Chapel Hill, NC, May 1992*.
228. Brigman B, Tsuzaki M, Lawrence WT, Banes AJ. Cell cycle and mitogen responses of tendon synovial and internal fibroblasts. *Southern Connective Tissue Society, Chapel Hill, NC, May 1992*.
229. Baird CW, Calderon MS, Keagy B, Banes AJ. Cyclic mechanical load and various cytokines stimulate SMC DNA synthesis. *International Conference on Pulmonary Health and Disease, London, GB, September, 1992*.
230. Banes AJ, Baird CW, Dorofi D, Calderon M, Amaya G, Keagy B. Mechanical load stimulates DNA synthesis in a threshold response in endothelial cells. *International Conference on Pulmonary Health and Disease, London, GB, September, 1992*.
231. Calderon MS, Yin H, Banes AJ, Lawrence WT. The effect of mechanical strain on normal dermal fibroblasts. *Wound Healing Society, April 1992*.
232. Banes AJ, Yin H, Brigman B, Lawrence WT, Tsuzaki M. Tendon synovial cells and internal fibroblasts respond differentially to PDGF BB, IGF-1 and mechanical load *in vitro*. *Wound Healing Society, April 1992*.
233. Calderon M, Lawrence WT, Banes AJ. PDGF-A chain mRNA in human endothelial cells is induced by *in vitro* wounding and mechanical load. *Wound Healing Society, April 1992*.
234. Pedersen DR, Brown TD, Banes AJ. Mechanical behavior of a new substratum for strain-mediated cell culture experiments. *Second North American Congress on Biomechanics, Chicago, IL, August, 1992*.
235. Pedersen DR, Brown TD, Banes AJ. Mechanical behavior of a new substratum for strain-mediated cell culture experiments. *Second North American Congress on Biomechanics, Chicago, IL, August, 1992*.
236. Almekinders L, Bracy L, Banes AJ. An *in vitro* model for tendonitis. *Sports Med*, 1992.
237. Almekinders L, Banes AJ, Ballenger CA. Inflammatory response of fibroblasts to repetitive motion. *Orthopaedic Research Society*, #678, 1992.
238. Lawrence WT, Yin H, Banes AJ. Response of dermal fibroblasts to expansion strain. *Surg Forum*, 1991.
239. Brigman BE, Banes AJ, Link GW, Tsuzaki M, Lawrence WT. Fibronectin is primarily secreted by tendon sheath and synovial cells but not internal fibroblasts. *Plast Surg Res Counc*, 95-97, 1991.
240. Lawrence WT, Yin H, Banes AJ. Response of dermal fibroblasts to tissue-like expansion strain. *Plast Surg Res Counc*, 205-207, 1991.
241. Vadiakas G, Banes AJ. ROS 17/2.8 cells respond to cyclic mechanical strain *in vitro*. *J Dental Res* 70:494, #1825, 1991.
242. Banes AJ, Brigman BE, Link GW, Yin H, Tsuzaki M, Lawrence T. Fibronectin is preferentially secreted by tendon synovial cells but not internal fibroblasts. *75<sup>th</sup> FASEB Annual Meeting C-232 #7234, Atlanta, GA, 1991*.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

243. Brigman BE, Yin H, Tsuzaki M, Lawrence T, Banes AJ. Elevated fibronectin levels in synovium compared with internal compartments of tendon and sheath. *75<sup>th</sup> FASEB Annual Meeting* C-232 #7234, Atlanta, GA, 1991.
244. Tsuzaki M, Link GW, Yin H, Banes AJ. Collagen compartments in avian flexor synovium, tendon and sheath. *75<sup>th</sup> FASEB Annual Meeting* C-231 #7233, Atlanta, GA, 1991.
245. Sutker BD, Lester G, Banes AJ, Dahners L. Cyclic strain stimulates DNA and collagen synthesis in fibroblasts cultured from rat medial collateral ligaments. *Orth Res Soc*, 1990.
246. Tsuzaki M, Link GW, Yin H, Banes AJ. Biochemical characteristics of collagen compartments in avian flexor tendon and sheath. *First Intl Symp and Workshop on the Synovium*, 1990.
247. Banes AJ, Brigman BE, Link GW, Yin H, Tsuzaki M. Fibronectin is preferentially secreted by tendon synovial cells but not internal fibroblasts. *First Intl Symp and Workshop on the Synovium*, 1990.
248. Brigman BE, Yin H, Tsuzaki M, Banes AJ. Fibronectin levels in synovium compared with internal compartments of tendon and sheath. *First Intl Symp and Workshop on Synovium*, 1990.
249. Banes AJ. Cells cultured from mechanically active tissues display diverse responses to cyclic deformation *in vitro*. *First World Congress of Biomechanics*, 1990.
250. Maroney J, Link GW, Banes AJ. Epiphyseal, sternal and temporomandibular joint chondrocytes produce aligned matrix *in vitro* in response to applied cyclic strain. *FASEB* 4:A772, 2934, 1990.
251. Banes AJ. A single stretch *in vitro* stimulates confluent internal tendon fibroblasts to synthesize DNA. *FASEB* 4:A487, 1280, 1990.
252. Upchurch GR, Ramadan F, Solomon G, Klemmer S, Link G, Johnson G, Banes AJ. A specific mechanical deformation regimen enhances endothelial cell DNA synthesis and division. *FASEB* 4:A911, 3743, 1990.
253. Vadiakas G, Banes AJ. Mechanically induced mineralization of ROS 17/2.8 cells is inhibited by verapamil. *FASEB* 4:A1049, 4544, 1990.
254. Upchurch G, Banes AJ, Wagner W, Henderson R, Link G, Johnson G. Venous endothelial cells secrete more prostacyclin (PGI<sub>2</sub>) than arterial endothelial cells *in vitro*. *Southern Association for Vascular Surgery Annual Meeting*, 1989.
255. Wright E, MacMurray R, Banes AJ. Alignment rates of skeletal myocytes subjected to cyclic stretch *in vitro*. *ASCB/ASBMB Federation Meeting*, 1989.
256. Upchurch G, Banes AJ, Wagner W, Henderson R, Sumpio B, Link G, Ramadan F, Johnson G. Reduction of prostacyclin secretion by aortic endothelial cells subjected to cyclic deformation *in vitro*. *ASCB/ASBMB Federation Meeting*, 1989.
257. Banes AJ. Avian tendon fibroblasts respond to cyclic deformation *in vitro* by aligning but do not increase their growth rate. *ASCB/ASBMB Federation Meeting*, 1989.
258. Gilbert JA, Banes AJ, Link GW. Characterization of the surface strain applied to cyclically stretched cells *in vitro*. *Orthopaedic Research Society 35th Meeting*, 1989.
259. Banes AJ, Henderson R, Donlon K, DiMeo F. Migration, alignment and cell division responses of avian tendon synovial cells and internal fibroblasts subjected to increasing cyclic deformation (at 3, 10, and 40 cycles per minute) *in vitro*. *Orthopaedic Research Society 35th Meeting*, 1989.
260. Lawrence WT, Solomon GG, Link GW, Banes AJ. Mitogenic activity in excisional wounds in rats and its stimulation by PDGF. *American College of Surgeons*, 1988.
261. Henderson R, Banes AJ, Solomon G, Lawrence WT, Peterson HD. Human scar fibroblasts react to applied tension *in vitro* by aligning and increasing polymerized actin content. *FASEB* 2(4):A574, 1988.

## ALBERT JOSEPH BANES

### CURRICULUM VITAE

262. Banes AJ, Henderson R, Donlon K, Hicks H. Alignment and morphologic changes in avian tendon internal fibroblasts subjected to cyclic deformation. *FASEB 2(4):A573*, 1988.
263. Sumpio BE, Banes AJ. Response of cultured endothelial cells (EC) and smooth muscle cells (SMC) to pulsatile stretching. *FASEB 2(4):A419*, 1988.
264. Buckley MJ, Banes AJ, Jordan R. Induction of mineralization in osteoblast-like cells by mechanical strain. *J Dental Res 67:251*, 1988.
265. Banes AJ, Buckley MJ. Protein synthetic changes in osteoblast-like cells subjected to cyclic strain. *J Dental Res 67:234*, 1988.
266. Jordan R, Buckley M, Hicks H, Tran Son Tay R, Banes AJ. Morphologic changes in osteoblast-like cells subjected to cyclic tension. *J Dental Res 67:234*, 1988.
267. Levin LG, Banes AJ, Link GW. Reactions of human pulpal fibroblasts to cyclic mechanical stretching. *in vitro. J Dental Res 67:215*, 1988.
268. Wagner WH, Henderson RM, Hicks HH, Banes AJ. Intrinsic differences in morphology, growth rate and protein synthesis between arterial and venous endothelial cells. *12<sup>th</sup> Annual Meeting Southern Association for Vascular Surgery, 1988*.
269. Inayama T, Banes AJ, Link GW, Dimeo F, Privette A, Henderson R, Meyer A, Peterson HD. The electric discharge flashover model: a new model for electric burns and materials that provide protection to skin. *Am Burn Assoc, 1987*.
270. Buckley M, Banes AJ, Levin L, Sato M. *Am Soc Bone Mineral Res, 1987*.
271. Banes AJ, Sumpio BE, Levin LG, Buckley MJ. Regulatory aspects of physical deformation on cultured cells: a general theory. *Am Soc Bone Mineral Res, 1987*.
272. Sumpio BE, Banes AJ, Letton RL, Johnson G. Response of aortic endothelial cells to mechanical cyclic stretching. *South Assoc Vasc Surg, 1987*.
273. Sumpio BE, Banes AJ, Letton RL, Levin L, Johnson G. Response of endothelial cells (EC) to mechanical cyclic stretching. *Am Soc Biol Chem, 1987*.
274. Banes AJ, Sumpio B, Levin L, Buckley M. The ultimate aerobics: exercising cells *in vitro* on a novel flexible-bottomed culture plate. *Am Soc Biol Chem, 1987*.
275. Banes AJ, Link GW, Noyes C. Fluorescent peptides of collagen: distinct differences among Types I, III, IV and V collagens. *9<sup>th</sup> Intl Conf on Calcium Reg Hormones, 1986*.
276. Banes AJ, Link GW. Quantitation of the phenylthiocarbonyl derivatives of reducible collagen crosslinks in the nonmineralized and mineralized compartments of bone. *Am Soc for Bone and Min Res, 1986*.
277. Banes AJ, Hauschka PV. Osteocalcin concentration is increased in the plasma of osteoblastoma chicks. *Am Soc for Bone and Min Res, 1986*.
278. Lanz J, Banes AJ. Cultured fibroblasts from alveolar and gingival mucosae are biologically and biochemically different. *Am Soc for Biol Chem, 1986*.
279. Levin LG, Banes AJ. A simple technique for culturing human pulpal fibroblasts. *Am Soc for Biol Chem, 1986*.
280. Lester GE, Banes AJ, Bullard MK, Dahners LE. Fibroblasts from healing ligaments respond to NSAIDs and mechanical stimulation *in vitro*. (1991) *Trans Orth Res Soc 16:111*.
281. Banes AJ, Link GW. Separation of the phenylthiocarbonyl derivatives of collagen crosslinks. *Amer Soc for Biol Chem, 1986*.
282. Link GW, Banes AJ, Beckman W, Powers SK. Reversed phase separation of rhodamine 123 from tumors and transformed cells. *Am Soc for Biol Chem, 1986*.
283. Herzog S, Banes AJ, Johnston M, Bevin AG, Peterson HD. Human dermal fibroblast growth on synthetic and biosynthetic dressings *in vitro*. *Am Burn Assoc, 1986*.
284. Banes AJ, Link GW, Bevin AG, Peterson HD. Collagen crosslink alterations in hypertrophic scar and adjacent skin compared with normal human dermis. *Am Burn Assoc, 1986*.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

285. Levin LG, Jontell M, Banes AJ. The presence of stress protein in human dental pulp. *Am Assoc for Dental Res*, 1986.
286. Banes AJ, Yamauchi M, Link GW, Mechanic GL. Collagen crosslink composition in non-mineralized and mineralized bone. *Fed Proc*, 1985.
287. Banes AJ, Link GW. RP separation of pyridinoline: problems in quantitation. 5<sup>th</sup> *Intnl Symp on HPLC of Proteins, Peptides and Polynuc*, 1985.
288. Dahners LE, BurrIDGE KWT, Banes AJ. On the presence of contractile proteins in ligamentous tissue. *Orthopaedic Research Society*, 1985.
289. Banes AJ, Link GW, Yamauchi M, Mechanic GL, Peterson HD. Temporal changes in collagen crosslink formation at the focus of trauma and at sites distant to a wound. *AFFRI Symp on Combined Injury and Trauma*, 1985.
290. Mechanic GL, Banes AJ, Henmi M, Yamauchi M. Possible collagen structural control of mineralization. 2<sup>nd</sup> *Intnl Conf on the Chem and Biol of Min Tissues*, 1984.
291. Link GW, Keller PL, Banes AJ. Methanol but not azide-H<sub>2</sub>O as storage media favors subsequent peptide binding to size-exclusion packing material. 4<sup>th</sup> *Intnl Symp on HPLC of Proteins, Peptides and Polynuc*, 1984.
292. Banes AJ, Keller PK, Link GW. Dupont GF-250A new column for size-exclusion chromatography: protein recovery and comparison to TSK 2000 and 3000 columns. 4<sup>th</sup> *Intnl Symp on HPLC of Prot Peptides and Polynuc*, 1984.
293. Banes AJ, Keller PK, Link GW. Cycling of mobile phase conditions alters peptide elution patterns and quantitation in SEC. 4<sup>th</sup> *Intnl Symp on HPLC of Proteins Peptides and Polynuc*, 1984.
294. Banes AJ, Link GW, Snyder LR. Peptide mapping by reversed phase HPLC: comparisons of column separations and recovery. 4<sup>th</sup> *Intnl Symp on HPLC Prot Peptides and Polynuc*, 1984.
295. Banes AJ, Jennings K, Link GW. Tendon fibroblasts *in vivo*: shift from collagen to actin production in control and stress conditions. *Am Soc Biol Chem*, 1984.
296. Mechanic GL, Banes AJ. The trifunctional crosslink pyridinoline reduces the interchain, intermolecular gap in collagen. *Am Soc Biol Chem*, 1984.
297. Link GW, Mechanic GL, Banes AJ. Immobilization alters the amount and distribution of pyridinoline crosslink peptides in tendon collagen. *Am Soc for Bone and Min Res*, 1984.
298. Banes AJ, Jennings K, Link GW. Characterization of two cell populations of flexor tendon: surface synovial and interior fibroblasts. *Am Soc for Bone and Min Res*, 1984.
299. Yamauchi M, Banes AJ, Mechanic GL. Purification of a pyridinoline-containing peptide fraction from avian osteoblastoma bone. *Am Soc for Bone and Min Res*, 1984.
300. Mechanic GL, Banes AJ. The role of 3-hydroxypyridinium in bone collagen. *Am Soc for Bone and Min Res*, 1984.
301. Hicks H, Johnston M, Banes AJ. The water, DNA, protein and collagen contents in embryos after maternal administration of phenytoin. *Teratology* 29:35A, 1984.
302. Dean J, Banes AJ, Hassell T, Gilbert G. Effect of inorganic and organic fluoride compounds on protein synthesis in human gingival fibroblasts. *IADR* 63:206, 1984.
303. Banes AJ, Link GW, Mechanic GL, Calingaert AB, Toverud SU. Non-mineralized and mineralized collagen compartments of bone: collagen structure and the roles of pyridinoline in non-mineralized collagen. *Gord Conf on Biochem of Bones and Teeth*, 1983.
304. Banes AJ, Link GW, Mechanic GL, Calingaert AB, Toverud SU. The role of pyridinoline in non-mineralized collagen. *Intnl Conf on Calcium Reg Hormones, The Parathyroid Conf*, 1983.
305. Banes AJ, Crowell J, Cooper C. PTH response of control and osteoblastoma bone cells. *Intnl Conf on Calcium Reg Hormones, The Parathyroid Conf*, 1983.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

306. Banes AJ, Mechanic GL, Calingaert AB, Toverud SU. Genetic Type I collagen crosslink structural differences in non-mineralized and mineralized compartments of bone. (1983) *Third Intl Symp on HPLC of Proteins, Peptides and Polynucleotides*, Monte Carlo, Monaco.
307. Hicks HE, Johnston MC, Banes AJ. *In vivo* biosynthesis of embryonic proteins is altered in phenytoin-treated mice. *Cell Biology*, 1983.
308. Banes AJ, Compton D, Bornhoeft J, Hicks H, Bevin AG. Effects of biologic, biosynthetic and synthetic dressings on wound tissue macromolecular synthesis. *First Intl Symp on Pathophys of Combined Injury and Trauma, AFFRI*, 1983.
309. Banes AJ, Compton D, Bornhoeft J, Hicks H, Dingledein P, Bevin AG. Effects of biologic and nonbiologic dressings on wound tissue morphology. *Am Burn Assoc*, 1983.
310. Compton DW, Jewson LG, Banes AJ. Intraoral use of synthetic dressings: biochemical and histologic results. *Am Assoc for Dental Res*, 1983.
311. Yamuchi M, Banes AJ, Kuboki Y, Mechanic GL. Distribution of the crosslink, pyridinoline, in bone collagen from normal, osteoblastoma and vitamin D-deficient chicks. *Am Assoc for Bone and Min Res*, 1982.
312. Banes AJ, Crowell J, Cooper C. PTH response of control and osteoblastoma bone cells isolated by non-enzymatic methods. Regional Meeting, *Am Assoc for Bone and Min Res, Montreat, NC*, 1982.
313. Banes AJ, Yamauchi M, Mechanic GL. Collagen tryptic peptides of mineralized and non-mineralized collagen from osteoblastoma and normal bone. Regional meeting, *Am Assoc for Bone and Min Res, Montreat, NC*, 1982.
314. Hicks HE, Johnston MC, Banes AJ. Alterations in DNA and protein synthesis in primary palates induces by Dilantin. *Intl Assoc for Dental Res*, 1982.
315. Banes AJ, Crowell J, Cooper C. PTH response of control and osteoblastoma bone cells isolated by non-enzymatic methods. *Intl Assoc for Dental Res*, 1982.
316. Hicks HE, Johnston MC, Banes AJ. Phenytoin-induced alterations in DNA and protein synthesis in primary palates. *Am Soc for Biolog Chem*, 1982.
317. Yamauchi M, Banes AJ, Kuboki Y, Mechanic GL. Distribution of the crosslink, pyridinoline, in bone collagen from normal, osteoblastoma and vitamin D-deficient chicks. *Am Soc for Biolog Chem*, 1982.
318. Banes AJ, Yamauchi M, and Mechanic GL. Collagen tryptic peptides of mineralized and non-mineralized collagen form osteoblastoma and normal bone. *Am Soc for Biolog Chem*, 1982.
319. Banes AJ, Spitznagel L, Enterline D, White K, Salisbury RE. Effects of viable vs non-viable skin grafts on macromolecular synthesis in wound tissue. *Am Burn Assoc*, 1981.
320. Banes AJ, Enterline D, Bevin AG, Salisbury RE. Effects of trauma and devascularization on collagen synthesis. *Assoc for the Surg of Trauma*, 1980.
321. Banes AJ, Enterline D, Bevin AG, Salisbury RE. Repair of flexor tendon: effects of trauma and devascularization on collagen synthesis. *Plast Surg Res Council*, 1980.
322. Banes AJ, Enterline D, Bevin AG, Salisbury RE. Effects of trauma and devascularization on collagen synthesis following flexor tendon injury. *Am College Surg*, 1980.
323. Banes AJ, Mechanic GL, Bevin AG, Salisbury RE. Altered patterns of collagen synthesis in the thermally injured host. *Am Burn Assoc*, 1980.
324. Banes AJ, Mechanic GL, Bevin AG, Salisbury RE. Altered patterns of collagen synthesis in the thermally injured host. *Am Soc Plast Reconstruct Surg*, 1979.
325. Mechanic GL, Salisbury RE, Bevin AJ, Banes AJ. Effect of progressive devascularization on collagen synthesis in repaired flexor tendons. *11<sup>th</sup> International Congress of Biochem*, 1979.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

326. Banes AJ, Mechanic GL. Biochemical parameters of cultured MAV-2(0)-infected chick limb buds cells. *11<sup>th</sup> International Congress of Biochem*, 1979.
327. Banes AJ, Mechanic GL. Increased collagen production in chick limb bud cells infected with a virus that causes osteoblastoma. *Am Soc for Bone and Min Res*, 1979.
328. Banes AJ, Salisbury RE, Bevin AG, Mechanic GL. The effect of thermal injury on collagen synthesis in healing skin wounds. *Fed Proc* 38:13, 1979.
329. Mechanic GL, Boyde A, Banes AJ. Collagen biochemistry and abnormal mineralization in avian osteogenic osteoblastoma. *14<sup>th</sup> European Symp on Calc Tissues*, 1979.
330. Boyde A, Banes AJ, Dillaman R, Mechanic GL. A morphological study of an avian bone disorder caused by myeloblastosis-associated virus. *14<sup>th</sup> European Symp on Calc Tissues*, 1979.
331. Mechanic GL, Banes AJ. Collagen crosslink changes in osteopetrotic chicken bone. *Intl Workshop on Calc Tiss*, 1978.
332. Banes AJ, Mechanic GL. Increased collagen synthesis in virus-infected chick embryo cells. *Fed Proc*, 1978.
333. Banes AJ, Smith RE, Mechanic GL. Quantitative maturational crosslink alterations in avian osteopetrotic bone. *Am Assoc for Dental Res*, 1977.
334. Banes AJ, Smith RE. Characterization of avian osteopetrosis caused by a myeloblastosis-associated virus. *Am Soc Microbiol*, 1977.
335. Banes AJ, Coleman PH. Sucrose gradient studies with LaCrosse virus. *Am Soc Microbiol*, p. 218, 1975.
336. Banes AJ, Coleman PH. Detection of LaCrosse virus proteins in extracts of infected BHK-21 cells. *Am Soc Microbiol*, p. 218, 1975.
337. Reams WM, Banes AJ. Epidermal morphogenesis on dead dermis. *ASB Bulletin* 19:94, 1972.
338. Banes AJ, Coleman PH. Studies with LaCrosse virus: a California group arbovirus. *Va J Sci* 23:94, 1972.

### **Unpublished Oral Presentations and/or Abstracts**

1. **Collagen Hydrogels in vitro: Controlled Gelation and Material Properties for Engineering Bioartificial Tendons.** Albert J. Banes<sup>1,2</sup>, Charles McGee<sup>1</sup>, David Grant<sup>1</sup>, Aisley Amegashie<sup>1</sup>, Jon Volmer<sup>1</sup>, Michelle Wall<sup>1</sup>, Ruwan Sumanisinghe<sup>1</sup>, Ashley Banes<sup>1</sup>, Don Bynum<sup>3</sup>, Anna Cederlund<sup>4</sup>, Ben Levin<sup>1</sup>, Jie Qi<sup>1</sup>, Jeff Thompson<sup>5</sup> and Elizabeth Lobo<sup>2</sup>. <sup>1</sup>Flexcell International Corp. Hillsborough, NC 27278, <sup>2</sup>Joint Dept. Biomedical Engineering, NCSU/UNC, Raleigh, NC, <sup>3</sup>Orthopaedics, UNC Chapel Hill, NC, <sup>4</sup>Upsalla U, Sweden, <sup>5</sup>Prosthodontics dept., Nova Southeastern University, Fort Lauderdale, FL.
  2. Talk, Chair Savio Woo, *BMES, Nemacon 2011*.
  3. Talk to Scientific Advisory Board, Dr. David Butler, Tissue Engineering Tendon and Ligament, Cincinnati 2012.
  4. Invited Speaker, Joint Meeting of the Materials Research Society, the American Vacuum Society, and the American Society for Metals, Raleigh, NC, November 19, 2010.
  5. First Annual NIH Bioengineering Research Partnership Grant meeting in Cincinnati, OH, April 30, 2010.
  6. Invited Speaker, "Cellular Signaling and Mechanotransduction" in a session on Tendons: The Connection Between Bone and Muscle" at the 40<sup>th</sup> International Sun Valley Workshop on Skeletal Biology, Sun Valley, Idaho Aug 1-4, 2010.
  7. Invited Speaker, Department of Biomedical Engineering, University of Pennsylvania, Host, Dr. Louis Soslowsky, Research Director, Dept of Orthopaedics, BME. April, 2009.
  8. NIH Tissue Engineering Evaluation Consensus Meeting. Member and speaker on biologic evaluation parameters. Organizers Dr. David Butler, School of Engineering, U. Cincinnati, Dr. Jack Lewis, School of Engineering, U. Minnesota; Dr. Cyril Frank MD,



# ALBERT JOSEPH BANES

## CURRICULUM VITAE

- Chair Orthopaedic Surgery, U. Calgary, 2008.
9. Member, Panel Discussion on "How to write a competitive NIH grant", Physical Regulation in Biology and Medicine meeting, Honolulu, HA 2008.
  10. Physical Regulation in Biology and Medicine meeting, Honolulu, HA 2008, 2009, Keynote speaker on Purinoceptor Regulation of Mechanical Load Responses.
  11. Invited Speaker, by Dr. Robert Sah, UCSD, Symposium on Tissue Engineering in Connective Tissues, November, 2008.
  12. Invited Speaker, Symposium on Mechanisms of Mechanotransduction in Connective Tissues, Dr. Michael Kjaer, University of Copenhagen, September, 2008.
  13. Invited Keynote Speaker, by Dr. Savio Woo, University of Pittsburgh, Bioengineering, Tissue Engineering Symposium, talk, "Mechanotransduction", July, 2008.
  14. Banes A.J. Mechanisms of Mechanosensitivity in Connective Tissue Cells, invited speaker, SPRBM, Hawaii, Jan, 2009.
  15. Banes, A.J. Bioreactors in Tissue Engineering, NATERMIS, invited talk and session moderator, San Diego, CA, Dec 2009.
  16. BioMed-ISS Pre-Application Meeting, June 16, 2009, NASA/Johnson Space Center, Houston, TX
  17. Invited Speaker, Cell-Based Therapies and Tissue Engineering 2009, "Mechanotransduction in Connective Tissue Cells: Incorporation in Bioreactors", May 18-21, 2009, Cleveland, Ohio, short course by Dr. Arnold Caplan
  18. Invited Distinguished Professor Lecture, "Mechanotransduction Mechanisms in Connective Tissue Cells" University of Pennsylvania Tuesday, April 21, 2009 Philadelphia, PA, Dr. Louis Soslowky PhD, Director of Research in Orthopaedics, host
  19. Banes, A.J. Panelist, "Musculoskeletal Tissue Engineering Design Evaluation", Hilton Head Island, South Carolina, April 27-29, 2007.
  20. Banes, A. J., Invited Speaker, "Biological Design/Evaluation Criteria", Gordon Research Conference on Musculoskeletal Biology & Bioengineering, Proctor Academy, Andover, NH, July 23-28, 2006.
  21. Banes, A. J., Panelist, "Scientist To Entrepreneur", NIEHS Career Fair, RTP, NC, USA, April 28, 2006.
  22. Banes, A. J., Invited Guest Lecturer and Invited Speaker, University of Texas, San Antonio, Biomedical Engineering Department, Jeff Thompson, Instructor, April 23-27, 2006.
  23. Banes, A. J., Invited Speaker, Mechanical Strain and the Phenotypic characterization of the tenocyte, Tendon and Ligament Remodelling and Regeneration, BSMB Satellite Symposium, Queens College, Cambridge, April 9, 2006.
  24. Nation, Allison, Are There Functional Remodeling Cells in Tendon? Investigation of a Catabolic Phenotype, ISLT Ligament Conference, Chicago, Illinois, US, March 18, 2006.
  25. Invited Speaker, The Orthopaedic Research Society, 52<sup>nd</sup> Annual Meeting, March 18-21, 2006.
  26. Invited Speaker, The American Society for Cell Biology, 45th Annual Meeting, Cortical and Gap Junction Distribution of Human Titin Carboxyl Terminus and Co-localization With Actin, December 10-14, 2005
  27. Invited Speaker, North Carolina Tissue Engineering Interest Group, 2005 Annual Meeting, IL-1 $\beta$  Spares Cell Viability In Response to Mechanical Loading by Reducing Cell Stiffness in Bioartificial Tendons, October 14, 2005
  28. Invited Speaker, Institute of Biological Engineering (IBE), Biology-Inspired Mechanics and Cellular Mechanics session, "Strain magnitudes at the cell and substrate level in vitro", March 4-6, 2005.
  29. Invited Speaker. First NC Meeting on Combination Devices. Flexcell Intl. Corp. as a Small NC Biotechnology Business, NC Biotechnology Center 2004.

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

30. Invited Speaker, Visiting Professor Lecture Series, Hospital for Special Surgery, "Signaling and a Functional Remodeling Unit in Tendon: Clues to Unlocking a Mechanism for Tendinopathy", September 30 – October 1, 2004.
31. Invited Speaker, Symposium on Connective Tissue, "Ligaments and Tendons". American Society of Biomechanics, September 8-12, 2004, Portland, Oregon.
32. Invited Speaker, Symposium on, "The extracellular matrix-conversion of mechanical loading into functional adaptation: Role for physiological and pathophysiological adaptation in health and disease, August 19-21, 2004, Copenhagen, Denmark, invited by Michael Kjaer MD, D, SC, Professor, University of Copenhagen, Denmark.
33. Invited Speaker, AAOS Workshop on Tissue Engineering Tendons, Bioartificial Tendons, invited by Dr. Joseph Iannotti, Chairman, Department of Orthopaedics, Cleveland Clinic, Cleveland, OH, March, 2004.
34. Invited Speaker, McGowan Center for Regenerative Medicine, University of Pittsburgh, Building Bioartificial Tendons: A 3D Model to Mechanically Load and Regulate Gene Expression, Cell Modulus and Material Properties, November, 21, 2003, Invited by Savio Woo, PhD.
35. Invited Speaker, International Olympic Committee workshop on Understanding and Prevention of Tendinopathy in the Athlete, Athens, Greece, October 6, 2003, Role of MMPs in Tendinopathy.
36. Invited Keynote lecture at the 2<sup>nd</sup> European Tissue Engineering Society Meeting, Genoa, IT, September 2-6, 2003, Mechanical Loading Modulates Matrix Remodeling and MMP Expression in Human Bioartificial Tendons, Invited by Dr. Ranieri Cancedda MD, University of Genoa, Genoa, IT
37. Invited Speaker, International Inflammation World Congress, Vancouver, BC, invited by Dr's. David Hart, Cyril Frank MD, Chair of Orthopaedics, Calgary, University, Mechanical Loading Modulates Matrix Remodeling and MMP Expression in Human Bioartificial Tendons. Albert J. Banes, Xi Yang, Jie Qi, August, 2003.
38. Invited Speaker, Brown University, Department of Orthopaedics, Basic Science talk, Titin: Role in elastic recoil in tendon cells, Invited by Dr. Qian Chen, Director of Research, March, 2003.
39. Invited Speaker, Brown University, Department of Orthopaedics, Grand Rounds, invited by Dr. Mike Ehrlich, Chairman, Orthopaedics, Role of Matrix Metalloproteinases in Tendon Remodeling.
40. Invited Speaker, AAOS Symposium on Tissue Engineering, Bioartificial Tendons, Sante Fe, NM, January, 2003
41. Invited Speaker, Regulating Signaling and Gene Expression in Tendon Cells with Mechanical Load, Second Joint Meeting of the IEEE Engineering in Medicine and Biology Society And the Biomedical Engineering Society, hosts: Kathy Derwin, Steve Elder, November, 02.
42. Invited Speaker to Micromechanical Tissue Repair Society, SIROT/SICOT, host Dr. Jack Ryaby, San Diego, August 02.
43. Invited Speaker to World Congress of Biomechanics, Signaling Pathways to Mechanical Load, Tendon Subgroup meeting 2002.
44. Invited Speaker to U. of Rochester, Bioartificial Tissues and Mechanical Load Response Pathways, host Dr. Rick Phipps, January, 02.
45. Society for Comparative Biology, Signaling Pathways to Mechanical Load in Tendon Cells, January, 02, Albert J. Banes, Anaheim, CA.
46. NC Tissue Engineering Society, Bioartificial Tendons, Albert J. Banes, NC State.
47. Congress of Biomechanics, Bioartificial Tendons, Albert J. Banes, San Diego, CA August, 01

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

48. Invited Speaker, AAOS Clinical Orthop. Tissue Engineering in Tendons. Tampa, FL, November 1999.
49. Co-Organizer with Dr. Carol Otey (Molecular Physiology Department, UNC) for Mechanical Activity Subgroup meeting , Mechanobiology: Role of the Cytoskeleton, at the ASCB in Washington DC, 7 speakers, Dec 6-13, 1998.
50. Invited speaker, Third World Congress of Biomechanics. Equibiaxial Strain and - Session Chair (FC19-1), Measuring and Analytical Methods for Biomechanics. – presented paper, Norepinephrine Activate CRE DNA Binding Protein and Expression of Connexin 43. Sapporo, Japan, August 2-8, 1998.
51. Invited Speaker to University of Wyoming , Gap Junctions are Mechanically Responsive Genes, host Dr. Scott Boitano, January, 1998.
52. Keystone Symposium on Wound Repair organized by Jeff Davidson and Vincent Falanga and Tissue engineering, organized by Mark Saltzman, Linda Griffith and Bernhard Palsson. Invited Chair of one of two joint sessions for the meeting, Physical Modulation of Wound Healing. Copper Mt., CO, January 10-15, 1998.
53. Organizer for Mechanical Activity Subgroup meeting at the ASCB in Washington DC. 200 attendees and 7 speakers, Dec 6-13, 1997.
54. Invited Speaker at Genetics Institute in Boston MA, Tendon Cells Responses to Strain In vitro. October 1997.
55. Poster Presentations at the 8th International Gap Junction Conference, Key Largo, FL July, 1997.
56. Organizer for one section of the 1996 Biomechanics and Orthopaedics Sciences Gordon Conference on Cytomechanics. Gave introductory remarks to the session as well as spoke at the evening session on cytotomechanics. Dr. Steve Goldstein, Chair. Proctor Academy, Vermont, August 28-July 2, 1996.
57. Speaker on How Cells Sense Mechanical Signals, Gordon Conference on Gravitational Effects on Biology, invited by symposium organizer, Dr. Manning Correia (Depts. Otolaryngology and Depts. Physiology and Biophysics, University of Texas, Galveston, TX), Colbe College, NH. Also nominated as Chair for next session.
58. Invited Speaker on Connexins in the Tendon Cell Response to Mechanical Load at the Biology of the Synovial Joint meeting, invited by Symposium organizers, Drs. Mike Benjamin, Jim Ralphs, Charles Archer, Bruce Catterson, Cardiff, Wales, June 1996.
59. Symposium speaker, Mechanosensing by Cells, at Interface of Cell Biology and Biomechanics: Industry and the University, invited by Symposium Chair, Dr. Hari Reddi, Dept. of Orthopaedic Surgery, Johns Hopkins University, Baltimore, MD, June 1996.
60. Subgroup Organizer and Speaker, The Cellular Mechanosensory Complex: Components Comprising a Fail-safe Designed System, Subgroup Mechanosensors and Signal Transduction in Mechanically Stimulated Cells American, Assoc Cell Biol, December 1995.
61. Invited Speaker at The Mechanosensory Complex: How Cells Detect, Interpret and Respond to Load Signals, Gravitational and Space Biology Association, Washington, DC November 1995.
62. Invited Speaker, Seminar, How Bone Cells Respond To Mechanical Strain Physiology, Glaxo, hosted by Dr. Larry Miller, Research Triangle Park NC, November 1995.
63. Invited speaker at Seminar, Tendon Cells Respond to Mechanical Load and Growth Factors and Up-regulate Connexins, Orthopedics Department, U. Calgary, hosted by Dr. Cyril Frank, January 1995.
64. Organizer and Speaker for Subgroup Meeting on Cytomechanics-How Cells Detect, Interpret and Respond to Mechanical Signals, Cell Biology Meeting, San Francisco, CA, December 1994.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

65. Participant, Response of Tendon Cells to Mechanical Strain. Gordon Conference on Biomechanics and Orthopedics, August 1994 (invited by Dr. Steve Tripple, Chairman).
66. Participant, Response of Soft Tissues to Mechanical Stresses. Gordon Conference on Wound Repair. June 13-18, 1993. Colby-Sawyer College. Invited by Dr. Jeff Davidson, Vanderbilt U. School of Medicine, Conference Chairman.
67. Participant, Role of Mechanical Challenge in Vascular Cell: Second Messenger Signalling and Response to Growth Factors, Symposium on Wound Repair, ULM, Germany, May 1993.
68. Participant, Neurosciences Symposium, Marion Merrell Dow, Kona, Hawaii, January 1993.
69. Speaker. Paper: Role of Collagen in Inflammation. Future Applications of Cellular Biology, Marion Merrell Dow, Inc, Kona, Hawaii, January 1993.
70. Speaker. Paper: Cellular responses to mechanical load *in vitro*. Future Applications of Cellular Biology, Marion Merrell Dow, Inc, Kona, Hawaii, January 1993.
71. AJ Banes, B Brigman, M Tsuzaki, L Almekinders, and WT Lawrence. Is mechanical load a surrogate progression factor for tendon fibroblasts *in vitro*?
72. Symposium Organizer, with Herman Vandenberg. Mechanical Deformation and Cell Responses, Amer Soc Cell Biol. 9 presenters, 2.5 hour symposium. 100 attendees. Denver, CO, Nov 16, 1993.
73. Conferee, NIH Lung Institute Symposium on Mechanical Strain on Cells and Tissues, Bethesda, MD, April, 1989.
74. Conferee, Marion Laboratories Wound Healing Symposia, Kansas City, MO, 1986-1993.
75. Participant, NIH Workshop on Tendon Repair, Charleston, SC, June 1987.
76. Speaker. Paper: Biochemistry of Bone. Gordon Conference on the Biochemistry of Bones and Teeth, Kimball Union Acad., Meriden, NH; 1985.
77. Conferee, Gordon Conference on the Biochemistry of Bones and Teeth, Kimball Union Acad., Meriden, NH; 1977-1985.
78. Speaker, First and Second International Symposium on the Pathophysiology of Combined Injury and Trauma, 2nd meeting, Wintergreen, VA, 1985.
79. Conferee, First and Second International Symposium on the Pathophysiology of Combined Injury and Trauma, Bethesda, MD, 1983.
80. Conferee, International Symposium on Tissue Repair. Biological and Chemical Aspects of Soft and Hard Tissue Repair, Innisbrook at Tarpon Springs, FL, May, 1983.

### **Seminars**

1. Mechanical strain and cell response. Invited Speaker, Iwaki Glass Co., Tokyo, Japan, Host, Dr. Ichio Ii, Development Group, August 1998.
2. Mechanical load responses in cells under applied strain. Invited Speaker, Chiba University, Tokyo, Japan, Host, Dr. Obinata, Physiology Dept. Dr. Yoshinori Kuboki, Oral Biology, August 1998.
3. Calcium responsiveness and gap junctions to mechanical stimulation in cells under strain. Invited Speaker to Department of Pharmacology, Cystic Fibrosis Group, June 1998.
4. Calcium signaling through connexin 43 gap junctions in tendon cells: responses to mechanical load. Invited Speaker to University of Virginia, Department of Orthopaedics. Host, Dr. Gary Balian, February 19, 1998.
5. How tendon cells detect and respond to mechanical load. Invited Speaker (invited by Dr. John Caulfield), Roche Biosciences, Palo Alto, CA, August 1996.
6. How cells detect mechanical load signals. Invited Speaker to Smith and Nephew, Inc. Pharmaceutical Company (hosted by Dr. Sorel Walawach), York, England, June 1996.

## ALBERT JOSEPH BANES

### CURRICULUM VITAE

7. Grand Rounds, Orthopaedics Department, Yale University School of Medicine. Invited by Dr. Richard Gelberman, Chairman, March 1996.
8. Human smooth muscle cells respond to mechanical strain by cyclin induction. Invited Speaker, University of Pittsburgh Division of Vascular Surgery, hosted by Dr. David Vorp.
9. How cells detect and respond to mechanical signals. Invited speaker, Department of Orthopedics, University of Pittsburgh, hosted by Dr. Savio Woo, December 1994.
10. Signalling responses of endothelial and smooth muscle cells to applied strain *in vitro*. Invited Speaker (invited by Prof. Lynn Hymel), Division of Vascular Surgery, Tulane, New Orleans.
11. Cellular responses to mechanical load. Symposium Organizer, satellite meeting at the Cell Biol meeting in New Orleans, 1993.
12. Role of collagen in inflammation. Future Applications of Cellular Biology. Marion Merrell Dow, Inc, Kona, Hawaii, Jan 10-11, 1993.
13. Cellular responses to mechanical load *in vitro*. Future Applications of Cellular Biology, Marion Merrell Dow, Inc, Kona, Hawaii, Jan 10-11, 1993.
14. Mechanical deformation and cell responses. Organized by AJ Banes and Herman Vandenberg, Amer Soc Cell Biol, Denver, CO, Nov 16, 1993 (9 presenters, 2.5 h symposium, 100 attendees).
15. Effects of stress on fibroblasts in culture. Invited Speaker, Academic Orthopedic Society, New Orleans, LA, Nov. 5-7, 1992.
16. Mechanical activity and cells in culture. Invited Speaker, The American Society of Mechanical Engineers, Sixth Annual Bioprocess Engineering Symposium, Anaheim, CA, Nov. 8-13, 1992.
17. Effects of mechanical activity *in vitro* on bone cells. Invited Speaker, University of Pittsburgh, Department of Oral Surgery (hosted by Dr. Michael Buckley), June 22, 1992.
18. Effects of mechanical loading on cellular responses. Invited Speaker, University College London Dept. of Anatomy (hosted by Dr. Allan Boyde), Sept. 4, 1992.
19. Effect of mechanical force on smooth muscle and endothelial cell function *in vitro*. Invited Speaker, International Conference on Pulmonary Vascular, National heart and Lung Inst, Sept 7-9th, 1992.
20. Avian tendon synovial cells and internal fibroblasts respond differentially to PDGF BB, IGF-1 and cyclic mechanical load *in vitro*. Invited Speaker, University of North Carolina at Chapel Hill, Southern Connective Tissue Meeting, May 4-5, 1992.
21. Load increases calcium accretion and OP mRNA in ROS 17/2.8 cells *in vitro*. Invited Speaker (invited by Steve Goldring), International Orthopedics Society Meeting, Banff, Alberta, Canada, November 1991.
22. Effects of load on connective tissue cells, a novel system for subjecting cultured cells to cyclic load *in vitro*. Invited Speaker (invited by Dr. Kate Vogel), International Orthopedics Society Meeting, Banff, Alberta, Canada, November 1991.
23. The ultimate exercise: Load effects on aortic endothelial cells and smooth muscle cells in culture. Invited Speaker (invited by Dr. George Martin), Aging Institute, Baltimore, MD, March 1991.
24. Effect of cyclic load on osteoblast-like cells. Invited Speaker (invited by Dr. Marian Young), NIDR, March 1991.
25. New technology for application of mechanical strain to cultured cells. Invited Speaker, MIT Forum, Pittsburgh, PA, January 1991.
26. Response of endothelial cells to tension *in vitro*. Invited Speaker, Dow Research Inst, U. Iowa, Iowa City, IA, April 1991.
27. Collagen and mineralization. Invited Speaker, Department of Hospital Dentistry, U. Iowa, Iowa City, IA, April 1991.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

28. Response of endothelium and smooth muscle to a mechanically active environment. Invited Speaker, NIH, National Aging Inst, Baltimore, MD, March 1991.
29. Response of osteoblasts to a mechanically active environment. Invited Speaker, NIH, National Inst Dental Res, Bethesda, MD, March 1991.
30. Mechanical strain and its effects on endothelial cells. Invited Speaker, Symposium on Mechanical Effects on Endothelial Cells, Georgia Tech (Organizer, Robert Nerem), April 1991.
31. Cells cultured from mechanically active tissues display diverse responses to cyclic deformation *in vitro*. Invited Speaker, First World Congress of Biomechanics, U. California, San Diego, CA, September 1990.
32. Biochemistry and biology of flexor tendon. Invited Speaker, Musculoskeletal Dept, Cleveland Clinic, Cleveland, OH, November 1990.
33. Applying strain to cultured cells with the Flexercell Strain Unit, Triangle Biotechnology Fair, Research Triangle Park, NC.
34. Exercising cells in culture, Burroughs Wellcome Virology Division, Research Triangle Park, NC.
35. The effects of cyclic strain on energy metabolism of skeletal muscle cells, Duke University Dept of Cell Biology and Anatomy, Durham, NC.
36. Exercising cells in culture, Tulane University Dept. of Vascular Surgery, New Orleans, LA.
37. Effects of cyclic strain on cells in culture, Duke University Center for Biochemical Engineering.
38. Exercising cells in culture, UNC Surgery Research Seminar.
39. Role of adhesion molecules in gliding tissues, Orthopaedic Research Seminar.

### **Other Un-Refereed Works**

1. Banes AJ, Wall ME, Bynum DK, Fox AM. Tendon & ligament cells and healing. In: *Orthopaedic Research Society Basic Science Lectures for the AAOS Board Preparation and Review Course*, Rosemont, IL: ORS/AAOS, 2008 (CD-ROM).

### **Patents/Applications of Albert J. Banes assigned to Flexcell Internation Corpotation**

1. Banes AJ. Biocompatible polyorganosiloxane composition for cell culture apparatus. United States Patent 4,789,601, Filed May 4, 1987, Issued December 6, 1988.
2. Banes AJ. Biocompatible polyorganosiloxane composition for cell culture apparatus. United States Patent 4,822,741, Filed April 11, 1988, Issued April 18, 1989.
3. Banes AJ. Apparatus for applying stress to cell cultures. United States Patent 4,839,280, Filed April 11, 1988, Issued June 13, 1989.
4. Banes AJ. Biocompatible polyorganosiloxane composition for cell culture apparatus. International Publication No. WO/1988/008789, Filed May 3, 1988, Published November 17, 1988.
5. Banes AJ. Biocompatible polyorganosiloxane composition for cell culture apparatus. European Patent No. EP0365536, Filed May 3, 1988, Published October 23, 1996.
6. Banes AJ. Floating cell culture device and method. United States Patent 5,122,470, Filed July 5, 1988, Issued June 16, 1992.
7. Banes AJ. Floating cell culture device and method. International Publication No. WO/1990/000595, Filed June 19, 1989, Published January 1, 1990.
8. Banes AJ. Culture plate with splash guard. United States Patent 5,593,891, Filed November 10, 1994, Issued January 14, 1997.
9. Banes AJ. Flexion enhanced transfection of genetic material. United States Patent 5,518,909, Filed November 18, 1994, Issued May 21, 1996.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

10. Banes AJ. Culture plate with splash guard. International Publication No. WO/1996/015219, Filed November 06, 1995, Published June 6, 1996.
11. Banes AJ. Flexible bottom culture plate for applying mechanical load to cell cultures. United States Patent 6,048,723, Filed November 30, 1998, Issued April 11, 2000.
12. Banes AJ. Loading station assembly. United States Patent 6,218,178, Filed May 6, 1999, Issued April 17, 2001.
13. Banes AJ. Culture compression device. United States Patent 6,037,141, Filed June 4, 1999, Issued March 14, 2000.
14. Banes AJ. Apparatus for growing cells in culture under shear stress and/or strain. United States Patent 6,586,235, Filed December 3, 1999, Issued July 1, 2003.
15. Banes AJ. Loading station assembly and method for tissue engineering. United States Patent 6,472,202, Filed September 29, 2000, Issued October 29, 2002.
16. Banes AJ. Apparatus for growing cells in culture under shear stress and/or strain. United States Patent 6,645,759, Filed December 8, 2000, Issued November 11, 2003.
17. Banes AJ. Method and apparatus to grow and mechanically condition cell cultures. Canada Patent No. 2,411,524, Filed December 10, 2001, Issued February 27, 2007.
18. Banes AJ. Method and apparatus to grow and mechanically condition cell cultures. Japan Patent No. 3,950,797, Filed December 10, 2001, Issued April 27, 2007.
19. Banes AJ. Method and apparatus to grow and mechanically condition cell cultures. European Patent No. 1,356,022, Filed December 10, 2001, Issued January 23, 2008.
20. Banes AJ. Method and apparatus to grow and mechanically condition cell cultures. Germany Patent No. DE 60,132,626, Filed December 10, 2001, Issued January 29, 2009.
21. Banes AJ, Maloney MM. Method and system for measuring properties of deformable material specimens. United States Patent 6,721,667, Filed February 10, 2003, Issued April 13, 2004.

### ***Patents/Applications of Albert J. Banes assigned to Medtrain Technologies***

22. Banes AJ. Method and apparatus to grow and mechanically condition cell cultures. United States Patent 6,998,265, Filed December 10, 2001, Issued February 14, 2006.
23. Banes AJ. Method and apparatus to grow and mechanically condition cell cultures. International Publication No. WO/2002/046365, Filed December 10, 2001, Published July 2, 2002.
24. Banes AJ, Qi J. Modulation of cell intrinsic strain to control matrix synthesis, secretion, organization and remodeling. United States Patent Application No. 10/570,125, Filed September 3, 2004.
25. Banes AJ, Qi J. Modulation of cell intrinsic strain to control matrix synthesis, secretion, organization and remodeling. International Publication No. WO/2005/023988, Filed September 3, 2004, Published March 17, 2005.
26. Banes AJ, Maloney MM. Tissue engineered construct analytical imaging system and method of obtaining and analyzing images of tissue engineered constructs. United States Patent Application No. 10/576,182, Filed October 22, 2004.
27. Banes AJ, Maloney MM. Tissue engineered construct analytical imaging system and method of obtaining and analyzing images of tissue engineered constructs. International Publication No. WO/2005/039396, Filed October 22, 2004, Published May 6, 2005.
28. Banes AJ, Qi J. Modulation of cell intrinsic strain to control cell modulus, matrix synthesis, secretion, organization, material properties and remodeling of tissue engineered constructs. United States Patent Application No. 11/076,425, Filed March 9, 2005. Abandoned 2013

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

29. Banes AJ, Qi J. Modulation of cell intrinsic strain to control cell modulus, matrix synthesis, secretion, organization, material properties and remodeling of tissue engineered constructs. International Publication No. WO/2005/086881, Filed March 10, 2005, Published August 10, 2006. Abandoned 2013.
30. Banes AJ, Qi J. Nuclear targeting sequence. United States Patent 7,531,624, Filed December 2, 2005, Issued May 12, 2009.
31. Banes AJ, Wang J, Qi J, Kheradpir K. Bioreactor for development of blood vessels. United States Patent Application No. 11/909858, Filed March 30, 2006.
32. Banes AJ, Wang J, Qi J, Kheradpir K. Bioreactor for development of blood vessels. International Publication No. WO/2006/105444, Filed March 30, 2006, Published October 5, 2006.
33. Wang J, Wall M, Banes AJ. Microfluidic device for application of shear stress and tensile strain. United States Patent Application No. 12/350,531, Filed January 8, 2009.
34. Banes AJ, Qi J, Tsuzaki M. and Qi, Ji. Thermally induced gelation of collagen hydrogel and method of thermally inducing gelling a collagen hydrogel. United States Patent Application No. 61/266,807, Filed December 4, 2009. Allowed June 13, 2013.
35. Banes AJ, Sumanasinghe R. Microfluidic device for applying physical forces and analyzing biochemical and biomechanical responses. United States Patent Application No. 61/266,821, Filed December 4, 2009.
36. Patent Application # 10/576,182 .Tissue Engineered Construct Analytical Imaging System and Method of Obtaining and Analyzing Images of Tissue Engineered Constructs. Amendment allowed.
37. Blood vessel device (PCT filing 2011)
38. Banes, A.J., C. Frazier, C Wimmer. Three well culture plate. December 3, 2013.
39. Banes, A.J. Method and Apparatus for Patterning Cells. December 19, 2013.

### ***Patents/Applications of Albert J. Banes assigned to The University of North Carolina at Chapel Hill and Flexcell International Corporation***

40. Banes AJ, Qi J, Bynum D, Koller B, Thompson J, Fox A, Nation A. Gene and cognate protein profiles and methods to determine connective tissue markers in normal and pathologic conditions. United States Patent Application No. 60/654,232, Filed February 18, 2005.
41. Banes AJ, Qi J, Bynum D, Koller B, Thompson J, Fox A, Nation A. Gene and cognate protein profiles and methods to determine connective tissue markers in normal and pathologic conditions. International Publication No. WO/2006/089268, Filed February 21, 2006, Published August 24, 2006.
42. Banes, AJ, et al. (TBD) Tenomodulin (TNMD) and its isoforms as tendon biomarkers and markers of pathology in dense connective tissues such as tendons and ligaments. Filed UNC, Arles Taylor, January 11, 2011.

### **Teaching Record**

#### ***Course Director***

1. **Principles of Tissue Engineering**, Joint Program in Biomedical Engineering and Curriculum of Applied and Materials Science, 200 graduate level course, 3 credit hours, 15 weeks August 18 to December 16, 1999, 2001, 2005, 2007, 2009, 2011 course meets 3 times per week for 1 hour.
2. **Biomaterials I**, Course Director with Dr. Jeff Thompson, Biomedical Engineering, 200 graduate level course, 3 credit hours, taught each fall.



# ALBERT JOSEPH BANES

## CURRICULUM VITAE

3. **Biomaterials II**, Course Director with Dr. Jeff Thompson, Biomedical Engineering, 200 graduate level course, 3 credit hours, taught alternate spring semesters.
4. **Introduction to Material Sciences**, Biomedical Engineering, 100 graduate level course, 3 credit hours.
5. **Advanced Biomaterials**, Biomedical Engineering, 200 graduate level course, 3 credit hours.
6. **Genes to Tissues (BME 570)**, graduate level cell biology for biomedical engineers, 4 credit hours.
7. **Functional Genomics (BME 770)**, graduate level cell biology and genetics for biomedical engineers, 3 credit hours.

### Course Lectures

1. **Growth Factors I, II**, Graduate Students, Dental School, Oral Biology (stopped 2006)
2. **Lecture on collagen biochemistry**, Musculoskeletal Course, Medical Students 2nd year
3. **Bone Biochemistry**, Orthopaedic Residents and Faculty (stopped 2005)
4. **Tendon Biochemistry**, Orthopaedic Residents and Faculty (stopped 2005)
5. **Tendon Biochemistry**, Plastic Surgery Residents and Faculty (on request)
6. **Collagen Biochemistry**, Periodontics, Course 270A, Dental Residents (on request)
7. **Wound Healing in Skin and Tendon**, Plastic Surgery Residents (on request)
8. **Molecular Biology of Wound Healing**, Medical Student Selective, MS-I, 25 contact hours
9. **Tendon Biology and Repair**, Orthopaedic Residents (on request)
10. **Collagen and Proteoglycan Chemistry** Lectures, MS-II, Musculoskeletal Course (now collagen lecture)
11. **Immunology lectures** to Biomaterials I, II graduate students
12. **Lecture on wound dressings** to Biomaterials students
13. **"Ethics and Business"** Lonnie Balaban course director NCSU Speaker: Albert Banes, Raleigh, NC Thursday, April 20, 2006
14. **IP in Materials Sciences**, Distance Teaching Lectures: BME NOVA University Ft. Lauderdale, Florida, Fall 2007 Advanced Biomaterials course, Dr. Jeff Thompson instructor
15. **How to Build a Company Based on your Science and Engineering**, Distance Teaching Lectures: BME NOVA University Ft. Lauderdale, Florida, Fall 2007 Advanced Biomaterials course, Dr. Jeff Thompson instructor

### Doctoral Candidates

- |      |   |
|------|---|
| 2002 | Ann Marie Fox, NC State UNC BME joint program. Project: NSF application title, "Modulation of Cell and Matrix Stiffness and Biomechanical Strength of a Bioartificial Tendon"   |
| 2001 | Archambault, Joanne BS, MS, PhD candidate from University of Calgary-mentor Dr. Walter Herzog, Kinesiology. <u>Albert J. Banes, PhD</u> thesis Committee member. Project-testing the effect of cyclic tension and IL-1 on rabbit tendon cell gene response. Hypothesis-repetitive mechanical load and inflammatory mediators induce matrix destructive enzymes. |
| 2000 | Jones Bertina, CAMS Curriculum of Applied and Materials Sciences predoctoral student. Project: Fabrication and mechanical testing of tissue-engineered ACL. NIH funded doctoral program for 3 years. \$60,000 02-05.  |
| 1999 | Wall-Elfervig, Michelle BS, Ph.D. candidate in Biomedical Engineering. Performing her doctoral work in our laboratory on shear stress effects on tendon cells.  |

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

### **Orthopaedic Residents**

- 2001-02 Jennifer Hooker MD, Orthopaedic Research Fellow. Projects: Project 1: OREF application- Mechanical load modulation of matrix metabolism in native and bioartificial tendons. Project 2: Regulation of titin and nebulin genes by mechanical load in tendons and cultured cells.
- 2000 Anthony Russo (3 months rotation)
- 2000-02 Satoru Yamazaki MD, Visiting Fellow from Wakayama Medical College, Wakayama Japan, Projects: Effects of vibration on DNA synthesis and gene expression in intervertebral disc cells.
- 1996-97 Christopher Larson, MD, Orthopaedic Research Fellow. Project: Differential display analysis of novel genes in mechanically loaded chondrons and chondrocytes.
- 1983-84 Dr. Byron Rosenstein, Orthopaedic Resident. Project: Preparation of bone powder preparations that stimulate new bone formation *in vivo*.

### **Post-doctoral fellows and students in the lab**

- 2011 Anna Cederlund, visiting student U. Lund, Sweden graduate student
- 2011 Kat Tech, BME UNC, first year graduate student
- 2010 Ashley N. Banes, NCSU veterinary student, second year
- 2010 Jacob Dmochowski, UNC medical student, first year
- 2009 Melissa Hecht, Summer intern Flexcell Intl. Corp.
- 2009 Ami Kabodi Duke U BME student summer intern
- 2008 Melissa Hecht intern Flexcell Intl Corp
- 2006 Vidya Goli, NC State
- 2006 Prakash Chandrasekaran, NC State
- 2006 Jamal Lewis, NC State
- 2005 Camille Thompson, NC State
- 2002 Ann Marie Fox, NC State UNC BME joint program. Project: NSF application title: Modulation of cell and matrix stiffness and biomechanical strength of a bioartificial tendon.
- 2001 Knutson, James BME Biomedical Engineering. Project: Fabrication and signaling responses of intervertebral disc cells in 3D matrices.
- 2001 Allison Nation, UNC-NC State joint BME program graduate student. Project: NSF pre-doctoral application: Bioreactor for fabrication and testing of a bioartificial digit.
- 2001-03 Katie Neal undergraduate in Biomedical Engineering. Project: integration of annulus cells into nucleus pulposus cells in a 3D tissue engineered intervertebral disc.
- 2001-02 Nathan Baldwin, biology undergraduate student- project study of musculotendinous junction in response to cyclic mechanical loading. Funded for \$3000.
- 2000-05 Bertina Jones, Curriculum in Applied and Materials Sciences Ph.D. student.
- 1999 Garvin-Bruno, Joanne BS, Ph.D. candidate in the Curriculum of Applied and Materials Sciences. Project: Investigation of cell signaling in 3D matrices in response to strain.
- 1999 Holley Tyler -NC School for Math and Sciences-Effect of flow on osteoblast-like cells: Ca<sup>2+</sup> signaling.
- 1999-02 Karen Spencer-UNC undergraduate student-Project-Effect of IL-1 on tendon cell response in whole tendons.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

- 1999-01 Griff Kuremsky-UNC undergraduate student-Project- Data workup on cell signaling experiments with tension, compression and fluid-induced shear stress.
- 1999-04 Eric Volkmann BS, UNC MSII-Project-Effect of therapeutic cyclic loading on tendon cell matrix gene response.
- 1999-03 Michelle Elfervig Wall BS, Biomedical Engineering Graduate Student. Project: Effect of ATP and mechanical load on human annulus cells, tendon fibroblasts and chondrons.
- 1998-99 Ross Adams, Undergraduate in Applied Sciences. Project: Mitogenic response in mechanically stimulated tendons *ex vivo*.
- 1997-01 Eric Francke, MSII. Project: Calcium wave responses of tendon cells to ATP.
- 1997-99 Ajay Sood, Undergraduate in Applied Sciences. Project: Calcium wave response in mechanically stimulated tendon and annulus cells.
- 1996 Carter Kenamond, Undergraduate in Applied Sciences. Project: Calcium wave response in mechanically stimulated tendon cells.
- 1996 Dr. Paul Weinhold, Engineer Post-doctoral Fellow. Project: Mechanics of tendons.
- 1993-95 Dr. Juro Yamamoto. Project: IP<sub>3</sub> receptor expression in hSMC in cells subjected to cyclic stretch *in vitro*.
- 1993-94 Dr. Eiji Chikamatsu. Project: Cyclin D biochemistry and expression in hSMC subjected to cyclic stretch *in vitro*.
- 1992-94 Dr. Peiqi Hu. Project: Cyclin D biochemistry, Connexins.
- 1992-94 Dr. Hong Xiao. Project: Cyclin D biochemistry, regulation of cell cycle control in dermal fibroblasts.
- 1992-93 Dr. Tetsuya Okamoto. Project: Biochemistry of integrins in hSMC subjected to cyclic stretch *in vitro*.
- 1992-93 Helen Bellar, MS-III. Project: Investigation of adhesions in human bowel-bowel connections. Presenter, Medical Student Research Day, 1993, poster presentation.
- 1992-93 Tony Brown, MS-II. Project: Covalent bonding of the anticoagulant hirudin to vascular graft prostheses. Presenter: Medical Student Research Day, 1993-slide presentation.
- 1992-94 David Dorofi, MS-I. Project: Regulation of alpha 6 and alpha V integrin subunits by mechanical load in cultured human smooth muscle cells. Presenter, Medical Student Research Day, 1993 (slide presentation-was selected 2<sup>nd</sup> of 15 presenters).
- 1991-93 Greg Amaya, MS-I. Project: Determine dose response of mechanical load on aortic endothelial cells *in vitro*. Presenter, Medical Student Research Day, 1993, slide presentation.
- 1991-92 Gerald Cooley, Medical Student. Project: Protein expression in strained Hailey-Hailey cells.
- 1991-94 Angela Keene, Medical Student. Project: Expression of bone sialoprotein in strained ROS cells.
- 1991 Marlene Calderon, Medical Student. Project: Endothelial cell wound model *in vitro* with applied load.
- 1990 Mari Tsuzaki, DDS, PhD, Research Fellow from Tokyo Medical and Dental University. Projects: (1) Characterization of collagens from synovium and internal compartments of tendon and sheath; (2) Characterization of matrix formed in tendon cells subjected to long term cyclic strain *in vitro*.
- 1990 Brian Brigman, Medical Student. Projects: (1) Quantitation of fibronectin and fibronectin messenger RNA in plasma, synovium and internal compartments

## ALBERT JOSEPH BANES

### CURRICULUM VITAE

- of avian flexor tendon and sheath; (2) Regulation of fibronectin expression in cyclically strained connective tissue.
- 1989 Hongliang Yin, MD, Visiting Fellow, Department of Ophthalmology, First Teaching Hospital of Second Military Medical University, Shanghai, People's Republic of China.
- 1988-91 George Vadiakas, DDS, Masters candidate in Orthodontics. Project: Proteins involved in the mineralization process in cyclically stretched osteoblasts.
- 1988-89 Fuad Ramadan, MD, Vascular Surgery Fellow. Project: Endothelial cell culture and response to strain (with Gilbert Upchurch).
- 1988-91 Jim Maroney, DDS, Masters candidate in Prosthodontics. Project: Responses of temporomandibular chondrocytes to applied strain *in vitro*.
- 1988 Brent Geisinger, Medical Student. Continuing with projects concerning the metabolism of cardiac myocytes in response to cyclic strain *in vitro*.
- 1988-89 Elizabeth Wright, Masters Candidate, UNC Department of Physical Education. Project: Effects of cyclic mechanical strain on skeletal myocytes. Advisors: Drs. A.J. Banes and R. MacMurry.
- 1988-89 Jeffrey Kobs, MD, Orthopaedic Fellow. Project: Identification of fibronectin in healing medial collateral ligaments.
- 1987-91 Gilbert Upchurch, UNC Medical Student. Continuing projects with Drs. Banes and Johnson, Division of Vascular Surgery, concerning responses of endothelial and smooth muscle cells to cyclic strain.
- 1987-88 Takako Inayama, MD, Visiting Fellow from Yokohama University Medical School, Japan, UNC Division of Plastic Surgery. Project: Effects of electric arc flashovers on wound healing in skin.
- 1987-88 Willis Wagner, MD, Vascular Surgery Research Fellow. Project: Biology and biochemistry of arterial and venous endothelial cells, responses to cyclic force *in vitro*.
- 1986-88 Rene Henderson, Masters Candidate, Department of Physical Therapy. Project: Effects of cyclic strain on normal human dermal fibroblasts and human scar fibroblasts.
- 1986-87 Dr. Bauer Sumpio, Vascular Surgery Fellow. Project: Effects of cyclic mechanical deformation on aortic endothelial cells in culture. (Currently Assistant Professor of Surgery at Yale University).
- 1986-87 Dr. Michael Buckley, Oral Surgery, Postdoctoral Fellow. Project: Effects of cyclic mechanical deformation on osteoblasts in culture, fellowship in Oral Surgery, \$20,000. Advisor for Master's thesis.
- 1984 Dr. Linda Gibson Levin, Post-Doctoral Fellow, Endodontics. Project: Reaction of pulpal fibroblasts *in vitro* to artificially induced stress, 1-F32-DE05435-01, (1985-1987), currently beginning as a Ph.D. candidate in the UNC Microbiology Department.
- 1983 Dave Mandelenich, dental student. Project: The effect of fluoride on macromolecular synthesis in cultured gingival fibroblasts.
- 1983 John Dean, Dental Student. Project: Quantitation of collagenolytic activity in supernatant fluids from cultured gingival fibroblasts.
- 1983-85 Advisor to Dr. John Lanz, Periodontist and Masters Candidate in Periodontics. Project: An evaluation of biosynthetic wound dressings for intraoral lesions in the human. Graduated MS, August 1985.
- 1983-90 Dr. G. William Link, Research Associate. Project: Quantitation of scar formation by measuring pyridinoline.

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

- 1983 David R. Heath and R.H. Leonard, dental students. Project: Quantitation of hemoglobin as a measure of tissue vascularization using polyacrylamide gel electrophoresis.
- 1982-85 Dr. Heraline Hicks, Postdoctoral Fellow. Project: Investigation of molecular etiology of dilantin-induced cleft palate.
- 1981-83 Dr. David Compton, Resident and Masters Candidate in Periodontics. Thesis: Effects of synthetic wound dressings on healing of intraoral wounds. Graduated August 1983 (see publications 15 and 19). Awarded postdoctoral fellowship 1-F32-DE05359-01 OBM, but declined to pursue private practice.
- 1981 Dr. Michelle Thiet, Surgery Resident. Project: Quantitation of healing response in tissue covered by viable and non-viable dressings.
- 1981 Dental Students. Wound healing project.
- 1980 Elizabeth Spitznagle, UNC Medical Student.
- 1978-81 David Enterline, UNC Medical Student.

### Grants

#### ***Pending Grants***

1. 2013 Tendon biomarkers in biology and repair: tenomodulin binds chromatin. NIH R21, 2 years, PI, \$275,000 (submitted February 16, 2013,)
2. 2010 *Tendon Biomarkers in Pathology and Repair*, NIH R01; 3 years, PI; \$493,157
3. 2010 *High throughput 2D and 3D strain applying culture plate*. SBIR through Flexcell International; 1 year; \$99,896  
Co-investigator
4. 2010 *Rapid Gelation Collagen Hydrogel for Tissue Engineering* SBIR through Flexcell International; 1 year; \$98,205  
Co-investigator
5. 2009 *High throughput 2D and 3D strain applying culture plate*. SBIR through Flexcell International; 1 year; \$99,896  
Co-investigator
6. 2009 *Rapid Gelation Collagen Hydrogel for Tissue Engineering* SBIR through Flexcell International; 1 year; \$98,205  
Co-investigator

#### ***Active/Completed Grants***

1. 2007 *Fabrication of a Venous Valve Replacement Device (VVRD)*. NCSU/UNC BME; 1 year; \$43,228
2. 2005-06 *Bioreactor for engineered bioartificial tissues (BAT's)* STTR/NIH; 1 year; \$99,999
3. 2005-06 *BMP testing in human bioartificial tendon culture* Wyeth Labs; 1 year; \$42,000
4. 2002-05 *Fabrication and mechanical testing of tissue-engineered ACL* Sponsor, NIH Predoctoral grant, awarded to Bertina Jones, Curriculum of Applied and Material Sciences; 3 years; \$60,000
5. 2000-05 *Tendon cells: interactions & responses to stress in vitro* NIH AR38121; 5 years; total costs: \$1,180,000  
Co-PI (50%) with J. Faber
6. 2000-03 *Signaling pathways in adaptation to mechanical load* NIH-1-R01; \$782,058; 3 years

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

7. 1999-03 Co-Investigator with PI-Greta Lee, UNC Orthopaedics  
*Repetitive strain injury of tendon in an ex vivo model*  
Whitaker Foundation, Biomedical Engineering Grants; 10/1/99-3/31/03;  
\$200,000
8. 1999-00 Consultant with PI-Paul Weinhold  
*The role of IL-1 in the early stages of tendinosis in humans*  
University Faculty Grants Committee; \$4000
9. 1999-00 Consultant with PI- Gregory Guyton  
*The role of IL-1 in the early stages of tendinosis in a rabbit model*  
UNC University Research Council; \$4,000
10. 1999 Consultant with PI- Gregory Guyton  
*Signaling responses of intervertebral disc cells to mechanical loading in vitro and ex vivo*  
Orthopaedic Research and Education Foundation; 7/1/99-6/30/01;  
\$98,334
11. 1998 Co-Investigator (10%) with PI-Joe Minchew, UNC Orthopaedics  
*Fluid dynamics of mechanically stimulated cell cultures*  
NIH 3-R01 AR42845; 1/95-2/28/98; \$523,416 total (direct costs, \$381,719), continuation
12. 1998 Co-Investigator (5% years 1,2, 20% year 3) with PI-Tom Brown, U. Iowa  
*Tendon cells: interactions and responses to stress in vitro*  
NIH 5-R01-AR38121-07-10; 3 years; \$740,739 (direct costs \$523,079), continuation
13. 1997 *Effects of vibrational loading on intervertebral disc tissue and cells*  
UNC Medical Faculty Grant; 7/10/97-7/10/98; \$4,000
14. 1996 *Mitogenic effects of metalloproteinase inhibitors on rat anterior tibialis tendon cells*  
Roche Biosciences; 11/1/96-10/31/97; 1 year; \$35,000
15. 1996 *Differential display analysis of osteoarthritic and normal cartilage mRNA*  
Arthritis Foundation; 6/1/96-6/30/98; \$50,000/yr
16. 1995 Co-Investigator with Scott Kelley and Greta Lee  
*Fluid dynamics of mechanically stimulated cell cultures*  
NIH 3-R01 AR42845; 1/95-2/28/98; \$523,416 total (direct costs, \$381,719)
17. 1995 Co-Investigator (5% years 1,2; 20% year 3) with PI-Tom Brown, U. Iowa  
*Tendon cells: interactions and responses to stress in vitro*  
NIH 5-R01-AR38121-07-10; 3 years; \$740,739 (direct costs \$523,079)
18. 1994 *Growth factors and tendon cell responses*  
Plastic Surgery Research Council; 6/1/94-5/31/95; \$5,000
19. 1994 *Vascular smooth muscle adrenoceptor function and expression*  
NIH 10/94-6/30/99; 5 years; \$1,182,826
20. 1993 Co-Investigator (5%) with PI-Jim Faber, Physiology Dept., UNC  
*Cyclic load on matrix responses to load in vitro*  
Co-sponsor, Plastic Surgery Research Council grant, awarded to Angela Keene, MS-III; 1 year; \$5,000
21. 1993 *The effect of cyclic load on expression of matrix proteins in osteoblasts*  
Sponsor, Howard Hughes Medical Student Research Fellowship grant, awarded to Angela Keene, MS-III; 1 year; \$23,200
22. 1993 *Signal responses transduced during load to no load shifts in osteoblasts in vitro*  
Sponsor, NASA Medical Student Research Fellowship grant, awarded to Angela Keene, MS-III; \$27,000

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

Note: This grant was awarded but not accepted due to acceptance of the Howard Hughes Award

23. 1992 *Tendon cell populations: response to growth factors and load*  
Co-sponsor, Plastic Surgery Research Council grant, awarded to Brian Brigman, MS-III; 1 year, \$4,980
24. 1992 *Assessing the role of fibronectin in the modulation of synovial rheology*  
Sponsor, Howard Hughes Medical Student Research Fellowship grant, awarded to Brian Brigman, MS-III; 1 year; \$21,500
25. 1991 *Effects of cigarette smoke condensate on bone marrow stem cells*  
RJR Nabisco International; 1 year; \$50,000
26. 1991 *Novel biomechanical drug screening assays based on altered cytotoxicity and adhesion of target cells challenged with a flexing substratum*  
Ben Franklin Partnership with Western PA Advanced Technology Center; 1 year; \$75,000 (direct and indirect costs)
27. 1990 *Interactions and responses to stress in vitro*  
NIH 2 RO1 AR38121-04; 2 years; \$499,942 (direct and indirect costs)
28. 1990 *Flexible biocompatible materials to culture cells in a mechanically active environment*  
Ben Franklin Partnership with Western PA Advanced Technology Center; 1 year; \$99,000
29. 1990 *Biochemical characterization of matrix. Proteins bound to flexible and rigid culture plate surfaces used to cyclically stretch cells in vitro*  
North Carolina Biotechnology Center; 1 year; \$100,000
30. 1990 *Potential mitogenic effects of cigarette smoke condensate on bone marrow stem cells*  
RJ Reynolds Company; \$60,000
31. 1990 *Further studies with the electric burn model in rats*  
Duke Power Company; \$107,000
32. 1989 *Study of the characteristics of electrical flashovers that result in partial thickness injury to skin and development of an apparatus for commercial garment testing*  
Duke Power Company; 1 year; \$79,338 (direct costs)
33. 1989 *Preparation of antibodies for immunostaining of tendon, synovial cells and internal fibroblasts*  
American Society for Surgery of the Hand; \$4,766  
Co-Investigator with Dr. D.K. Bynum, PI
34. 1989 *Flexible biocompatible materials to culture cells in a mechanically active environment*  
Ben Franklin Partnership with Western PA Advanced Technology Center; 1 year; \$100,000
35. 1989 *Potential mitogenic effects of cigarette smoke condensate on bone marrow stem cells*
36. 1987 *Tendon cells: interactions and responses to stress in vitro*  
NIH AR38121; 3 years; \$354,427 (direct costs)  
RJ Reynolds Company; \$65,000
37. 1989 *Develop a cell culture assay to determine acceptability of integra synthetic dermis lots*  
Marion Laboratories, Kansas City, MO; 1 year; \$27,600
38. 1987 *Study of electrical burns on skin*  
Duke Power Company; with H.D. Peterson; \$37,200
39. 1987 *Tendon cells: interactions and responses to stress in vitro*

**ALBERT JOSEPH BANES**  
**CURRICULUM VITAE**

40. 1986 NIH 1-R01-AM38121-01; 3 years; \$354,427  
*Effects of cyclic mechanical deformation on cultured osteoblasts*  
Sponsor, American Association for Oral Surgery Fellowship grant,  
awarded to Dr. Michael Buckley; 1 year; \$20,000
41. 1986 *Effects of immobilization and motion on healing in the injured tendon*  
NIH 2-R01-AM30952-04a2; 3 years; \$324,915
42. 1986 *Study of the effects of laser dyes on suppression of tumor cell growth*  
Eastman Kodak; with Drs. S.K. Powers and W. Beckman; 2 years;  
\$150,000
43. 1986 Column chromatography applications  
Dupont de Nemours & Company; 1 year; \$10,000
44. 1985 *Reaction of pulpal fibroblasts in vitro to artificially-induced stress*  
Sponsor, NIDR grant 1-F32-DE05435-01 awarded to Dr. Linda Levin,  
Department of Endodontics; 2 years; \$51,000
45. 1985 Wound healing project contract  
B.F. Goodrich; 1 year; \$12,000
46. 1985 Column chromatography applications  
Dupont de Nemours & Company; 1 year; \$10,000
47. 1985 *Osteoblastoma project AD-390*  
Dental Research Center; 1 year; \$49,000
48. 1984 *Osteoblastoma project AD-390*  
Dental Research Center; 1 year; \$49,000
49. 1984 *Effect of stress generated potentials on ligament fibroblasts*  
UNC Small Grant; 1 year; \$2,000
50. 1984 *Investigation of ligament contractility*  
Orthopaedic Research and Education Foundation  
Co-Investigator with PI-L. Dahners, J. Gilbert and K. Burrige
51. 1983 *Osteoblastoma project AD-390*  
Dental Research Center; 1 year; \$49,000
52. 1983 *Burn research*  
Hunt Foundation; 1 year; \$2,500
53. 1982 *Healing of periodontal lesions with synthetic dressings*  
Sponsor, Postdoctoral Fellowship grant 1-F32-DE05359-0 awarded to Dr.  
David Compton, Periodontics Department; \$41,276  
Note: This grant was awarded but was turned down by the awardee in  
favor of private practice.
54. 1982 *Effects of immobilization and motion on healing in the injured tendon*  
NIH 1-R01-AM30952-01; 3 years; \$183,824
55. 1982 *Effects of diet and disease on collagen maturation*  
NIH 1-R01AM30478-01; 3 years; \$140,835
56. 1982 *Effects of non-biologic dressings on intraoral healing*  
NIH 1-R03-DE-06291-01; 1 year, \$15,000
57. 1982 *Osteoblastoma project AD-390*  
Dental Research Center; \$49,000
58. 1982 *Clinical testing of wound dressings*  
American Convertors, Evanston, IL; \$20,000
59. 1982 *Animal testing of wound dressings*  
American Convertors, Evanston, IL; \$10,600
60. 1982 *Burn research*  
Hunt Foundation, Pittsburgh, PA; \$5,000
61. 1981 *Burn research*



# ALBERT JOSEPH BANES

## CURRICULUM VITAE

62. 1981 Alcoa Foundation, Pittsburgh, PA; \$10,000  
*Burn research*  
Armour Pharmaceutical; \$2,000
63. 1981 *Effect of exercise in vivo and in vitro & mechanical stimulation in vitro on the biochemistry of tendons & cells in culture*  
American Society for Surgery of the Hand; 1 year; \$3,000
64. 1980 *Burn research*  
Alcoa Foundation, Pittsburgh, PA; 1 year; \$15,000
65. 1980 *Affects of stress on tendon cells in culture*  
UNC Faculty Grants Award; 1 year; \$2,000
66. 1974 *Collagen metabolism in osteopetrotic bone*  
NIH Arthritis, Metabolic, & Digestive Disease 1 F22 AM02159-01; 2 years; \$26,000  
Postdoctoral fellowship sponsored by Dr. Ralph Smith, Duke University

### Professional Service

#### **Committees**

- 2009-10 Board of Directors, International Symposium for Ligaments and Tendons
- 2008-present Board of Directors, Society for the Physical Regulation in Biology and Medicine (SPRBM)
- 2008-09 Member, UNC Arts & Sciences, CASE ExCom
- 2008-09 Chair, Joint BME Department Social Committee
- 2008-09 Chair, Joint BME Department Research Committee
- 2006-present Board of Directors, NCTERM, North Carolina Tissue Engineering and Regenerative Medicine group
- 2006 Steering Committee President, North Carolina Tissue Engineering Interest Group
- 2006-07 Chair, Tendon/Ligament Topic Committee, ORS (Orthopaedics Research Society); Committee also responsible for the subareas of Biology, Biomechanics, and Healing of Tendons and Ligaments
- 2005-08 Scientific Advisory Group, Nanostructure Center (CRANN) Trinity College, Dublin, IR
- 2005-10 Chair, Abstract Selection Committee, Orthopaedic Research Society
- 2005 Steering Committee member, North Carolina Tissue Engineering Interest Group (NCTERM)
- 2004 Steering Committee, ISLT (International Symposium for Ligaments and Tendons)
- 2004 Member, Joint BME Department ABET Accreditation Committee
- 2003-10 Member, Abstract Selection Committee, ISLT (International Symposium for Ligaments and Tendons)
- 2003 Program Committee, ISLT (International Symposium for Ligaments and Tendons), March 2004, San Francisco
- 2003 Program Committee, ORS (Orthopaedics Research Society), San Francisco, March 2004
- 2003 Member, Academic-Industrial Committee for the Joint Biomedical Engineering Dept. UNC, NC State Universities
- 2002 Program Committee, International Congress of Biomechanics, August 5, 2002, Calgary, Alberta, CA

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

2002	Advisory Committee, Whitaker Special Opportunity Award, Biological and Agricultural Engineering, NC State, Biomedical Engineering, UNC – Chapel Hill
2000-03	Chair, Search Committee for Biomaterials Faculty in Curriculum of Applied and Materials Sciences, Orthopaedics, and Biomedical Engineering, UNC
2000-02	Arthritis Center Steering Committee
1998-99	Medical Illustrations Overview Committee
1995-96	Chair, Biomaterials Subgroup Committee, UNC Health Sciences Division
1995-2003	Chair, Orthopaedic Research Committee, UNC Orthopaedics Department
1993-96	Membership Committee, Orthopaedic Research Society
1989-91	Radiation Safety Advisory Committee, UNC School of Medicine
1985-86	Periodontics Search Committee, UNC School of Dentistry
1984	Periodontics Search Committee, UNC School of Dentistry
1981-83	Learning Resources Center Advisory Committee, UNC School of Dentistry
1980-82	Animal Advisory Committee

### **Professional Societies**

Alpha Rho Honorary-Medical College of Virginia  
American Burn Association  
New York Academy of Sciences  
American Society for Bone and Mineral Research  
American Society for Biological Chemistry  
American Association for the Advancement of Science  
Orthopaedic Research Society  
American Chemical Society  
American Association for Dental Research  
American Society for Cell Biology  
Biomedical Engineering Society  
Tissue Engineering Society  
North Carolina Tissue Engineering Society (NCTERM, Board member)  
International Symposium for Ligaments and Tendons (Board member)  
Society for Biophysical Regulation in Biology and Medicine (Board member)

### **Consultant**

1. **Aircast Inc**, 2004
2. **Roche Biosciences**, John Caulfield M.D.; Pharma Division, Musculoskeletal/Auto-Immune Unit, Palo Alto, CA
  - Research on metalloproteinase inhibitors
3. **B.F. Goodrich**, Dr. Ralph Ewall, Dr. Eugene Gilbert, Mr. Joe McDaniel, Brecksville, OH
  - Consultant on wound dressings
4. **Marion, Merrill, Dow Inc.**, Dr. Robert Henderson, Mr. Mike Cutrera, Dr. Carlos Blanco, Mr. John Yount, Overland Park, MO
  - Consultant on wound healing concepts and products
5. **Dupont de Nemours**, Mr. Allan Goldberg, Dr. Lloyd Snyder; Lloyd Snyder, Inc., Wilmington, DE
  - Testing chromatography columns
6. **Cerex Research**, Research Triangle Park, NC
  - Development of health care products using Cerex
7. **Monsanto Textiles Co.**, Mr. William Blackburn, Director
8. **American Convertors**, Evanston, IL 1980-1983, with Dr. John Bornhoeft
  - Development of a new burn wound dressing

# ALBERT JOSEPH BANES

## CURRICULUM VITAE

### **Editorial Activity**

1. Reviewer for *Calcified Tissue Research*
2. Reviewer for *Journal of Chromatography*
3. Reviewer for *American Journal of Pathology*
4. Reviewer for *Journal of Orthopaedics Research*
5. Special Reviewer for the Veteran's Administration's grant review
6. Special Reviewer for *American Journal of Cellular Physiology*
7. Editorial Board, *J Burn Research and Rehabilitation*, 1988-present
8. Editorial Board, *J Bone and Joint Surgery*, 1995-present
9. Special Reviewer for the *Journal of Hypertension* 1996
10. Special Reviewer for *Journal of Investigative Research*
11. Special Reviewer for *Journal of Biomechanics*
12. Member, Editorial Board, *Calcified Tissue International*
13. Reviewer for *American Journal Physiology*
14. Reviewer for *Science*
15. Reviewer for *Nature*
16. Reviewer for *Journal of Applied Physiology*
17. Reviewer for *International Society of Biorheology*
18. Reviewer for *Journal of Orthopaedic Surgery*
19. Reviewer for *Journal of Tissue Engineering*
20. Reviewer for *Journal of Cell Physiology*
21. Reviewer for *Journal of Arthritis and Rheumatism*
22. Reviewr for *Annals of Biomedical Engineering*

### **Study Section Service**

1. 2011 March, NIH Study Section, Abdelouahab Aitouche, Ph.D SRA
2. Canadian Research Group, Arthritis Research Campaign Grant
3. 2009 June, NIH BERT I
4. 2009 March, NIH SBIR Study Section, Richard Bartlett SRA
5. 2008 November, NIH SBIR Study Section, Richard Bartlett SRA
6. Engineering and Physical Science Research Council, Peer Reviewer, 2006-2009.
7. Science Advisory Board to the Center for Research on Adaptive Nanostructures and Nanodevices, 2005.
8. NIAMS Special Emphasis Panel, Member. 2003/10 Council ZAR1 AAA-G 04 P, 07/02/2003, Aftab Ansari, SRA. November, 2003.
9. 2003 November, Chair, Program Project Grant Review, NIAMS, Susan Nesbitt SRA.
10. 2003 June Program Project Grant Review, NIAMS
11. 2003 May, NIH Special Study Section, phone review, Richard Bartlett SRA.
12. 2003-March, NIDR, Oral Biology Study Section, full, Peter Zelizoofsky, SRA
13. NIAMS Special Study Section Program Project review (Lotz UCSD, Scripps Inst.) 2001.
14. MSK Special Study Section, Program Project Grant Review, 1999.
15. Oral Biology and Medicine, Ad Hoc member 1998.
16. MSK Special Study Section, Chair, Program Project Grant Review, 1998.
17. MSK Special Study Section, Chair, Program Project Grant Review, 1997.
18. MSK Special Study Section, Program Project Grant Review, 1996.
19. MSK Special Study Section, Program Project Grant Review, 1995.
20. MSK Special Study Section, Program Project Grant Review, 1994.
21. Oral Biology and Medicine, ad hoc, 1996; 1997; 1998.
22. Orthopaedics Study Section NIH 1990-1994.
23. Ad Hoc reviewer for the Orthopaedics Study Section NIH, 1990-1

**ALBERT JOSEPH BANES**  
*CURRICULUM VITAE*