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EDUCATION:

Sc.D., June 1974, Department of Electrical Engineering and Computer Science,
Massachusetts Institute of Technology

S.M., S.B., January 1971, Department of Electrical Engineering,
Massachusetts Institute of Technology

PROFESSIONAL EXPERIENCE:

- 1974-1977 **Assistant Professor**, Department of Electrical Engineering & Computer Science, Massachusetts Institute of Technology
- 1975-1977 Esther and Harold E. Edgerton Assistant Professor of Electrical and Bioengineering, Massachusetts Institute of Technology (Endowed)
- 1976-1977 Visiting Lecturer and Research Associate, Department of Orthopaedic Surgery, Harvard Medical School and Children's Hospital, Boston, MA
- 1977-1984 **Associate Professor** of Electrical and Bioengineering, Department of Electrical Engineering & Computer Science, MIT
- 1977 Visiting Associate Professor, Biomechanics Laboratory, Department of Mechanical Engineering, Rensselaer Polytechnic Institute (summer)
- 1979-1984 Joint Appointment with Harvard-MIT Division of Health Science and Technology as Associate Professor of Electrical and Bioengineering
- 1980-1987 Science Advisory Panel of New York State Department of Health: 5-year Research Program on Health Effects of High Voltage Transmission Lines
- 1981-1986 Scientific Program Committee of the Bioelectrical Repair & Growth Society; Chairman of Program Committee in 1984; Scientific Council 1984-6
- 1982-1992 **Editorial Board:** Associate Editor, Journal of Orthopaedic Research

1984-present **Full Professor** of Electrical and Bioengineering, Department of Electrical Engineering and Computer Science, MIT, and Harvard-MIT Division of Health Sciences and Technology (Joint)

1985,'96,'97 Study Sections, NIH, NIAMS (also on Special Study Sections)

1986-1987 **President of the Bioelectrical Repair and Growth Society** (now: Society for Physical Regulation in Biology and Medicine)

1987-1992 Biomedical Engineer, Department of Biomedical Engineering, Massachusetts General Hospital

1988 Visiting Professor of Biochemistry and Orthopaedics, Rush Presbyterian St. Luke's Medical Center, Rush University, Chicago

1988-2003 Science Advisory Board for NIH SCOR Grant on Osteoarthritis: Biochemistry Dep't., Rush University Medical School, Chicago

1990 **Chairman, Gordon Research Conference: Musculoskeletal Biology & Bioengineering**

1992 **Joint Appointment: Professor of Mechanical Engineering,** Department of Mechanical Engineering, MIT

1992-1995 Member of **Biochemistry Study Section**, Arthritis Foundation

1995-1998 Associate Director, Center for Biomedical Engineering, MIT

1992-2001 **Editorial Board:** Journal of Polymer Gels and Networks

1995-2002 **Editorial Board:** Archives Biochemistry Biophysics

1995-2000 External Advisory Board: UCSD Dep't. Bioengineering

1995-2002 External Advisory Board: Cleveland Clinic Foundation Lerner Research Institute

1996-2010 Chairman, External Advisory Board: Cleveland Clinic Lerner Research Institute Dep't. of Biomedical Engineering

1996 Invited Visiting Professor, Mayo Clinic, Feb 1996

1996-1997 Gastprofessor of Biomechanik, Univ. Bern, Switzerland, Oct'96-Jan'97

1998-2008 **Dual Appointment: MIT EECS Dept & Biological Engineering Dept**

2008-present Primary App't in Biol Eng, MIT; with joint appointments in EECS and MecheE

1998-present **Director, Center for Biomedical Engineering, MIT**

1998-2000 **President: International Cartilage Repair Society**

2001-2006 Science Advisory Board, ISTO Technologies (Cartilage Tissue Engineering)

2002-2006 Science Advisory Board, Smith and Nephew (Endoscopy), UK

- 2003-2010 **Graduate Officer and Chair, Graduate Program** of Biological Engineering Dept, MIT
- 2003-2007 Science Advisory Board for NIH SCOR Grant on Osteoarthritis: Orthopaedics Department, University of Iowa Medical School, Chicago
- 2004-2005 **Program Chair**, Orthopaedic Research Society; **President Elect**: 2006-7
- 2005-2008 External Advisory Board, Cleveland Clinic Musculoskeletal Core Center Grant
- 2005-2009 External Advisory Board, Cleveland Clinic – Case Western University: Clinical Tissue Engineering Center
- 2005-2008 **Editorial Board**, Arthritis and Rheumatism
- 2007-2008 **President Orthopaedic Research Society**
- 2008-present Primary App't in Biological Engineering Dept with joint appointments in EECS and ME
- 2008-present **Editorial Board**, Osteoarthritis and Cartilage
- 2009-2011 Science Advisory Board on Osteoarthritis, Biogen Idec
- 2009-present Advisory Board to Scripps Research Institute Program Project Grant on Aging and Osteoarthritis
- 2010-Spring Visiting Professor Lund University Depts Orthopaedics, Rheumatology, Clinical Immunol.
- 2010-present Chair, Advisory Board to Arthritis Research UK Biomechanics and Bioengineering Centre, Cardiff, Wales, UK
- 2011-2012 Institute for Advanced Studies Professorship-at-Large Fellowship, University of Western Australia, Perth, Australia
- 2013-present **Editorial Board**: Biophysical Journal
- 2015-present Member of National/International Advisory Board of the Cologne Center for Musculoskeletal Biomechanics (CCMB), Cologne, Germany

RESEARCH INTERESTS:

Osteoarthritis and Joint Injury on Earth and in Space: in vitro models of injury and degradation of cartilage and other joint tissues; diagnostics, therapeutics, and drug discovery; Cartilage tissue engineering and regeneration: functionalized self-assembling peptide hydrogel scaffolds encapsulating bone marrow stem cells; Molecular NanoMechanics: AFM-based molecular mechanical properties of matrix proteins and proteoglycans; Mechanobiology: mechanical regulation of gene expression and cellular synthesis, assembly, and degradation of extracellular matrix; Cell and tissue biomechanics: Influence of chemical and electrical stresses on connective tissue metabolism, growth, and pathology; Electromechanical and physicochemical properties of biological tissues and polyelectrolyte-based scaffold biomaterials; Electrically controlled hydrogel membrane permeability for drug delivery and separation processes; Fundamental study and modeling of electrical, mechanical and chemical energy conversion in natural and synthetic membranes, hydrogels, and biological tissues.

HONORS and AWARDS:

- 1973 Goodwin Medal, MIT, for “Conspicuously Effective Teaching While a Graduate Student and Member of the Academic Staff”
- 1975-1977 Esther and Harold E. Edgerton Endowed Assistant Professorship (two-year), Department of Electrical Engineering and Computer Science, MIT
- 1977 C. Holmes MacDonald Distinguished Young Electrical Engineering Teacher Award, Honorable Mention, 1979 (awarded by the Eta Kappa Nu Association, Nation-wide Electrical Engineering Honor Society)
- 1979 Best Paper Award, 7th Northeast Bioengineering Conference: “Proton Diffusion-Reaction in a Protein Polyelectrolyte,” (with J. Nussbaum)
- 1979 Orthopaedic Science and Bioengineering Group: American Delegation to the People's Republic of China (summer)
- 1980 Best Paper Award, 8th Northeast Bioengineering Conference: “Electrically Modulated Membrane Permeability,” (co-authored with S. Eisenberg)
- 1985 Kappa Delta Award of Bioelectrical Repair & Growth Society for research on “Cartilage Electromechanics and Implications For Stimulation of Cellular Response”
- 1987 Best Student Paper Award, Bioelectromagnetics Society (to L MacGintie; AJ Grodzinsky, Preceptor)
- 1987 **Giovani Borelli Award** of the American Society of Biomechanics for “Outstanding Contributions on Cartilage and Soft Tissue Electromechanics”
- 1990 **Chairman, Gordon Research Conference** on Bioengineering and Orthopaedic Science
- 1993 Ann Doner Vaughan **Kappa Delta Award** of the American Academy of Orthopaedic Surgeons for Research on “Physical Regulation of Cartilage Matrix Metabolism”
- 1993 Distinguished Lecturer in Chemical Engineering, University of Toronto
- 1993 **Founding Fellow** of the American Institute of Medical and Biological Engineering (AIMBE), “For contributions to the understanding of the physical regulation, synthesis, assembly, and degradation of cartilage extracellular matrix”
- 1994 **NIH MERIT Award**, National Institute of Arthritis, Musculoskeletal and Skin Diseases for research on “Cartilage Metabolic Response to Loading”
- 1996 Best Paper Award of ASME Bioeng Div, J Biomechanical Eng. (w M. Buschmann)
- 1997 **Melville Medal of the ASME** for best original paper in all areas of Mechanical Engineering (w M. Buschmann)
- 1999 MIT Class of 1960 Innovation in Education Award (with L. Griffith and R. Kamm)
- 1998-2000 **President:** International Cartilage Repair Society

- 2001 Amer Chem Soc Best Poster Award to J. Seog (AJG Co-Supervisor)
- 2002 New Investigator Research Award, Orthopaedic Res. Soc. to M. Jin (AJG Supervisor)
- 2005 New Investigator Research Award, Orthop. Res. Soc. to J. Fitzgerald (AJG Supervisor)
- 2005 IEEE/ACM (MIT Chapter) Award for Best Undergrad Academic Advisor in EECS, MIT
- 2007 Honorary Fellow & Life Membership Award, International Cartilage Repair Society, ICRS
- 2007-2008 **President** Orthopaedic Research Society (ORS)
- 2008 **Honorary Doctorate** (Docteur honoris causa), University of Montreal, May, 2008
- 2011-2012 Institute for Advanced Studies Professorship-at-Large Fellowship, University of Western Australia, Perth.
- 2012 Sigma Kappa Tau Lectureship, City University of New York, for outstanding contributions to Biomedical Engineering Research and Education
- 2017 Orthopaedic Research Society (ORS) Life-Fellow
- 2018 Orthopaedic Research Society Outstanding Achievement in Mentoring Award
- 2019 Distinguished Investigator Award ORS/OREF (Orthopaedic Research and Education Foundation)

PROFESSIONAL SOCIETIES:

- American Institute of Medical and Biological Engineering (**AIMBE Founding Fellow**)
- American Society for Biochemistry and Molecular Biology (ASBMB)
- American Society for Matrix biology (ASMB)
- American Society of Biomechanics (ASB)
- Biophysical Society (**Editorial Board** of *Biophysical J*)
- Bioelectromagnetics Society (Board of Directors, 1989-91)
- Biomedical Engineering Society (Chairman, Constitution & Bylaws Committee 1984-1986)
- International Cartilage Repair Society (**President**, 1998-2000; Honorary Life Member)
- International Society for Matrix Biology (ISMB)
- Orthopaedic Research Society (**President** 2007-2008)
- Osteoarthritis Research Society International (OARSI) (**Editorial Board** *Osteoarth Cartilage*)
- Soc Physical Regulation in Biology & Medicine (formerly BRAGS, **President** 1986-7)

SUBJECTS TAUGHT During Career at MIT:

MIT BIOLOGICAL ENGINEERING DEPARTMENT

- 20.430 Fields, Forces and Flows in Biological Systems (Graduate, Co-Lecturer-in-Charge, **1998 - present**; also co-listed as 6.561, 10.539, 2.795, HST 544)
- 20.410 Molecular, Cellular, and Tissue Biomechanics (Graduate, Co-Lecturer-in-Charge, 1999-2009; also co-listed as 2.798, 10.537, 6.524)
- 20.310 Molecular, Cellular, and Tissue Biomechanics (Undergraduate, Co-Lecturer-in-Charge, 1997-1999; **2011-present**)

- 20.330 Fields, Forces and Flows in Biological Systems (Co-Lecturer-in-Charge, **Spring 2018**;
Undergraduate version of 20.430; chair of initial development)

MIT Department of ELECTRICAL ENGINEERING & COMPUTER SCIENCE

- 6.013 Electromagnetic Fields and Energy (Lecturer-in-charge, Spring '84, '86, '87, '91, '93, '97)
6.012 Electronic Devices and Circuits (Co-Lecturer-in-Charge 1974-1978)
6.014 Electrodynamics (Recitations)
6.601 Electromechanics (Lecturer-in-Charge)
6.003 Systems and Signals (Recitations)
6.071 Introduction to Electronics (Recitations)
6.021J Quantitative Physiology: Cells and Tissues (Undergraduate, Recitations)
6.024 Molecular, Cellular, and Tissue Biomechanics (Undergraduate, also 20.310, 2.797)
6.561 Fields, Forces and Flows in Biological Systems (Lecturer-in-charge in early format during: 1975-1997; in 1998, evolved with major modifications into 20.430, co-listed as 2.795, 10.539, HST544)
6.524 Molecular, Cellular, and Tissue Biomechanics (Graduate, 20.410, 310J, 2.797, 10.537)

MIT Department of MECHANICAL ENGINEERING (in addition to 2.795, 2.798 above)

- 2.907 Mechanics of Biological Polymers (PPST 1071) (Guest Lectures)
2.785J Mechanical Forces in Organ Development (HST523J) (Guest Lectures, 2008 - present)

MIT Department of CHEMICAL ENGINEERING Lectures in:

- 10.565 Separation Processes for Biochemical Products (1988-92)
10.444 Guest lectures in Frontiers in Therapeutics and Drug Delivery (**2011 – present**)

Harvard-MIT Div. of HEALTH SCIENCES & TECHNOLOGY Lectures in:

- HST-020 Musculoskeletal Pathophysiology (**2008-2015**)
HST-050 Physical Principles Applied to Physiology
HST-585 Biomedical Measurements
HST-572 Creation of Medical Technology

MIT COMMITTEE & EDUCATIONAL ASSIGNMENTS (Current and recent):

- (1) Biological Engineering Department: Member, Undergraduate Program Committee; MEng Committee
- (2) Co-Chair of Committee on Prehealth Advising (COPA, Institute Committee)
- (3) Biological Engineering Department Faculty Search Committee Co-Chair (2018-2019)
- (4) Teaching: Co-Lecturer-in-Charge for 20.430; 20.310
- (5) Textbook on Fields, Forces and Flows in Biological Systems: Garland Science, Publisher
- (6) Biological Engineering Department faculty mentor

REVIEWER FOR:

- IEEE Transactions on Biomedical Engineering
- Annals of Biomedical Engineering
- Biomechanics and Modeling in Mechanobiology
- Biomaterials
- Journal of Biomechanical Engineering
- Journal of Biomechanics
- Journal of Biomaterials Science
- Journal of Bioelectricity
- Journal of Electrostatics
- Journal of Royal Society Interface
- Medical Instrumentation
- Acta Biomaterialia
- ACS Biomaterials Science and Engineering
- AIChE Journal
- Archives Biochemistry Biophysics (*Editorial Board 1995-1998*)
- BioMacromolecules
- Biomed Central (Open Access)
- Biophysical Journal (*Editorial Board 2013 – present*)
- Biophysical Chemistry
- Biorheology
- Biotechnology and Bioengineering
- Journal of Controlled Release
- Journal of Electrochemical Society
- Journal of Membrane Science
- Journal of Polymer Gels and Networks (*Editorial Board 1992-2000*)
- Journal of Physical Chemistry
- Journal of Royal Society Interface
- Journal of Biological Chemistry (JBC)
- Journal of Bone and Joint Surgery
- Journal of Bone and Mineral Research
- Journal of Cellular Physiology
- Journal of Clinical Investigation
- Journal of Investigative Dermatology
- Journal of Orthopaedic Research (*Editorial Board 1982-1992*)
- Journal of Periodontal Research
- Macromolecules
- Matrix Biology
- Nature Reviews Rheumatology
- Philosophical Transactions of the Royal Society
- Proceedings National Academy of Science
- Cells Tissues and Organs
- Journal of Cell Science
- Annals of Rheumatic Diseases
- Arthritis and Rheumatism (*Editorial Board, 2005-2008*)
- Arthritis Research and Therapy
- BMC Musculoskeletal Disorders
- Calcified Tissue International
- Clinical Orthopaedics and Related Research (*Review Board 1993-1997*)

- Clinical Oral Implants Research
- Connective Tissue Research
- Inflammation Research
- Osteoarthritis and Cartilage (*Editorial Board 2008-present*)
- Scientific reports
 - National Institutes of Health: *Orthopaedic Study Section (NIH)* Special study secs.
 - National Sciences and Engineering Research Council of Canada
 - NIH (NIAMS) Skeletal Biology Research Study Section (Feb 2006)
 - NIH (NIDCR) Intrameural Program Review Panel
 - NIH (NICHD) Institute of Child Health & Human Development
 - National Science Foundation
 - American Society of Mechanical Engineers (ASME)
 - Arthritis Foundation *Biochemistry Study Section*
 - Arthritis Research Campaign (ARC), United Kingdom
 - Orthopaedic Research Society (ORS)
 - Osteoarthritis Research Society International (OARSI)
 - Whitaker Foundation
 - Canadian Arthritis Network
 - Wellcome Trust

CONSULTED FOR:

- Biomechanics Lab., RPI
- The Gillette Co.
- Teepak (Continental Can Co.)
- Valley Lab (Electrosurgery Division)
- Codman & Shurtleff, Inc.
- American Cyanamid, Inc.
- New York State Department of Health
- Burns and Levinson, Attorneys
- United States Department of Justice
- Analytix, Inc.
- Ethicon (Johnson and Johnson)
- American Medical Electronics
- Bard, Med Systems Division
- Olin Corp.
- Norwich Eaton Pharmaceuticals
- Monsanto
- Burke, Weiners, Moran, Hurley and Merrick, Attorneys
- Krent-Parffett, Associates
- Southeast Center for Electrical Engineering Education
- Dow Corning, Inc.
- U.S. Food and Drug Administration
- U.S. Department of Justice
- Merck
- BioSurface Technology, Inc. (became Genzyme Tissue Repair)
- Pfizer (St. Louis)
- Bayer

- Cleveland Clinic Foundation
- Cleveland Clinic Lerner Research Institute
- University of California, San Diego
- GlaxoSmithKline
- Tissue Engineering, Inc.
- ISTO Technologies
- Reconstructive Technologies, Inc.
- Pharmacia
- Smith and Nephew
- Hale and Dorr, LLP
- Centocor, J&J
- 3D-Matrix (Scientific Co-Founder and former Science Advisory Board Member)
- Biogen Idec
- Biomet
- Pfizer, Cambridge (North)
- Merrimack Pharmaceuticals
- Wellcome Trust, U.K.
- Engineering and Physical Sciences Research Council, U.K.
- Scripps Research Institute

PUBLICATIONS: BOOKS

1. **Grodzinsky, AJ, *Fields, Forces and Flows in Biological Systems***, Garland Science (Taylor & Francis), ISBN-13:9780815342120, 2011.
308-page-Textbook (AJG, single author) used for MIT courses including: *Fields, Forces and Flows in Biological Systems* (graduate: 20.430/6.561/2.795/10.539/HST544), and *Molecular, Cellular and Tissue Biomechanics* (graduate: 20.410, 2.798, 3.971/6.524/10.537; and undergraduate: 20.310, 2.797, 6.024).
2. **Smith, DW, Gardiner, BS, Zhang L, Grodzinsky, AJ, *Articular Cartilage Dynamics***, Springer, New York, 2018 (in press).
3. **Sandell, LJ and Grodzinsky, AJ, eds., *Tissue Engineering in Musculoskeletal Practice***, Amer Acad Orthop Surg, Pub., Rosemont, IL., 2004.

PUBLICATIONS: Refereed Journal Articles and Review Articles

1. Liebesny, PH, Mroszczyk KA, Zlotnick H, Hung HH, Frank EH, Kurz B, Frisbie DD, Grodzinsky AJ, Enzyme pre-treatment combined with locally delivered HB-IGF-1 stimulates integrative cartilage repair in an in vitro hydrogel/explant model, 2018 (submitted).
2. Sellon, JB, Azadi, M, Oftadeh, R, Nia, HT, Ghaffari, R, Grodzinsky, AJ, Freeman, DM, Nanoscale poroelasticity of the tectorial membrane determines hair bundle deflections, 2018 (in revision).
3. Seano, G, Nia, HT, Emblem, KE, Datta, M, Ren, J, Kloepper, J, Krishnan, S, Ghosh, M, Pinho, MC, Askoxylakis, V, Ferraro, GB, Riedemann, L, Gerstner, ER, Batchelor, TT, Wen, PY, Lin, NU, Grodzinsky, AJ, Fukumura, D, Huang, P, Baish, JW, Padera, TP, Munn, LL, Jain, RK, Neurological dysfunction caused by brain tumor-generated solid stress is reversed by lithium, *Nature Biomedical Engineering*, 2018 (in press).

4. Brett C. Geiger, BC, Wang, S, Padera, PF, Grodzinsky, AJ, Hammond, PT, Cartilage penetrating nanoparticles improve delivery and efficacy of growth factor in treatment of osteoarthritis, *Science Translational Medicine*, 2018 (in press).
5. Orozco, GA, Tanska, P, Florea, C, Grodzinsky, AJ, Korhonen, RK, A novel mechanobiological model can predict how physiologically relevant dynamic loading causes proteoglycan loss in mechanically injured articular cartilage, *Scientific Reports*, 2018, 8:15599 | DOI:10.1038/s41598-018-33759-3
6. Krishnan, Y, Rees, HA, Rossitto, CP, Kim, S-E, Hung, HK, Frank, EH, Olsen, BD, Liu, DR, Hammond, PT, Grodzinsky, AJ, Green fluorescent proteins engineered for cartilage-targeted drug delivery: insights for transport into highly charged avascular tissues, *Biomaterials*, 183:218-233, 2018.
7. Geiger, BC, Grodzinsky, AJ, Hammond, PT, Designing Drug Delivery Systems for Articular Joints, *Chemical Engineering Progress* 114:46-51, 2018.
8. Kodihalli, R, Ahrens, CC, Wang, Y, Ramseier, JY, Wishnok, JS, Griffith, LG, Grodzinsky, AJ, Tannenbaum, SR, Functional Proteomics of Matrix Metalloproteases in an In Vitro Model of Osteoarthritis, *J Biological Chemistry*, 293:11459-11469, 2018.
9. Krishnan, Y, Grodzinsky, AJ, Cartilage diseases, *Matrix Biology*, 71-72:51-69, 2018.
10. Connizzo, BK, Grodzinsky, AJ, Release of Pro-Inflammatory Cytokines from Muscle and Bone Causes Tenocyte Death in a Novel Rotator Cuff In Vitro Explant Culture Model, *Connective Tissue Research*, 59:423-436, 2018.
11. Oftadeh, R, Connizzo, BK, Nia, HT, Ortiz, C, Grodzinsky, AJ, Biological connective tissues exhibit viscoelastic and poroelastic behavior at different frequency regimes: application to tendon and skin biophysics, *Acta Biomaterialia*, 70:249-259, 2018.
12. Connizzo, B, Grodzinsky, AJ, Multiscale Poroviscoelastic Compressive Properties of Mouse Supraspinatus Tendons Are Altered in Young and Aged Mice, *J Biomechanical Engineering*, 140: 051002-1-8, 2018.
13. Behrendt P; Feldheim M; Preusse-Prange A; Weitkamp JT, Haake M; Rolauffs B; Fay J; Seekamp A; Grodzinsky AJ; Kurz B, Chondrogenic potential of IL-10 in mechanically injured cartilage and cellularized collagen ACI grafts, *Osteoarthritis Cartilage*, 26:264-275, 2018.
14. Rothdiener, M, Uynuk-Ool, T, Südkamp, N, Aurich, M, Grodzinsky, AJ, Kurz, B, Rolauffs, B, Human osteoarthritic (OA)-chondrons outnumber and outperform patient- and joint-matched OA-chondrocytes in hydrogel culture – future application in autologous cell-based OA cartilage repair, *J Tissue Engineering and Regenerative Medicine*, J Tissue Eng Regen Med. 2018;12:e1206–e1220.
15. Kim, C-W, Hosseini, A, Lin, L, Wang, Y, Torriani, M, Grodzinsky, AJ, Li, G, Quantitative analysis of T2 relaxation times of the Patellofemoral Joint Cartilage 3 years after ACL reconstruction, *Journal of Orthopaedic Translation*, 12:85-92. 2018.
16. Bajpayee, AG, De la Vega, RE, Scheu, M, Varady, NH, Yannatos, IA, Brown, LA, Krishnan, Y, Fitzsimons, TJ, Bhattacharya, P, Frank, EH, Grodzinsky, AJ, Porter, RM, Sustained intra-cartilage delivery of low dose dexamethasone using a cationic carrier for treatment of post traumatic osteoarthritis, *European Cells and Materials J*, 34:341-364, 2017.
17. Hu, J, Jafari, S, Han, Y, Grodzinsky, AJ, Cai, S, Guo, M, Size and speed dependent resistance in living mammalian cytoplasm, *PNAS*, 114:9529-9534, 2017.

18. Han, B, Nia, HT, Wang, C, Chandrasekaran, P, Li, Q, Chery, DR, Li, H, Grodzinsky, AJ, Han, L, AFM-nanomechanical test: an interdisciplinary tool that links the understanding of cartilage biomechanics, osteoarthritis degeneration and tissue engineering, *ACS Biomaterials Science & Engineering*, 3:2033-2049, 2017.
19. Bricca, A, Juhl, CB, Grodzinsky AJ, Roos, EM, Impact of daily exercise dose on knee joint cartilage – a systematic review and meta-analysis of randomized control trials in healthy animals, *Osteoarthritis Cartilage*, 25:1223-1237, 2017.
20. Wang, Y, Li, Y, Khabut, A, Chubinskaya, S, Grodzinsky, AJ, Önerfjord, P, Quantitative proteomics analysis of cartilage response to mechanical injury and cytokine treatment, *Matrix Biology*, 63:11-22, 2017.
21. Per Swärd, P, Wang, Y, Hansson, M, Lohmander, LS, Grodzinsky, AJ, Struglics, A, Mechanical injury to bovine cartilage co-cultured with joint capsule increases aggrecanase and matrix metalloproteinase activity, *Arthritis Research and Therapy*, 19:157, 2017 DOI 10.1186/s13075-017-1318-9.
22. Hanifi, A, Palukuru, U, McGoverin, C, Shockley, M, Frank, EH, Grodzinsky, AJ, Spencer, R, Pleshko, N, Near Infrared Spectroscopic Assessment of Developing Engineered Tissues: correlation with mechanical and compositional properties, *Analyst*, 142:1320-1332, 2017.
23. Connizzo, B, Grodzinsky, AJ, Tendon exhibits complex poroelastic behavior at the nanoscale as revealed by high-frequency AFM-based rheology, *J Biomechanics*, 54:11-18, 2017.
24. Grodzinsky, AJ, Wang, Y, Kakar, S, Vrahas, MS, Evans, CH, Intra-articular dexamethasone to inhibit the development of post-traumatic osteoarthritis, *J Orthop Res*, 35:406-411, 2017.
25. Bajpayee, AG, Grodzinsky, AJ, Cartilage-targeted drug delivery: can electrostatic interactions help? *Nature Reviews Rheumatology*, 13:183-193, 2017.
26. Hajjarian, Z, Nia, HT, Ahn, S, Grodzinsky, AJ, Jain, RK, Nadkarni, SK, Laser speckle rheology for evaluating the viscoelastic properties of hydrogel scaffolds, *Scientific Reports*, 2016 1:6:37949. doi: 10.1038/srep37949.
27. Rahbari NN, Kedrin D, Incio J, Liu H, Ho WT, Nia HT, Edrich CM, Jung K, Daubriac J, Chen I, Heishi, T, Martin JD, Huang Y, Maimon N, Reissfelder C, Weitz J, Boucher Y, Clark JW, Grodzinsky AJ, Duda DG, Jain RK, Fukumura D. Anti-VEGF therapy enhances mechanical barriers to therapy in colorectal cancer liver metastases by increasing hyaluronan deposition. *Science Translational Medicine*, 8:360ra135, 2016.
28. Nia, HT, Liu, H, Seano, G, Datta, M, Jones, D, Rahbari, N, Incio, J, Chauhan, VP, Jung, K, Martin, JD, Askoxylakis, V, Padra, T, Fukumura, D, Boucher, Y, Grodzinsky, AJ, Baish, JW, Munn, L, Jain, RK, Solid stress and elastic energy: new measures of tumor mechanopathology, *Nature Biomedical Engineering*, 2017 (online, in press doi:10.1038/s41551-016-0004).
29. Kar, S, Smith, DW, Gardiner, BS, Grodzinsky, AJ, Systems based study of the therapeutic potential of small charged molecules for the inhibition of IL-1 mediated cartilage degradation, *PLoS ONE*, 11(12): e0168047. doi:10.1371/journal.pone.0168047, 2016.
30. Shah, NJ, Geiger, BC, Quadir, MA, Krishnan, Y, Hyder, MN, Grodzinsky, AJ, Hammond, PT, Synthetic nanoscale electrostatic particles as growth-factor carriers for cartilage repair, *Bioengineering and Translational Medicine*, 1:347-356, 2016.

31. Behrendt P; Preusse-Prange A; Klueter T; Rolauffs B; Grodzinsky AJ; Lippross S; Kurz B, IL-10 reduces apoptosis and extracellular matrix degradation after injurious compression of mature articular cartilage, *Osteoarthritis Cartilage*, 24:1981-1988, 2016.
32. Liebesny, PH, Byun S, Hung HH, Pancoast JR, Mroszczyk KA, Young, WT, Lee, RT, Frisbie DD, Kisiday JD, Grodzinsky AJ, Growth factor-mediated migration of trabecular bone-derived progenitor cells for accelerated scaffold recruitment to regenerate cartilage, *Tissue Engineering A*, 22:917-927, 2016.
33. Felka, T, Rothdiener, M, Bast, S, Uynuk-Ool, T, Herrmann, S, Fischer, A, Zouhair, S, Ochs, BJ, De Zwart, P, Stoeckle, U, Aicher, WK, Hart, ML, Shiozawa, T, Grodzinsky, AJ, Schenke-Layland, K, Handl, L, Schmidt, V, Venkatesan, JK, Cucchiari, M, Madry, H, Kurz, B, Rolauffs, B, Cell shape plays a major role in the cellular spatial organization of articular cartilage, *Osteoarthritis Cartilage*, 24: 1200-1209, 2016.
34. Azadi, M, Nia, HT, Gauci, SJ, Ortiz, O, Fosang, A, Grodzinsky, AJ, Wide bandwidth nanomechanical assessment of murine cartilage reveals protection of aggrecan knock-in mice from joint-overuse, *J Biomechanics*, 49:1634-1640, 2016.
35. Kar, S, Smith, DW, Gardiner, BS, Li, Y, Wang, Y, Grodzinsky, AJ, Modeling IL-1 α induced degradation of cartilage tissue, *Archiv Biochem Biophys*, 594:37-53, 2016.
36. Smith, DW, Gardiner, B, Davidson, J, Grodzinsky, AJ, Computational model for the analysis of cartilage and cartilage tissue constructs, *J Tissue Eng Regenerative Med*, 10:334-347, 2016.
37. Varady, N, Grodzinsky, AJ, Osteoarthritis year in review: mechanics, *Osteoarthritis Cartilage*, 24:27-35, 2016.
38. Bajpayee, AG, Quadir, MA, Hammond, PT, Grodzinsky, AJ, Targeted intra-tissue sustained delivery of dexamethasone using avidin nano-carriers for treating cartilage degeneration, *Osteoarthritis and Cartilage*, 24:71-81, 2016.
39. Gardiner, BS, Woodhouse, FG, Besier, TF, Grodzinsky, AJ, Lloyd, DJ, Zhang, L, Smith, DW, Predicting knee osteoarthritis, *Annals of Biomedical Engineering*, 44:222-233, 2016.
40. Scarcelli, G, Polacheck, W, Nia HT, Kripa Patel, P, Grodzinsky, AJ, Kamm, RD, Yun, SH, Noncontact mapping of intracellular elastic modulus by Brillouin confocal microscopy, *Nature Methods*, 12:1132-1132, 2015.
41. Bae, JH, Hosseini, A, Wang, Y, Jasty, N, Torriani, M, Gill, TJ, Grodzinsky, AJ, Li, G, Articular cartilage of the knee 3 years after ACL reconstruction: A quantitative T2 relaxometry analysis, *Acta Orthopaedica*, 86:605-610, 2015.
42. Li, Q, Doyran, B, Gamer, LW, Lu, XL, Qin, L, Ortiz, C, Grodzinsky, AJ, Rosen, V, Han, L, Biomechanical Properties of Murine Meniscus Surfaces via AFM-based Nanoindentation, *J Biomechanics*, 48:1364-1370, 2015.
43. Bajpayee, AG, Scheu, M, Grodzinsky, AJ, Porter, RM, A rabbit model demonstrates the influence of cartilage thickness on intra-articular drug delivery and retention within cartilage, *J Orthopaedic Res*, 33:660-667, 2015.

44. Wang, Y, Grodzinsky AJ, The response of cartilage to injury, in *Post-Traumatic Arthritis: Pathogenesis, Diagnosis, and Management*, S. Olson, F. Guilak, eds, Springer, New York, 2015, pp 121-133.
45. Nia, HT, Han, L, Bozchalooi, IS, Roughley, P, Youcef-Toumi, K, Grodzinsky, AJ, Ortiz, C, Aggrecan nano-scale solid-fluid interactions are a primary determinant of cartilage dynamic mechanical properties, *ACS Nano*, 9:2614-2625, 2015.
46. Lee, BB, Han, L, Frank, EH, Grodzinsky, AJ, Ortiz, C, Dynamic Nanomechanics of Individual Bone Marrow Stromal Cells and Cell-Matrix Composites during Chondrogenic Differentiation, *J Biomechanics*, 48:171-175, 2015.
47. Li, Y, Wang, Y, Chubinskaya, S, Schoeberl, B, Kopesky, P, Grodzinsky, AJ, Effects of insulin-like growth factor-1 and dexamethasone on cytokine-challenged cartilage: relevance to post traumatic osteoarthritis, *Osteoarthritis Cartilage*, 23:266-274, 2015.
48. Nia, HT, Gauci, S, Azadi, M, Hung, HH, Frank, EH, Fosang, A, Ortiz, C, Grodzinsky, AJ, High-bandwidth AFM-based rheology is a sensitive indicator of early cartilage aggrecan degradation relevant to mouse models of Osteoarthritis, *J Biomechanics*, 48:162-165, 2015.
49. Zhang, L, Miramini, S, Smith, D, Gardiner, B, Grodzinsky, AJ, Time evolution of deformation in human cartilage under cyclic loading, *Annals Biomed Eng*, 43:1166-1177, 2015.
50. Florine, EM, Miller, RE, Liebesny, P, Mroszczyk, K, Lee, RT, Patwari, P, Grodzinsky AJ, Delivering HB-IGF-1 with Self-Assembling Peptide Hydrogels, *Tissue Engineering Part A*, 21:637-646, 2015.
51. Han, L and Grodzinsky, AJ, Advances and applications of nanomechanical tools to cartilage tissue engineering, in *A Tissue Regeneration Approach to Bone and cartilage repair*, H Zreiqat and V Rosen, eds, Springer, New York, 2015, pp. 191-218.
52. Nia, HT, Ortiz, C, Grodzinsky AJ, Aggrecan: Approaches to study biophysical and biomechanical properties, in *Methods in Molecular Biology*, K Balagurunathan, H Nakato, U Desai, eds, Springer, New York, vol. 1229:221-237, 2015.
53. Batista, MA, Nia, HT, Önnarfjord, P, Cox, K, Rosen, V, Ortiz, C, Grodzinsky, AJ, Heinegård, D, Han, L, Nanomechanical phenotype of chondroadherin-null murine articular cartilage, *Matrix Biology*, 38:84-90, 2014.
54. Miller, RE, Grodzinsky, AJ, Barrett, MF, Hung, HH, Frank, EH, Werpy, N, CW McIlwraith, CW, Frisbie, DD, Effects of the combination of microfracture and self-assembling peptide filling on the repair of a clinically-relevant trochlear defect in an equine model, *J Bone Joint Surg*, 96:1601-1609, 2014.
55. Ahrman, Em Lorenzo, P, Holmgren, K, Grodzinsky, AJ, Dahlberg, L, Saxne, T, Heinegard, D, Önnarfjord, P, Novel COMP neoepitopes identified from patients with joint diseases by immune-affinity chromatography and mass spectrometry, *J Biological Chemistry*, 289:20908-20916, 2014.
56. Bajpayee, AG, Scheu, M, Grodzinsky, AJ, Porter, RM, Electrostatic Interactions Enable Rapid Penetration, Enhanced Uptake and Retention of Intra-articular Injected Avidin in Rat Knee Joints, *J Orthopaedic Res*, 32:1044-1051, 2014.
57. Rojas, FP, Batista, M, Lindburg, AC, Dean, D, Grodzinsky, AJ, Ortiz, C, Han, L, Molecular adhesion between cartilage extracellular matrix macromolecules, *Biomacromolecules*, 15:772-780, 2014.

58. Irrechukwu, O, Van Thaer, S, Frank, EH, Lin, PC, Reiter, D, Grodzinsky, AJ, and Spencer, R, Prediction of Cartilage Compressive Modulus using Multiexponential Analysis of T₂ Relaxation Data and Support Vector Regression, *NMR Biomedicine*, 27:468-477, 2014.
59. Kopesky, PW, Byun, S, Vanderploeg, EJ, Kisiday, JD, Frisbie, DD, Grodzinsky, AJ, Sustained delivery of bioactive TFG- β 1 from self-assembling peptide hydrogels induces chondrogenesis of encapsulated bone marrow stromal cells, *J Biomed Mater Res-A*, 102A:1275-1285, 2014.
60. Ogawa, H, Kozhemyakina, E, Hung, HH, Grodzinsky, AJ, Lassar, AB, Mechanical motion promotes expression of Prg4 in articular cartilage via multiple CREB-dependent, fluid flow shear stress-induced signaling pathways, *Genes and Development*, 28:127-139, 2014.
61. Wagner, T, Uri Eden, U, Rushmore, J, Russo, CJ, Dipietro, L, Fregni, F, Simon, S, Rotman, S, Pitskel, NB, Ramos-Estebanez, C, Pascual-Leone, A, Grodzinsky, AJ, Zahn, M, Valero-Cabre, A, Impact of brain tissue filtering on neurostimulation fields: a modeling study, *NeuroImage*, 85:1048-1057, 2014.
62. Bajpayee, AG, Wong, CR, Bwendi, MG, Frank, EH, Grodzinsky, AJ, Avidin as a model for charge driven transport into cartilage and drug delivery for treating early stage post-traumatic osteoarthritis, *Biomaterials*, 35:538-549, 2014.
63. Li, Y, Frank, EH, Wang, Y, Chubinskaya, S, Huang, HK, Grodzinsky, AJ, Moderate dynamic compression inhibits pro-catabolic response of cartilage to mechanical injury, TNF α and Il-6, but accentuates degradation above a strain threshold, *Osteoarthritis and Cartilage*, 21:1933-1941, 2013.
64. Byun, S, Sinskey, YL, Lu, YCS, Frank, EH, Grodzinsky, AJ, Transport and binding of tumor-necrosis factor- α in articular cartilage depend on protein quaternary structure, *Archiv Biochem Biophys*, 540:1-8, 2013.
65. Imgenberg, J, Rolauffs, B, Grodzinsky AJ, Schunke, M, Kurz, B, Estrogen reduces mechanical injury-related cell death and proteoglycan degradation in mature articular cartilage tissue independent of the presence of the superficial zone tissue, *Osteoarthritis Cartilage*, 21: 1738-1745, 2013.
66. Rolauffs, B, Kurz, B, Aurich, M, Felka, T, Stoeckle, U, Badke, A, Frank, E, Aicher, WK, Grodzinsky, AJ, Stress-vs-time signals allow the prediction of structurally catastrophic events during fracturing of immature cartilage and predetermine the biomechanical, biochemical and structural impairment, *J Structural Biology*, 183:501-511, 2013.
67. Zhang, L, Smith, DW, Gardiner, BS, Grodzinsky, AJ, Modeling the Insulin-Like Growth Factor System in Articular Cartilage, *PLoS*, 8(6):1-22, 2013 (e66870).
68. Matheney, T, Sandell, L, Foucher, K, Lamontagne, M, Grodzinsky, AJ, Peters, C, Motion analysis, cartilage mechanics, and biology in femoroacetabular impingement: current understanding and areas of future research, *J Amer Acad Orthop Surgeons*, 21:S27-S32, 2013.
69. Sankar, W, Sandell, L, Kim, Y-J, Arden, N, Grodzinsky, AJ, Scanzello, C, Siebenrock, K, Staging of hip osteoarthritis for clinical trials on femoroacetabular impingement, *J Amer Acad Orthop Surgeons*, 21:S33-S38, 2013.
70. Nia, HT, Bozchalooi, IS, Li, Y, Han, L, Hung, H-H, Frank, EH, Yousef-Toumi, K, Ortiz, C, Grodzinsky, AJ, High bandwidth AFM-based rheology reveals that cartilage is most sensitive to high loading rates at early stages of impairment, *Biophysical J*, 104:1529-1537, 2013.

71. Lee, CM, Kisiday, JD, McIlwraith, W, Grodzinsky, AJ, Frisbie, DD, Synoviocytes protect cartilage from the effects of injury in vitro, *BMC Musculoskeletal Disorders*, 14:54, 1-14, 2013 (doi:10.1186/1471-2474-14-54).
72. Byun, S, Sinskey, YL, Lu, YCS, Ort, T, Kavalkovich, K, Sivakumar, P, Hunziker, EB, Frank, EH, Grodzinsky, AJ, Mechanical injury and inflammatory cytokines alter transport of anti-IL-6 antigen binding fragments into cartilage, *Arch Biochem Biophys*, 532:15-22, 2013.
73. Lee, H-Y, Han, L, Roughley, P, Grodzinsky, AJ, Ortiz, C, Age-related nanostructural and nanomechanical changes of individual human cartilage aggrecan monomers and their glycosaminoglycan side chains, *J Structural Biol*, 181:264-273, 2013.
74. Hufeland, M, Schünke, M, Grodzinsky, AJ, Kurz, B, Response of mature meniscal tissue to a single injurious compression and interleukin-1 in vitro, *Osteoarthritis and Cartilage*, 21:209-216, 2013.
75. Lee, CM, Kisiday, JD, McIlwraith, Grodzinsky, AJ, Frisbie, DD, Development of an in vitro model of injury induced osteoarthritis in adult equine cartilage using single impact compressive overload, *Amer J Vet Res*, 74:40-47, 2013.
76. Florine, EM, Miller, RE, Porter, RM, Evans, CH, Kurz, B, Grodzinsky, AJ, Effects of dexamethasone on mesenchymal stromal cell chondrogenesis and ADAMTS activity: comparison of agarose and self-assembling peptide scaffolds, *Cartilage*, 4:63-74, 2013.
77. Ahn, AC, Gow, B, Martinsen, OG, Zhao, M, Grodzinsky, AJ, Baikie, I, Applying the Kelvin probe to biological tissues: theoretical and computational analyses, *Physical Review E*, 85:061901-1-13, 2012.
78. Florine, EM, Grodzinsky, AJ, The role of chondrogenic factors in differentiation of bone marrow stromal cells to the cartilage lineage, in *Stem Cells And Cancer Stem Cells: Therapeutic Applications in Disease and Injury*, Volume 7, M.A. Hayat, ed., Springer Verlag, 2012, pp. 171-178.
79. Gardiner, BS, Zhang, L, Smith, DW, Pivonka, P, Grodzinsky AJ, A mathematical model for targeting chemicals to tissues by exploiting complex degradation, *Biology Direct*, 6:46, 1-16, 2011.
80. Nia, HK, Han, L, Ortiz, C, Grodzinsky, AJ, Poroelasticity of cartilage at the nanoscale, *Biophys J*, 101:2304-2313, 2011.
81. Lu, YCS, Evans, C, Grodzinsky, AJ, Effects of short-term glucocorticoid treatment on changes in cartilage matrix degradation and chondrocyte gene expression induced by mechanical injury and inflammatory cytokines, *Arthritis Research Therapy*, 13:1-15, R142, 2011.
82. Han, L, Grodzinsky AJ, Ortiz, C, Nanomechanics of cartilage extracellular matrix, *Ann Review Materials Res*, 41:133-168, 2011.
83. Rolauffs, B, Rothdiener, M, Bahrs, C, Badke, A, Weise, K, Kuettner, KE, Baddeley, A, Kurz, B, Aurich, M, Grodzinsky, AJ, Aicher, WK, Onset of pre-clinical osteoarthritis: the angular spatial organization permits early diagnosis, *Arthritis Rheumatism*, 63:1637-1647, 2011.
84. Miller, RE, Kopesky, PW, Grodzinsky, AJ, Growth factor delivery via self-assembling peptide scaffolds, *Clinical Orthop Rel Res*, 469:2716-2724, 2011.
85. Han, L, Frank, EH, Greene, JJ, Lee, H-Y, Hung, HK, Grodzinsky, AJ, Ortiz, C, Time-Dependent Nanomechanics of Cartilage, *Biophysical J*, 100:1846-1854, 2011.

86. Kopesky, PW, Vanderploeg, EJ, Kisiday, JD, Frisbie, DD, Sandy, JS, Grodzinsky, AJ, Controlled delivery of TGF- β 1 by self-assembling peptide hydrogels induces chondrogenesis of bone marrow stromal cells via Smad2/3 signaling, *Tissue Engineering A*, 17:83-92, 2011.
87. Rolauffs, B, Badke, A, Weise, K, Grodzinsky, AJ, Aicher, WK, Stem cells and cartilage repair, in *Stem Cell Based Tissue Repair*, Goradetsky R and Schäfer R, Eds, Royal Soc Chemistry Publishing, London, DOI:10.1039/9781849732246-00248, pp. 248-272, 2010.
88. Miller, RE, Grodzinsky AJ, Vanderploeg, EJ, Lee C, Ferris, DJ, Barrett, MF, Kisiday, JD, Frisbie, DD, Repair of full-thickness articular cartilage defect using self-assembling peptide, chondrogenic factors, and bone marrow derived stromal cells, *Osteoarthritis Cartilage*, 18:1608-1619, 2010.
89. Miller, RE, Grodzinsky, AJ, Cummings, K, Plaas, AHK, Cole, AA, Lee, RT, Patwari, P, Intra-articular injection of heparin-binding insulin-like growth factor-1 sustains delivery of insulin-like growth factor 1 to cartilage through binding to chondroitin sulfate, *Arthritis Rheumatism*, 62:3686-3694, 2010.
90. Lee, H-Y, Kopesky, PK, Plaas, AHK, Sandy, JD, Kisiday, JD, Frisbie, DD, Grodzinsky, AJ, Ortiz, C, Adult bone marrow stromal cell-based tissue-engineered aggrecan exhibits ultrastructure and nanomechanical properties superior to native cartilage, *Osteoarthritis Cartilage*, 18:1477-1486, 2010.
91. Rolauffs, R, Muehleman, C, Li, J, Kurz, B, Kuettner, KE, Frank, EH, Grodzinsky, AJ, Vulnerability of the superficial zone of immature articular cartilage to compressive injury, *Arthritis Rheumatism*, 62: 3016-3027, 2010.
92. Zhang, L, Smith, DW, Gardiner, GS, Pivonka, P, Grodzinsky, AJ, The transport of insulin-like growth factor through cartilage, in *Porous Media: Applications in Biological Systems and Biotechnology*, ed., K Vafai, CRC Press, 2010, pp. 399-453.
93. Hosseini, A, Van de Velde, SK, Kozanek, M, Gill, TJ, Grodzinsky, AJ, Rubash, HE, Li, G, In-vivo time-dependent articular cartilage contact behavior of the tibiofemoral joint, *Osteoarthritis Cartilage*, 18:909-916, 2010.
94. Byun, S, Tortorella, MD, Malfait, AM, Fok, K, Frank, EH, Grodzinsky, AJ, Transport and equilibrium uptake of a peptide inhibitor of PACE4 into articular cartilage is dominated by electrostatic interactions, *Archiv Biochem Biophys*, 499:32-39, 2010.
95. Lemke, AK, Sandy, JD, Voigt, H, Dreier, R, Lee, JH, Grodzinsky, AJ, Mentlein, R, Fay, J, Schünke, M, Kurz, B, Interleukin-1 α treatment of meniscal explants stimulates the production and release of aggrecanase-generated GAG-substituted aggrecan products and also the release of pre-formed aggrecanase generated G1 and m-calpain generated G1-G2, *Cell Tissue Res*, 340:179-188, 2010.
96. Bao, G, Kamm, RD, Thomas, W, Hwang, W, Fletcher, DA, Grodzinsky, AJ, Zhu, C, Mofrad, MRK, Molecular biomechanics: the molecular basis of how forces regulate cellular function, *Cellular and Molecular Bioengineering*, 3:91-105, 2010.
97. Kopesky, PW; Lee, H.-Y.; Vanderploeg, EJ; Kisiday, JD; Frisbie, DD; Ortiz, C; Grodzinsky, AJ, Adult equine bone-marrow stromal cells produce a cartilage-like ECM superior to animal-matched adult chondrocytes, *Matrix Biology*, 29:427-438, 2010.
98. Kisiday, JD, Vanderploeg, EJ, McIlwraith, CW, Grodzinsky, AJ, Frisbie, DD, Mechanical Injury of Explants from the Articulating Surface of the Inner Meniscus, *Arch Biochem Biophys*, 494:138-144, 2010.
99. Zhang, L, Gardiner, BS, Smith, DW, Pivonka, P, Grodzinsky, AJ, On the role of diffusible binding partners in modulating the transport and concentration of proteins in tissues, *J Theoretical Biol*, 263:20-29, 2010.

100. Kopesky PW, Vanderploeg, EJ, Sandy JD, Kurz, B, Grodzinsky, AJ, Self-assembling peptide Self-assembling peptide hydrogels modulate *in vitro* chondrogenesis of bovine bone marrow stromal cells, *Tissue Engineering A*, 16:465-477, 2010.
101. Chai, DH, Arner, EC, Griggs, DW, Grodzinsky, AJ, αv and $\beta 1$ integrins regulate dynamic compression-induced proteoglycan synthesis in 3D gel culture by distinct complementary pathways, *Osteoarthritis Cartilage*, 18, 249-256, 2010.
102. Rolauuffs, B, Williams, JM, Grodzinsky AJ, Aurich, M, Kuettner, KE, Cole, AA, Proliferative remodeling of the spatial organization of human superficial chondrocytes distant to focal early osteoarthritis (OA), *Arthritis Rheumatism*, 62:489-498, 2010.
103. Lee BB, Han, L, Frank, EH, Chubinskaya, S, Ortiz, C, Grodzinsky, AJ, Dynamic mechanical properties of the tissue-engineered matrix associated with individual chondrocytes, *J Biomech*, 43:469-476, 2010.
104. Lee, JH, Fitzgerald, JB, DiMicco, MA, Flannery, CR, Cheng, DM, Sandy, JD, Plaas, AH, Grodzinsky, AJ, Co-culture of mechanically injured cartilage with joint capsule tissue alters chondrocyte expression patterns and increases ADAMTS5 production, *Archiv Biochem Biophys*, 489:118-126, 2009.
105. Sui, Y Lee, JH, DiMicco, MA, Vanderploeg, EJ, Blake, SM, Hung, H-H, Plaas, AHK, James, IE, Song, X-Y, Lark, MW, Grodzinsky, AJ, Mechanical injury potentiates proteoglycan catabolism induced by IL-6/sIL-6r and TNF- α in immature bovine and adult human articular cartilage, *Arthritis Rheumatism*, 60:2985-2996, 2009.
106. Vanderploeg, EJ and Grodzinsky, AJ, Can the meniscus affect the nature of a chondrocyte, *Osteoarthritis and Cartilage*, 17:969-970, 2009.
107. Kisiday, JD, Lee, JH, Siparsky, PN, Frisbie, DD, Flannery, CR, Sandy, JD, Grodzinsky, AJ, Catabolic responses of chondrocyte-seeded peptide hydrogel to dynamic compression, *Annals Biomed Eng*, 37:1368-75, 2009.
108. Ahn, AC, Grodzinsky, AJ, Relevance of collagen piezoelectricity to “Wolff’s Law”: a critical review, *Medical Engineering and Physics*, 31:733-741, 2009.
109. Kisiday, JD, Frisbie, DD, McIlwraith, CW, Grodzinsky, AJ, Dynamic compression stimulates proteoglycan synthesis by mesenchymal stem cells in the absence of chondrogenic cytokines, *Tissue Engineering Part A*, 15:2817-2824, 2009.
110. Wheeler, CA, Jafarzadeh, SR, Rocke, DM, Grodzinsky, AJ, IGF-1 does not moderate the time-dependent transcriptional patterns of key homeostatic genes induced by sustained compression of bovine cartilage, *Osteoarthritis Cartilage*, 17:930-938, 2009.
111. Stevens, AL, Wishnok, JS, White, FM, Grodzinsky, AJ, Tannenbaum, SR, Mechanical injury and cytokines cause loss of cartilage integrity and upregulate proteins associated with catabolism, immunity, inflammation, and repair, *Molecular Cell Proteomics*, 8:1475–1489, 2009.
112. Patwari, P, Lin, SN, Kurz, B, Cole AA, Kumar, S, Grodzinsky, AJ, Potent inhibition of cartilage biosynthesis by coincubation with joint capsule through an IL-1-independent pathway, *Scand J Med Sci in Sports*, 19:528-535, 2009.
113. Jones, ARC, Chen, S, Chai, D, Stevens, AL, Gleghorn, JP, Bonassar, LB, Grodzinsky, AJ, Flannery, CR, Modulation of lubricin biosynthesis and tissue surface properties following cartilage mechanical injury, *Arthritis Rheum*, 60:133-42, 2009.
114. Zhang, L, Gardiner, B, Smith, D, Pivonka, P, Grodzinsky, AJ, An Integrated model of IGF-I mediated biosynthesis in deforming articular cartilage, *Journal of Engineering Mechanics*, 135:439-449, 2009.

115. Han, L, Dean, D, Daher, LA, Grodzinsky, AJ, Ortiz, Cartilage aggrecan can undergo self-adhesion, *Biophysical J*, 95:4862-70, 2008.
116. Lin, Z, Fitzgerald, JB, Xu, J, Willers, C, Wood, D, Grodzinsky, AJ, Zheng MH, Gene expression profiles of chondrocytes during passaged monolayer cultivation, *J Orthop Res*, 26:1230-1237, 2008.
117. Pfeiffer, E, Vickers, SM, Frank, EH, Grodzinsky, AJ, Spector, M, The effects of glycosaminoglycan content on the compressive modulus of cartilage engineered in type ii collagen scaffolds, *Osteoarthritis Cartilage*, 16:1237-44, 2008.
118. Zhang, L, Gardiner, B, Smith, D, Pivonka, P, Grodzinsky, AJ, A fully coupled poroelastic reactive-transport model of cartilage, *Molecular Cellular Biomech*, 5:133-153, 2008.
119. Rolauffs, B, Williams, JM, Grodzinsky, AJ, Kuettner, KE, Cole, AA, Distinct horizontal patterns in the spatial organization of superficial zone chondrocytes of human joints, *J Struc Biol*, 162:335-44, 2008.
120. Tokunou, T, Miller, R, Patwari, P, Davis, ME, Segers, VFM, Grodzinsky, AJ, Lee, RT, Engineering insulin-like growth factor-1 for local delivery, *FASEB J*, 22:1886-1893, 2008.
121. Wagner T, Eden, U, Fregni, F, Valero-Cabre, A, Ramos-Estebanez, C, Pronio-Stelluto, V, Grodzinsky, AJ, Zahn, M, Pascual-Leone, A, Transcranial magnetic stimulation and brain atrophy: a computer-based human brain model study, *Exp Brain Res*, 186(4):539-50, 2008.
122. Zhang, L, Gardiner, B, Smith, D, Pivonka, P, Grodzinsky, AJ, Growth factor uptake with competitive binding in articular cartilage, *J Biological Systems*, 16:175-195, 2008.
123. Fitzgerald, JB, Jin, M, Chai, D, Siparsky, P, Fanning, P, Grodzinsky, AJ, Shear and compression-induced chondrocyte transcription requires MAPK activation in cartilage explants, *J Biol Chem*, 283:6735-6743, 2008.
124. Stevens, A, Wishnok, JS, Chai, D, Grodzinsky, AJ, Tannenbaum, SR, An SDS-PAGE-LC/MS/MS analysis of cartilage tissue response to mechanical compression injury and the inflammatory cytokines TNF- α and IL-1 β , *Arthritis Rheum*, 58:489-500, 2008.
125. Stevens, A, Wheeler, CA, Tannenbaum, SR, Grodzinsky, AJ, The role of nitric oxide in TNF- α -induced, chondrocyte-mediated extracellular matrix damage compared to IL-1 β in bovine cartilage explant cultures, *Osteoarthritis Cartilage*, 16:489-497, 2008.
126. Kisiday, JD, Kopesky, PW, Evans, CH, Grodzinsky, AJ, McIlwraith, CW, Frisbie, DD, Evaluation of adult equine bone marrow- and adipose-derived progenitor cell chondrogenesis in hydrogel cultures, *J Orthop Res*, 26:322-331, 2008.
127. Han, L, Dean, D, Mao, P, Ortiz, C, Grodzinsky, AJ, Nanoscale shear deformation mechanisms of opposing cartilage aggrecan macromolecules, *Biophysical J*, 93:L22-25, 2007.
128. Chai, D, Stevens, AL, Grodzinsky, AJ, Joint Injury and Osteoarthritis, in *Bone and Osteoarthritis*, F Bronner and M.C. Farach-Carson, Eds., Springer, London, 2007, pp. 165-179.
129. DiMicco, MA, Kisiday, JD, Gong, H, Grodzinsky, AJ, Structure of pericellular matrix around agarose-embedded chondrocytes, *Osteoarthritis and Cartilage*, 15:1207-1216, 2007.
130. Gardner, BS, Smith, DW, Pivonka, P, Grodzinsky, AJ, Frank, EH, Zhang, L, Solute transport in cartilage undergoing cyclic deformation, *Comp Meth Biomech Biomed Eng*, 10:265-78, 2007.
131. Mankin, HJ, Grodzinsky, AJ, Buckwalter, JA, Articular cartilage and osteoarthritis, in *Orthopaedic Basic Science, Foundations of Clinical Practice*, 3rd Ed., TA Einhorn, RJ O'Keefe, and JA Buckwalter, eds., American Academy of Orthopaedic Surgeons pub., Rosemont IL, Chapter 9, pp. 161-174, 2007.

132. Wagner, T, Fregni, F, Fecteau, S, Grodzinsky, AJ, Zahn, M, Pascual-Leone, A, Transcranial Direct Current Stimulation: A computer based human model study, *NeuroImage*, 35:1113-1124, 2007.
133. Han, L, Dean, D, Ortiz, C, Grodzinsky, AJ, Lateral nanomechanics of cartilage aggrecan macromolecules, *Biophysical J*, 92:1384-98, 2007.
134. Zhang, L, Gardner, BS, Smith, DW, Pivonka, P, Grodzinsky, The effects of cyclic deformation and solute binding on solute transport in cartilage, *Archiv Biochem Biophys*, 457:47-56, 2007.
135. Ng, L, Hung, HH, Sprunt, A, Chubinskaya, S, Ortiz, C, Grodzinsky, AJ, Nanomechanical properties of individual chondrocytes and their developing growth factor-stimulated pericellular matrix, *J Biomechanics*, 40:1011-23, 2007.
136. Patwari, P, Cheng, DM, Cole, AA, Kuettner, KE, Grodzinsky, AJ, Injurious compression of human post-mortem knee and ankle cartilage: analysis of the relationship between peak stress and proteoglycan loss, *Biomech Modeling Mechanobiol* 6:83-9, 2007.
137. Dean, D, Han, L, Grodzinsky, AJ, Ortiz, C, Compressive nanomechanics of opposing aggrecan molecules, *J Biomechanics*, 39:2555-2565, 2006.
138. Behera, AK, Hildebrand, E, Szafranski, J, Hung, HK, Grodzinsky AJ, Lafyatis, R, Koch, AE, Kalish, R, Perides, G, Steere AC, Hu, LT, Role of aggrecanase-1 in lyme disease, *Arthritis Rheumatism*, 54:3319-3329, 2006.
139. Fitzgerald, JB, Jin, M, Grodzinsky, AJ, Shear and compression duration, rate, and amplitude differentially regulate the temporal transcription profile of functionally-related genes in cartilage explants, *J Biological Chem*, 281:24095-24103, 2006.
140. Davis, ME, Hsieh, PCH, Takahashi, T, Song, Q, Zhang, S, Kamm, RD, Grodzinsky, AJ, Anversa, P, Lee, RT, Local myocardial delivery of IGF-1 with self-assembling peptides improves transplanted cell survival and maturation following infarction, *Proc Nat Acad Sci*, 103:8155-8160, 2006.
141. Wagner, T, Felipe Fregni, Uri Eden; Ciro Ramos-Estebanez, Grodzinsky, AJ, Zahn, M, Pascal-Leone, A, Transcranial magnetic stimulation and stroke: A computer based human model study, *NeuroImage*, 30:857-70, 2006.
142. Kurz, B, Lemke, AK, Fay, J, Pufe, T, Grodzinsky, AJ, Schunke, M, Pathomechanisms of cartilage destruction by mechanical injury, *Annals Anatomy*, 187:473-485, 2005.
143. Bathe, M, Rutledge, GC, Grodzinsky, AJ, Tidor, B, Osmotic pressure of aqueous chondroitin sulfate solution: A molecular modeling investigation, *Biophysical J*, 89:2357-2371, 2005.
144. Wheeler, C, Fitzgerald, JB, Grodzinsky, AJ, Cartilage mechanobiology: the response of chondrocytes to mechanical force, *Curr Opin Orthopaedics*, 16:346-353, 2005.
145. Grodzinsky, AJ, Szafranski, J, DiMicco, MA, Szasz, N, Biophysical regulation of cell and tissue function, in *Physical Regulation of Skeletal Repair*, R Aaron and M Bolander, eds., AAOS, Pub, p. 119-130, 2005.
146. Lee, JH, FitzGerald, JB, DiMicco MA, Grodzinsky, AJ, Mechanical injury of cartilage explants causes specific time dependent changes in chondrocyte gene expression, *Arthritis Rheumatism*, 52: 2386-2395, 2005.
147. Seog, J, Dean, D, Rolauuffs, B, Plaas AHK, Grodzinsky, AJ, Ortiz, C, Nanomechanics of opposing glycosaminoglycan molecules, *J Biomechanics*, 38:1789-1797, 2005.
148. Davis, ME, Hsieh, PCH, Grodzinsky, AJ, Lee RT, Custom design of the cardiac microenvironment with biomaterials, *Circulation Res*, 97:8-15, 2005.

149. Dean, D, Han, L, Ortiz, C, Grodzinsky, AJ, Nanoscale conformation and compressibility of cartilage aggrecan using micro-contact printing and atomic force microscopy, *Macromolecules*, 38:4047-4049, 2005.
150. Bathe, M, Rutledge, GC, Grodzinsky, AJ, Tidor, B, A coarse-grained molecular model for glycosaminoglycans: Application to chondroitin sulfate and hyaluronic acid, *Biophysical J.*, 88:3870-3887, 2005.
151. Patwari, P, Gao, G, Lee, J, Grodzinsky, AJ, Sandy JD, Studies of the Control of Aggrecanlysis in IL-1-treated bovine articular cartilage: evidence for the involvement of MT4MMP in processing of ADAMTS4, *Osteoarthritis Cartilage*, 13:269-277, 2005.
152. Lu, Y, Adkisson, D, Bogdanske, J, Kalscheur, V, Linden, S, Hao, Z, Maloney, W, Cheung, R, Grodzinsky, AJ, Hruska, KA, Markel, MD, An in vivo sheep study of transplantation of ovine neocartilage allografts: determining the effectiveness of tissue transglutaminase, *J Knee Surgery*, 18:31-42, 2005.
153. Buckwalter, JA, Mankin, HJ, Grodzinsky, AJ, Articular cartilage and osteoarthritis, in *American Academy of Orthopaedic Surgeons Instructional Course Lectures*, Rosemont IL, 54:465-480, 2005.
154. Kisiday, JD, Kurz, B, DiMicco, MA, Grodzinsky, AJ, Evaluation of ITS-supplemented media for culture of bovine chondrocytes in 3-D hydrogel scaffolds, *Tissue Engineering*, 11:141-151, 2005.
155. Szafranski, J, Grodzinsky, AJ, Burger, E, Hunziker, EB, Chondrocyte mechanotransduction: effects of physiological compression on deformation of intracellular organelles and relevance to chondrocyte biosynthesis, *Osteoarthritis Cartilage*, 12:937-946, 2004.
156. Bathe, M, Grodzinsky, AJ, Tidor, B, Rutledge, GC, Optimal linearized Poisson-Boltzmann theory applied to the simulation of flexible polyelectrolytes in solution, *J Chem Phys*, 121:7557-7561, 2004.
157. Frank, E, Evans, R, Lee, C, Treppo, S, Spector, M, Grodzinsky, AJ, Quantitative electrical impedance analysis of cartilage degradation, *Biorheology*, 41:195-202, 2004.
158. Wagner, T, Zahn, M, Grodzinsky, AJ, Pascal-Leone, A, Realistic head model simulation of transcranial magnetic stimulation, *IEEE Trans Biomed Eng*, 51:1586-1598, 2004.
159. L. Ng, A. Grodzinsky, A. Plaas, J. Sandy, and C. Ortiz, Persistence length calculations of individual cartilage aggrecan macromolecules measured via atomic force microscopy, *Macromolecular Symposia* 214:1-4, 2004.
160. Gouze JN, Stoddart MJ, Gouze E, Palmer GD, Ghivizzani SC, Grodzinsky AJ, Evans CH. In vitro gene transfer to chondrocytes and synovial fibroblasts by adenoviral vectors. *Methods Mol Med* 100:147-164, 2004.
161. DiMicco, MA, Grodzinsky, AJ, Kim, YJ, Mechanisms of acute tissue degradation following in vitro cartilage injury, *Orthopaedic Journal at Harvard Medical School*, 61-63, 2004.
162. Kisiday, JD, Zhang, S, Cosman, C, Saachi, S, Grodzinsky, AJ, Self-assembling peptide hydrogel scaffolds for cartilage tissue engineering, in *Tissue Engineering in Musculoskeletal Clinical Practice*, eds., AAOS Pub, LJ Sandell and AJ Grodzinsky, pp. 349-353, 2004.
163. Feder, J, Adkisson, HD, Kizer, N, Hruska, KA, Cheung, R, Grodzinsky, AJ, Lu, Y, Bogdanske, J, Markel, M, The promise of chondral repair using neocartilage, in *Tissue Engineering in Musculoskeletal Clinical Practice*, eds., AAOS Pub, LJ Sandell and AJ Grodzinsky, pp. 219-226, 2004.

164. Fitzgerald, JB, Jin, M, Dean, D, Wood, DJ, Zheng, MH, Grodzinsky, AJ, Mechanical compression of cartilage explants induces multiple time-dependent gene expression patterns and involves intracellular calcium and cyclic AMP, *J Biol Chem*, 279: 19502-19511, 2004.
165. Kisiday, JD, Jin, M, DiMicco, MA, Kurz, B, Grodzinsky, AJ, Effects of dynamic compressive loading on chondrocyte biosynthesis in self-assembling peptide scaffolds, *J Biomech*, 37:595-604, 2004.
166. Gouze JN, Gouze E, Palmer GD, Kaneto H, Evans CH, Grodzinsky, AJ, Ghivizzani SC, Adenovirus-mediated gene transfer of glutamine:fructose-6-phosphate amidotransferase down-regulates the effects of interleukin-1 beta on rat chondrocytes, *Osteoarthritis and Cartilage*, 12:217-224, 2004.
167. Kisiday, J, Kerin, A, Grodzinsky, AJ, Mechanical testing of cell material constructs, *Methods Mol Biol*, 238:239-254, 2004.
168. DiMicco, MA, Patwari, P, Siparsky, PN, Kumar, S, Pratta, MA, Lark, MW, Kim, YJ, Grodzinsky AJ, Mechanisms of tissue degradation following in vitro cartilage injury, *Arthritis Rheum*, 50:840-848, 2004.
169. Patwari, P, Gaschen, V, James, IE, Berger, E, Blake, SM, Lark, MW, Grodzinsky, AJ, Hunziker, EB, Quantification by ultrastructural morphology of cell death after injurious compression of bovine calf articular cartilage, *Osteoarthritis and Cartilage*, 12:245-252, 2004.
170. Seog, J, Frank, EH, Dean, D, Ortiz, C, Grodzinsky, AJ, Preparation of end-grafted polyelectrolyte brushes on nanoscale probe tips using an electric field, *Macromolecules*, 37:1156-1158, 2004.
171. Kurz, B, Lemke, A, Kehn, M, Domm, C, Patwari, P, Frank, E, Grodzinsky, AJ, Schunke, M, Influence of tissue maturation and antioxidants on the apoptotic response of articular cartilage after injurious compression, *Arthritis and Rheumatism*, 50:123-30, 2004.
172. Pufe, T, Lemke A, Kurz, B, Petersen, W, Tillmann, B, Grodzinsky, AJ, Mentlein, R, Mechanical overload induces VEGF in cartilage discs via hypoxia-inducible factor (HIF), *Amer J Pathology*, 164:185-92, 2004.
173. Bathe, M, Rutledge GC, Grodzinsky, AJ, Tidor, B, Towards a multi-scale model of cartilage: coarse-graining glycosaminoglycans, in *Computational Fluid and Solid Mechanics*, KJ Bathe, ed., Elsevier, 2003, p. 1626-1630.
174. Fanning, P, Emkey, G, Grodzinsky, AJ, Trippel, SD, Mechanical regulation of mitogen-activated protein kinase signaling in articular cartilage, *J Biol Chem*, 278:50940-50948, 2003.
175. Ng, L, Grodzinsky, AJ, Sandy, JD, Plaas, AHK, Ortiz, C, Individual aggrecan molecules and their constituent glycosaminoglycans visualized via atomic force microscopy, *J Structural Biol*, 143:242-257, 2003.
176. DiMicco, M, Kim YJ, Grodzinsky, AJ, Response of the chondrocyte to mechanical stimuli, *Textbook on Osteoarthritis*, K Brandt, M Doherty, and LS Lohmander, eds., Oxford Univ Press, pp. 112-120, 2003.
177. Gouze, JN, Gouze, E, Palmer, GD, Liew, VS, Pascher, A, Betz, OB, Thornhill, TS, Evans, CH, Grodzinsky, AJ, Ghivizzani, SC, A comparative study of the inhibitory effects of IL-1Ra following administration as a recombinant protein or by gene transfer, *Arthritis Res and Therapy*, 5:301-309, 2003.
178. Garcia, AM, Szasz, N, Trippel, SB, Morales, TI, Grodzinsky, AJ, Frank, EH, Transport and binding of IGF-1 through articular cartilage, *Archiv Biochem Biophys*, 415:69-79, 2003.
179. Jin, M, Emkey, GR, Siparsky, P, Trippel, SB, Grodzinsky, AJ, Combined effects of dynamic tissue shear deformation and insulin-like growth factor-1 on chondrocyte biosynthesis in cartilage explants, *Archiv Biochem Biophys*, 414:223-231, 2003.

180. Patwari, P, Cook, MN, DiMicco, MA, Blake, SM, James, IE, Kumar, S, Cole, AA, Lark, MW, Grodzinsky, AJ, Proteoglycan degradation after injurious compression of bovine and human articular cartilage in vitro: interaction with exogenous cytokines, *Arthritis and Rheum*, 48:1292-1301, 2003.
181. Dean, D, Seog, J, Ortiz, C, Grodzinsky, AJ, Molecular level theoretical model for electrostatic interactions within polyelectrolyte brushes: applications to charged glycosaminoglycans, *Langmuir*, 19:5526-5539, 2003.
182. Lee, JH, Kisiday, J, Grodzinsky, AJ, Tissue engineered versus native cartilage: linkage between cellular mechanotransduction and biomechanical properties, *Novartis Foundation Symposium Monograph 249 on Tissue Engineering of Cartilage and Bone*, Wiley, UK, 2003, pp: 52-69.
183. Lee, CR, Grodzinsky, AJ, Spector, M, Biosynthetic response of passaged chondrocytes in a type II collagen scaffold to mechanical compression, *J Biomed Mat Res*, 64A(3):560-9, 2003.
184. Lee, CR, Grodzinsky, AJ, Hsu, HP, Spector, M, Effects of a cultured autologous chondrocyte-seeded type II collagen scaffold on the healing of a chondral defect in a canine model, *J Orthop Res*, 21:272-281, 2003.
185. Lee, CR, Grodzinsky, AJ, Spector, M, Modulation of the contractile and biosynthetic activity of chondrocytes seeded in collagen-glycosaminoglycan matrices, *Tissue Engineering*, 9:25-36, 2003.
186. Jin, M, Grodzinsky, AJ, Wuerz, TH, Emkey, GR, Wong, M, Hunziker, EB, Influence of tissue shear deformation on chondrocyte biosynthesis and matrix electromechanics, in *The Many Faces of Osteoarthritis*, VC Hascall and KE Kuettner, eds., Birkhauser Verlag, Basel, 397-408, 2002.
187. Kisiday, J, Jin, M, Kurz, B, Hung, HH, Zhang, S, Grodzinsky, AJ, Cartilage tissue engineering using a new self-assembling peptide gel scaffold, in *The Many Faces of Osteoarthritis*, VC Hascall and KE Kuettner, eds., Birkhauser Verlag, Basel, 423-428, 2002.
188. Quinn, TM, Studer, C, Grodzinsky, AJ, Meister, JJ, Preservation and analysis of nonequilibrium solute concentration distributions within mechanically compressed cartilage explants, *J Biochem Biophys Methods*, 52(2):83-95, 2002.
189. Schaefer, D, Martin, I, Jundt, G, Seidel, J, Herberer, M, Grodzinsky, AJ, Bergin, I, Vunjak-Novakovic, G, Freed, LE, Tissue engineered composites for the repair of large osteochondral defects, *Arthritis Rheum*, 46:2524-2534, 2002.
190. Quinn TM, Schmid P, Hunziker EB, Grodzinsky AJ, Proteoglycan deposition around chondrocytes in agarose culture: construction of a physical and biological interface for mechanotransduction in cartilage, *Biorheology*, 39:27-37, 2002.
191. Kisiday, J, Jin, M, Kurz, B, Hung, HH, Semino, C, Zhang, S, Grodzinsky, AJ, Self-assembling peptide hydrogel fosters chondrocyte extracellular matrix production and cell division: implications for cartilage tissue repair, *PNAS*, 99:9996-10001, 2002.
192. Seog, J, Dean D, Plaas, AHK, Wong-Palms, S, Grodzinsky, AJ, Ortiz, C, Direct measurement of glycosaminoglycan intermolecular interactions via high resolution force spectroscopy, *Macromolecules*, 35:5601-15, 2002.
193. Kerin, A, Patwari, P, Kuettner, KE, Cole, A, Grodzinsky, AJ, Molecular basis of osteoarthritis: biomechanical aspects, *Cell Mol Life Sci*, 59:27-35, 2002.
194. Jin, M, Grodzinsky, AJ, Effect of electrostatic interactions of glycosaminoglycans on the shear stiffness of cartilage: molecular model of electrostatic interactions between glycosaminoglycans, *Macromolecules*, 34:8330-8339, 2001.

195. Jin M, Frank EH, Quinn TM, Hunziker EB, Grodzinsky, AJ, Tissue shear deformation without fluid flow stimulates chondrocyte proteoglycan and protein biosynthesis in bovine cartilage explants, *Archiv Biochem Biophys*, 395:41-48, 2001.
196. Quinn, TM, Dierickx, P, Grodzinsky, AJ, Glycosaminoglycan network geometry may contribute to anisotropic hydraulic permeability in cartilage under compression, *J Biomechanics*, 34:1483-1490, 2001.
197. Lee, C, Grodzinsky, AJ, Spector, M, The effects of cross-linking of collagen glycosaminoglycan scaffolds on compressive stiffness, chondrocyte-mediated contraction, proliferation, and biosynthesis, *Biomaterials*, 22:3145-3154, 2001.
198. Patwari, P, Fay, J, Cook, MN, Badger, AM, Kerin, AJ, Lark, MW, Grodzinsky, AJ, In vitro models for investigation of the effects of acute mechanical injury on cartilage, *Clin Orthop Rel Res*, 391S:S61-S71, 2001.
199. Kurz, B, Jin, M, Patwari, P, Cheng, DM, Lark, M, Grodzinsky, AJ, Biosynthetic response and mechanical properties of articular cartilage after injurious compression: the importance of strain rate, *J Orthop Res*, 19:1140-1146, 2001.
200. Hu, LT, Eskildsen, MA, Masgala, C, Steere, AC, Arner, EC, Pratta, MA, Grodzinsky, AJ, Loening, A, Perides, G, Host metalloproteinases in lyme disease, *Arthritis Rheum*, 44:1401-1410, 2001.
201. Griffith, LG, Grodzinsky, AJ, *Advances in biomedical engineering*, *J Amer Med Assoc*, 285:556-561, 2001.
202. Bonassar, LJ, Grodzinsky, AJ, Frank, EH, Davilla, SG, Bhakta, NR, Trippel, SB, The effect of dynamic compression on the response of articular cartilage to insulin-like growth factor-1, *J Orthop Res*, 16:16-22, 2001.
203. Lee, CR, Grodzinsky, AJ, Hsu, HP, Martin, S, Spector, M, Harvest and selected cartilage repair procedures affect physical and biochemical properties of uninvolved articular cartilage in the canine knee, *J Orthop Res*, 18:790-799, 2000.
204. Treppo, S, Koeppe, H, Quan, EC, Cole, AA, Kuettner, KE, Grodzinsky, AJ, Comparison of biomechanical and biochemical properties of cartilage from human knee and ankle pairs, *J Orthop Res*, 18:739-748, 2000.
205. Ragan, PM, Chin, VI, Hung, HH, Masuda, K, Thonar, EJMA, Sandy, JD, Grodzinsky, AJ, Chondrocyte extracellular matrix synthesis and turnover is influenced by static compression in an alginate culture system, *Archiv Biochem Biophys*, 383:256-264, 2000.
206. Chen, CT, McCabe, RP, Grodzinsky, AJ, Vanderby, R, Transient and cyclic responses of strain generated potential in rabbit patellar ligament is frequency and pH dependent, *J Biomech Eng*, 122:465-470, 2000.
207. Loening, AM, James, I, Levenston, ME, Badger, AM, Frank, EH, Kurz, B, Nuttall, Hung, HH, Blake, SM, Grodzinsky, AJ, Lark, MW, Injurious mechanical compression of bovine articular cartilage induces chondrocyte apoptosis, *Archiv Biochem Biophys*, 381:205-212, 2000.
208. Martin, I, Obradovic, B, Treppo, S, Grodzinsky, AJ, Langer, R, Freed, LE, Vunjak-Novakovic, G, Modulation of the mechanical properties of tissue engineered cartilage, *Biorheology*, 37:141-147, 2000.
209. Frank, EH, Jin, M, Loening, A, Levenston, ME, and Grodzinsky, AJ, A versatile shear and compression apparatus for mechanical stimulation of tissue culture explants, *J Biomech*, 33:1523-1527, 2000.

210. Grodzinsky, AJ, Levenston, ME, Jin, M, Frank, EH, Cartilage tissue remodeling in response to mechanical forces, *Annu Rev Biomed Eng*, 2:691-714, 2000.
211. Bonassar, LJ, Grodzinsky, AJ, Srinivasan, A, Davila, SG, Trippel, SB, Mechanical and physicochemical regulation of the action of IGF-1 on articular cartilage, *Archiv Biochem Biophys*, 379:57-63, 2000.
212. Netti PA, Berk DA, Swartz MA, Grodzinsky AJ, Jain RK, Role of extracellular matrix assembly in interstitial transport in solid tumors, *Cancer Research*, 60:2497-2503, 2000.
213. Bhakta, NB, Garcia, AM, Frank, EH, Grodzinsky, AJ, Morales, TI, The insulin-like growth factors IGF-I and II bind to articular cartilage via the IGF-binding proteins," *J Biol Chem*, 275:5860-5866, 2000.
214. Patwari, P, Kurz, B, Sandy, JD, Grodzinsky, AJ, Mannosamine inhibits aggrecanase-mediated changes in the physical properties and biochemical composition of articular cartilage, *Archiv Biochem Biophys*, 374:79-85, 2000.
215. Ragan, PM, Badger, AM, Cook, M, Chin, VI, Gowen, M, Grodzinsky, AJ, Lark, MW, Downregulation of chondrocyte aggrecan and type ii collagen gene expression correlates with increases in static compression magnitude and duration, *J Orthop Res*, 17:836-842, 1999.
216. Swartz, MA, Kaipainen, A, Netti, PA, Brekkan, C, Boucher, Y, Grodzinsky, AJ, Jain, RK, Mechanics of interstitial-lymphatic fluid transport: theoretical foundation and experimental validation, *J Biomechanics*, 32:1297-1307, 1999.
217. Buckwalter, JA, and Grodzinsky, AJ, Loading of healing bone, fibrous tissue and muscle: implications for orthopaedic practice, *J Am Acad Orthop Surg*, 7:291-299, 1999.
218. Buschmann, MD, Kim, YJ, Wong, M, Frank, EH, Hunziker, EB, and Grodzinsky, AJ, Stimulation of aggrecan synthesis in cartilage explants by cyclic loading is localized to regions of high interstitial fluid flow, *Archiv Biochem Biophys*, 366:1-7, 1999.
219. Quinn, TM, Maung, A, Grodzinsky, AJ, Hunziker, EB, and Sandy, JD, Physical and biological regulation of proteoglycan turnover around chondrocytes in cartilage explants: implications for tissue degradation and repair, *NY Acad Sci*, 878:420-441, 1999.
220. Levenston, ME, Frank, EH, and Grodzinsky, AJ, Electrokinetic and poroelastic coupling during finite deformations of charged porous media, *J Applied Mechanics*, 66:323-333, 1999.
221. Vunjak-Novakovic, G, Martin, I, Obradovic, B, Treppo, S, Grodzinsky, AJ, Langer, R, Freed, LE, Bioreactor cultivation conditions modulate the composition and mechanical properties of tissue engineered cartilage, *J Orthop Res*, 17:130-138, 1999.
222. Treppo, S, Berkenblit, SI, Bombard, DL, Frank, EH, and Grodzinsky, AJ, Physical diagnostics of cartilage degeneration, in, *Advances in Osteoarthritis*, Tanaka, Hamanishi, eds., Springer-Verlag Tokyo, 1999, pp. 59-73.
223. Garcia, AM, Lark, MW, Trippel, SB, Grodzinsky, AJ, Transport of TIMP-1 through cartilage: contributions of fluid flow and electrical migration, *J Orthop Res*, 16:734-742, 1998.
224. Levenston, ME, Eisenberg, SE, and Grodzinsky, AJ, A variational formulation for coupled physicochemical flows during finite deformations of charged poroelastic media, *Int J Solids Structures*, 35:4999-5019, 1998.
225. Quinn, TM, Grodzinsky, AJ, Hunziker, EH, and Sandy, JD, Effects of injurious compression on matrix turnover around individual cells in calf articular cartilage explants, *J Orthop Res*, 16:490-499, 1998.

226. Quinn, TM, Grodzinsky, AJ, Buschmann, MD, Kim, Y-J, Hunziker, EB, Mechanical compression alters proteoglycan matrix assembly around individual cells in cartilage explants, *J Cell Sci*, 111:573-583, 1998.
227. Levenston, ME, Frank, EH, and Grodzinsky, AJ, Variationally derived 3-field finite element formulations for quasistatic poroelastic analysis of hydrated biological tissues, *Comp Meth Appl Mech and Eng*, 156:231-246, 1998.
228. Grodzinsky, AJ, Kim, YJ, Buschmann, MD, Quinn, TM, and Garcia AM, Quinn, TM, Hunziker, EB, Response of the chondrocyte to mechanical stimuli, *Textbook on Osteoarthritis*, K Brandt, M Doherty, and L Stefan Lohmander, eds., Oxford Univ Press, 1998, pp. 123-136.
229. Cheng, GC, Briggs, W, Gerson, D, Libby, P, Grodzinsky, AJ, Gray, ML, and Lee, RT, Mechanical strain tightly controls FGF-2 release from human vascular smooth muscle cells, *Circulation*, 80:28-36, 1997.
230. Bonassar, LJ, Sandy, JD, Lark, MW, Plaas, AHK, Frank, EH, and Grodzinsky, AJ, Inhibition of cartilage degradation and changes in physical properties induced by IL-1(and retinoic acid using matrix metalloproteinase inhibitors, *Archiv Biochem Biophys*, 344:404-412, 1997.
231. Grodzinsky, AJ, Kamm, RD and Lauffenberger, DA, Quantitative aspects of tissue engineering: basic issues in kinetics, transport, and mechanics, in *Principles of Tissue Engineering*, R Lanza, R Langer, and W Chick, eds., RG Landes & Academic Press, 1997, pp 193-207.
232. Maroudas, A, Urban, JPG, Kuettner, KE, Grodzinsky, AJ, Articular cartilage and intervertebral disc, *Encyclopedia of Human Biology*, Vol. 1, Academic Press, New York, 1997, pp. 445-450.
233. Bonassar, LJ, Stinn, JL, Paguio, CG, Frank, EH, Moore, VL, Lark, MW, and Grodzinsky, AJ, Activation and inhibition of endogenous matrix metalloproteinases in articular cartilage: effects on composition and biophysical properties, *Archiv Biochem Biophys*, 333:359-367, 1996.
234. Garcia, AM, Frank, EH, Grimshaw, PE, and Grodzinsky, AJ, Contribution of fluid convection and electrical migration to molecular transport in cartilage: relevance to loading, *Archiv Biochem Biophys*, 333:317-325, 1996.
235. Kim, Y-J, Grodzinsky, AJ, Plaas, AHK, Differential effects of compression on synthesis and intracellular processing of aggrecan, link protein, and hyaluronan, *Archiv Biochem Biophys*, 328:331-340, 1996.
236. Lee E, Vaughan, DE, Parikh, SH, Grodzinsky, AJ, Libby, P, Lark, MW, and Lee RT, Regulation of matrix metalloproteinases and plasminogen activator inhibitor-1 synthesis by plasminogen in cultured human vascular smooth muscle cells, *Circulation Research*, 78:44-49, 1996.
237. Whale, MD, Grodzinsky, AJ, and Johnson, M, The effect of aging and pressure on the specific hydraulic conductivity of the aortic wall, *Biorheology*, 33:17-44, 1996.
238. Cheng, GC, Libby, P, Grodzinsky, AJ, and Lee, RT, Induction of DNA synthesis by a single transient mechanical stimulus of human vascular smooth muscle cells: role of fibroblast growth factor-2, *Circulation*, 93:99-105, 1996.
239. Grodzinsky, AJ, Frank, EH, Kim, YJ, and Buschmann, MD, The role of specific macromolecules in cell-matrix interactions and in matrix function: physicochemical and mechanical mediators of chondrocyte biosynthesis, in *Extracellular Matrix*, Vol. 2: Molecular Components and Interactions, WD Comper, ed., Harwood Academic Pub GmbH, Amsterdam, pp. 310-334, 1996.
240. Buschmann, MD, Hunziker, EB, Kim, YJ, Grodzinsky, AJ, Altered aggrecan synthesis correlates with cell and nucleus morphology in statically compressed cartilage, *J Cell Sci*, 109:499-508, 1996.

241. Sah, RL, Trippel, SB, and Grodzinsky, AJ, Differential effects of serum, insulin-like growth factor-1, and fibroblast growth factor-2 on the maintenance of cartilage physical properties during long-term culture J Orthop Res, 14:44-52, 1996.
242. Lee, E, Grodzinsky, AJ, Libby, P, Clinton, SK, Lark, MW, and Lee, RT, Human vascular smooth muscle cell - monocyte interactions and metalloproteinase secretion in culture, Arterioscler Thromb Vasc Biol, 15:2284-2289, 1995.
243. Bonassar LJ, Jeffries, KA, Frank, EH, Moore, VL, Lark, MW, Bayne, EK, McDonnell, J, Olszewski, J, Hagman, W, Chapman, K, and Grodzinsky, AJ, In vivo effects of stromelysin on the composition and physical properties of rabbit articular cartilage in the presence and absence of a stromelysin inhibitor, Arthritis and Rheumatism, 38:1678-1686, 1995.
244. Bonassar, LJ, Jeffries, KA, Paguio, CG, and Grodzinsky, AJ, Cartilage degradation and associated changes in biomechanical and electromechanical properties, Acta Orthop Scand (Suppl 266) 66:38-44, 1995.
245. Lohmander, LS, Lark, MW, Sandy, JD, and Grodzinsky, AJ, Consequences and mechanisms of aggrecan degradation in articular cartilage, Rheumatology in Europe, Suppl 2, 24:62-65, 1995.
246. Mallein-Gerrin, F, Ruggiero, F, Quinn, TM, Grodzinsky, AJ, Olsen BR, and Van der Rest, M, Analysis of collagen synthesis and assembly in culture of immortalized mouse chondrocytes in presence or absence of (I(IX) collagen chain, Exp Cell Res, 219:257-265, 1995.
247. Chang, YHD, Grodzinsky, AJ, and Wang, DIC, Augmentation of mass-transfer through electrical means for hydrogel-entrapped escherichia-coli cultivation, Biotech and Bioeng, 48:149-157, 1995.
248. Chang, YHD, Grodzinsky, AJ, and Wang, DIC, Nutrient enrichment and in-situ waste removal through electrical means for hybridoma cultures, Biotech and Bioeng, 47:319-326, 1995.
249. Chang, YHD, Grodzinsky, AJ, and Wang, DIC, In-situ removal of ammonium and lactate through electrical means for hybridoma cultures, Biotech and Bioeng, 47:308-318, 1995.
250. Grodzinsky, AJ and Urban, JPG, Physical regulation of metabolism in cartilaginous tissues: relation to extracellular forces and flows, in Interstitium, Connective Tissue and Lymphatics, J Bert, GA Laine, N McHale, R Reed, and P Winlove, eds., Portland Press, London, pp. 67-84, 1995.
251. Kim, YJ, Bonassar, LJ, and Grodzinsky, AJ, The role of cartilage streaming potential, fluid flow and pressure in the stimulation of chondrocyte biosynthesis during dynamic compression, J Biomechanics, 28:1055-1066, 1995.
252. Sachs, JS, and Grodzinsky, AJ, Electromechanical spectroscopy of cartilage using a surface probe with applied mechanical displacement, J Biomechanics, 28:963-976, 1995.
253. Buschmann, MD, Gluzband, YA, Grodzinsky, AJ, Hunziker, EB, Mechanical compression modulates matrix biosynthesis in chondrocyte-agarose culture, J Cell Sci, 108:1497-1508, 1995.
254. Berkenblit, SI, Quinn, TM, and Grodzinsky, AJ, Molecular electromechanics of cartilaginous tissues and polyelectrolyte gels, J Electrostatics, 34:307-330, 1995.
255. Buschmann, MD and Grodzinsky, AJ, A molecular model of proteoglycan-associated forces in cartilage mechanics, J Biomech Eng, 117:179-192, 1995.
256. Bonassar, LJ, Frank, EH, Murray JC, Paguio, CG, Moore, VL, Lark, MW, Sandy, JD, Wu, J-J, Eyre, DR, Grodzinsky, AJ, Changes in cartilage composition and physical properties due to stromelysin degradation, Arthritis and Rheumatism, 38:173-183, 1995.

257. Berkenblit, SI, Frank, EH, Salant, EP, and Grodzinsky, AJ, Nondestructive detection of cartilage degeneration using electromechanical surface spectroscopy, *J Biomech Eng*, 116:384-392, 1994.
258. Bonassar, LJ, Paguio, CG, Frank, EH, Jeffries, KA, Moore, VL, Lark, MW, Caldwell, CG, Haggmann, WK, and Grodzinsky, AJ, Effects of matrix metalloproteinases on cartilage biophysical properties in vitro and in vivo, in *Inhibition of Matrix Metalloproteinases: Therapeutic Potential*, *Annals NY Acad of Sci*, 732:439-443, 1994.
259. MacGinitie, LA, Gluzband, YA, and Grodzinsky, AJ, "Electric Field Modulation of Protein Synthesis in Cartilage Explants," *J Orthop Res*, 12:151-160, 1994.
260. Kim, Y-J, Sah RL-Y, Grodzinsky, AJ, Plaas, AHK, and Sandy, JD, Mechanical regulation of cartilage biosynthetic behavior: physical stimuli, *Archiv Biochem Biophys*, 311:1-12, 1994.
261. Loree, HM, Grodzinsky, AJ, Park, SY, Gibson, LJ, and Lee, RT, Static circumferential tangential modulus of human atherosclerotic tissue, *J Biomech*, 27:195-204, 1994.
262. Sah, RL, Chen, AC, Grodzinsky, AJ, and Trippel, SB, Differential effects of bFGF and IGF-I on matrix metabolism in calf and adult bovine cartilage explants, *Archiv Biochem Biophys*, 308:137-147, 1994.
263. Grodzinsky, AJ, Age-related changes in cartilage: physical properties and cellular response to loading, in *Musculoskeletal Soft-Tissue Aging: Impact on Mobility*, Buckwalter, Gordon, and Woo, eds., *Amer Acad Orthop Surg*, Rosemont, IL, pp. 137-149, 1994.
264. Shefer, A, Grodzinsky, AJ, Prime, KL, and Busnel, J-P, Novel model polyelectrolyte networks: synthesis and characterization, *Macromolecules*, 26:5009-5014, 1993.
265. Quinn, TM and Grodzinsky, AJ, The longitudinal modulus and hydraulic permeability of poly(methacrylic acid) gels: effects of charge density and solvent content, *Macromolecules*, 26:4332-4338, 1993.
266. Shefer, A, Grodzinsky, AJ, Prime, KL, and Busnel, J-P, Free radical telomerization of tert-butyl acrylate in the presence of bis-(4-aminophenyl) disulfide as chain initiator transfer terminator (iniferter) agent, *Macromolecules* 26:2240-2245, 1993.
267. Grodzinsky, AJ and Yarmush, ML, Electrokinetic separations, in *Biotechnology 2nd Ed., Vol. 3, Bioprocessing*, G Stephanopoulos, ed., pp. 679-693, 1993.
268. Bassar, PJ and Grodzinsky, AJ, A Model for Donnan equilibrium derived from composite Poisson-Boltzmann equations, *Biophysical Chem*, 46:57-68, 1993.
269. Buschmann, MD, Gluzband, YA, Grodzinsky, AJ, Kimura, JH, and Hunziker, E, Chondrocytes in agarose gel synthesize a mechanically functional extracellular matrix, *J Orthop Res*, 10:745-758, 1992.
270. Edelman, ER, Fiorino, A, Grodzinsky, AJ, and Langer, R, Mechanical deformation of polymer matrix controlled release devices modulates drug release, *J Biomed Mater Res*, 26:1619-1631, 1992.
271. Sah, RL-Y, Grodzinsky, AJ, Plaas, AHK, and Sandy, JD, Effects of static and dynamic compression on matrix metabolism in cartilage explants, in *Articular Cartilage Biochemistry and Osteoarthritis*, K.E. Kuettner, V.C. Hascall and R. Schleyerbach, eds., Raven Press, New York, 1992, pp. 373-392.
272. Lee, RT, Richardson, SG, Loree, HM, Grodzinsky, AJ, Gharib, SA, Schoen, FJ, Pandian, N, Prediction of mechanical properties of human atherosclerotic tissue by high frequency intravascular ultrasound imaging: an in vitro study, *Arteriosclerosis and Thrombosis*, 12:1-5, 1992.
273. Adler, KP, Weiss, AM, Grodzinsky, AJ, and Yarmush, ML, The effect of polymer network structure on diffusive transport across chemically controlled membranes, *Makromol Chem Macromol Symp*, 45:259-269, 1991.

274. Lee, RT, Grodzinsky, AJ, Frank, EH, Kamm, RD, and Schoen, FJ, Structure-dependent dynamic mechanical behavior of fibrous caps from human atherosclerotic plaques, *Circulation*, 83:1764-1770, 1991.
275. Sah, RL-Y, Doong, J-YH, Grodzinsky AJ, Plaas, AHK, and Sandy, JD, Effects of compression on the release of newly synthesized proteoglycans and proteins from cartilage explants, *Arch Biochem Biophys*, 286:20-29, 1991.
276. Weiss, AM, Adler, KA, Grodzinsky, AJ, and Yarmush, ML, Variable permeable membranes: network structure of poly(methacrylic acid) and its relation to diffusive transport, *J Membrane Sci*, 58:153-172, 1991.
277. Frank, EH, Grodzinsky, AJ, Phillips, SL, and Grimshaw, PE, Physicochemical and bioelectrical determinants of cartilage material properties, in *Biomechanics of Diarthrodial Joints*, VC Mow, A Ratcliffe, and S.L-Y. Woo, eds, Springer-Verlag, New York, pp. 261-282, 1990.
278. Grimshaw, PE, Nussbaum, JH, Grodzinsky, AJ, and Yarmush, ML, Kinetics of electrically and chemically induced swelling in polyelectrolyte gels, *J Chemical Physics*, 93:4462-4472, 1990.
279. Sah, RLY, Kim, YJ, Grodzinsky, AJ, The effect of mechanical compression on cartilage metabolism, in *Methods in Cartilage Research*, A. Maroudas and K.E. Kuettner, eds., Academic Press, New York, pp. 116-119, 1990.
280. Grodzinsky, AJ, Mechanical and electrical properties and their relevance to physiological processes, in *Methods in Cartilage Research*, A. Maroudas and K.E. Kuettner, eds., Academic Press, New York, pp. 275-281, 1990.
281. Grimshaw, PE, Grodzinsky, AJ, Yarmush, ML, and Yarmush, DM, Selective augmentation of macromolecular transport in gels by electrodiffusion and electrokinetics, *Chem Eng Sci*, 45:2917-2929, 1990.
282. Grodzinsky, AJ and Grimshaw, PE, Electrically and chemically controlled hydrogels for drug delivery, in *pulsed and self regulated drug delivery*, Y. Kost, ed., CRC Press, Boca Raton, pp. 47-64, 1990.
283. Grodzinsky, AJ and Frank, EH, Electromechanical and physicochemical regulation of cartilage strength and metabolism, in *Connective Tissue Matrix: Volume II Topics in Molecular and Structural Biology*, D. Hukins, ed., MacMillan, London, pp. 91-126, 1990.
284. Sah, RL-Y, Grodzinsky, AJ, Plaas, AHK, and Sandy, JD, Effect of tissue compression on the hyaluronate binding properties of newly synthesized proteoglycans in cartilage explants, *Biochemical J*, 267:803-808, 1990.
285. Sachs, JR and Grodzinsky, AJ, A mathematical model of an electromechanically coupled poroelastic medium driven by an electric current, *PhysicoChemical Hydrodynamics*, 11:585-614, 1989.
286. Sah, RL, Kim, YJ, Doong, JY, Grodzinsky, AJ, Plaas, AHK, and Sandy, JD, Biosynthetic response of cartilage explants to dynamic compression, *J Orthop Res*, 7:619-636, 1989.
287. Gray, ML, Pizzanelli, AM, Lee, RC, Grodzinsky, AJ, and Swann, DA, Kinetics of chondrocyte biosynthetic response to compressive load and release, *Biochim Biophys Acta*, 991:415-425, 1989.
288. Grimshaw, PE, Grodzinsky, AJ, Yarmush, ML and Yarmush, DM, Dynamic membranes for protein transport: chemical and electrical control, *Chem Eng Sci*, 44:827-840, 1989.
289. Eisenberg, SR and Grodzinsky, AJ, Electrokinetic micromodel of extracellular matrix and other polyelectrolyte networks, *PhysicoChemical Hydrodynamics*, 10:517-539, 1988.

290. Kim, YJ, Sah, RL, Doong, JY and Grodzinsky, AJ, Fluorometric assay of DNA in cartilage explants using Hoechst 33258, *Analytical Biochemistry*, 174:168-176, 1988.
291. Gray, ML, Pizzanelli, AM, Grodzinsky, AJ, and Lee, RC, Mechanical and physicochemical determinants of chondrocyte biosynthetic response, *J Orthop Res*, 6:777-792, 1988.
292. Sah, RL-Y, and Grodzinsky, AJ, Biosynthetic response to mechanical and electrical forces: calf articular cartilage in organ culture, in *Biology of Tooth Movement*, L.A. Norton and C.J. Burstone, eds, CRC Press, Florida, pp. 335-347, 1988.
293. MacGinitie, LA, Grodzinsky, AJ, Frank, EH, and Gluzband, YA, Frequency and amplitude dependence of electric field interactions: electrokinetics and biosynthesis, in *mechanistic approaches to interaction of electric and electromagnetic fields with living systems*, M. Blank and E. Findl, eds., Plenum Press, New York, pp. 133-149, 1987.
294. Grodzinsky, AJ, Electromechanical transduction and transport in the extracellular matrix, *Adv Microcirc*, 13:35-46, 1987.
295. Frank, EH, Grodzinsky, AJ, Koob, TJ, and Eyre, DR, Streaming potentials: a sensitive index of enzymatic degradation in articular cartilage, *J Orthop Res*, 5:497-508, 1987.
296. Frank, EH, and Grodzinsky, AJ, Cartilage Electromechanics II: a continuum model of cartilage electrokinetics and correlation with experiments, *J Biomechanics*, 20:629-639, 1987.
297. Frank, EH, and Grodzinsky, AJ, Cartilage Electromechanics I: electrokinetic transduction and the effects of pH and ionic strength, *J Biomechanics*, 20:615-627, 1987.
298. Lavine, LS and Grodzinsky, AJ, Current Concepts: Electrical stimulation of repair of bone, *J Bone and Joint Surgery*, 69A:626-630, 1987.
299. Eisenberg, SR, and Grodzinsky, AJ, The kinetics of chemically induced nonequilibrium swelling of articular cartilage and corneal stroma, *J Biomech Eng* 109:79-89, 1987.
300. Valleton, JM, Grodzinsky, AJ, and Selegny, E, Theoretical study of mechanochemical coupling in a compartmental enzyme system, *Biophys Chem*, 26:29-38, 1986.
301. Valleton JM and Grodzinsky, AJ, Conductivity mediated regulation in a compartmental enzyme system: superactivation and conductance bistability, *Biophys Chem*, 24:277-284, 1986.
302. Weiss, AM, Grodzinsky, AJ, Yarmush, ML, Chemically and electrically controlled membranes: size specific transport of fluorescent solutes through PMMA membranes, *AIChE Symp. 250 Adv. in Separation Techniques*, 82:85-98, 1986.
303. Frank, EH, Kavesh, NG and Grodzinsky, AJ, Continuum theory and measurement of cartilage electrokinetics: relevance to stimulation of chondrocyte biosynthesis, in *Bioelectric Repair and Growth*, H. Takahashi, ed., Nishimura Co. Ltd., Niigata, Tokyo, pp. 85-91, 1985.
304. Eisenberg, SR and Grodzinsky, AJ, Swelling of articular cartilage and other connective tissues: electromechanochemical forces, *J Orthop Res* 3:148-159, 1985.
305. Grodzinsky, AJ and Weiss, AM, Electric field control of membrane permeability, *Separation and Purification Methods*, 14:1-40, 1985.
306. Eisenberg, SR and Grodzinsky, AJ, Electrically modulated membrane permeability, *J Membrane Sci*, 19:173-194, 1984.
307. Grodzinsky, AJ and Hey, LA, Skeletal tissue electromechanics and electrical stimulation of growth and remodeling, *IEEE Eng Med Biol*, 2:18-22, 1983.

308. Hoch, DH, Grodzinsky, AJ, Koob, TJ, Albert, ML, and Eyre, DR, Early changes in material properties of rabbit articular cartilage after meniscectomy, *J Orthop Res*, 1:4-12, 1983.
309. Grodzinsky, AJ, Electromechanical and physicochemical properties of connective tissues, *CRC Critical Reviews in Biomed Eng*, 9:133-199, 1983.
310. Grodzinsky, AJ, Chen, TL, and Newton, DW, Physical characterization of electrosurgical coagulation, *J Surgical Res*, 33:469-481, 1982.
311. Lee, RC, Frank, EH, Grodzinsky, AJ, and Roylance, DK, Oscillatory compressional behavior of articular cartilage and its associated electromechanical properties, *J Biomechan Eng*, 103:280-292, 1981.
312. Grodzinsky, AJ, Roth, V, Myers, E, Grossman, WD, and Mow, VC, The significance of electromechanical and osmotic forces in the non-equilibrium behavior of articular cartilage in tension, *J Biomechanical Eng*, 103:221-231, 1981.
313. Nussbaum, JH and Grodzinsky, AJ, Proton diffusion-reaction in a protein membrane and the kinetics of electromechanical forces, *J Membrane Sci*, 8:193-219, 1981. (Also presented at 7th Northeast Bioeng. Conf., Troy, N. Y., 1979, and awarded one of the Best of Conference designations).
314. Shoenfeld, NA and Grodzinsky, AJ, The contribution of electrodiffusion to the dynamics of electrically-stimulated changes in mechanical properties of collagen membranes, *Biopolymers*, 19:241-262, 1980.
315. Lee, RC, Grodzinsky, AJ and Glimcher, MJ, Electromechanics of Normal and Chemically modified Cartilage, in *Electrical Properties of Bone and Cartilage: Experimental Effects and Clinical Applications*, C. T. Brighton, J. Black, and S. R. Pollack, eds., Grune and Stratton, New York, pp. 47-56, 1979.
316. Roth, V, Mow, VC and Grodzinsky, AJ, Biophysics and electromechanics of articular cartilage, in *techniques for skeletal research*, D. J. Simmons and A. S. Kunin, eds., Academic Press, New York, pp. 301-341, 1979.
317. Grodzinsky, AJ, Lipshitz, H and Glimcher, MJ, Electromechanical properties of articular cartilage during compression and stress relaxation, *Nature*, 175:448-450, 1978.
318. Grodzinsky, AJ and Eisenberg, SR, Double Layer Mediated Energy Conversion with a Protein Membrane Using an Imposed Frequency and Wavelength, *J. Electrostatics*, 5:33-50, 1978.
319. Grodzinsky, AJ and Shoenfeld, NA, Tensile forces induced in collagen by means of electromechanochemical transductive coupling, *Polymer*, 18:435-443, 1977.
320. Picheny, MA and Grodzinsky, AJ, Method for measurement of charge on collagen and polyelectrolyte composite membranes, *Biopolymers*, 15:184-1851, 1977.
321. Grodzinsky, AJ and Melcher, JR, Electromechanical transduction with charged polyelectrolyte membranes, *IEEE Trans. on Biomed. Eng.*, BME-23:421-433, 1976.
322. Yannas, IV and Grodzinsky, AJ, Electromechanical conversion with collagen fibers in an aqueous medium, *J. Mechanochem. Cell Motility*, 2:113-125, 1973.

REFEREED CONFERENCE PAPERS and ABSTRACTS:

1. Krishnan, Y, Rees, HA, Rossitto, CP, Kim, S-E, Hung, HK, Frank, EH, Olsen, BD, Liu, DR, Hammond, PT, Grodzinsky, AJ, Engineered Green Fluorescent Proteins: Cartilage-Targeted Delivery Nanocarriers that Provide Insights on the Effects of Charge on Transport into Dense Charged Tissues, 2018 AIChE Annual Meeting, Oct 28 – Nov 2, Pittsburgh, 2018.
2. Krishnan, Y, Rossitto, CP, Hung, HK, Hammond, PT, Grodzinsky, AJ, Articular Joint on a Chip: An In-Vitro Co-Culture System of Cartilage and Joint Capsule Synovium to Simulate Post-Traumatic Osteoarthritis, , 2018 AIChE Annual Meeting, Oct 28 – Nov 2, Pittsburgh, 2018.
3. Orozco, G, Tanska, P, Florea, C, Grodzinsky, AJ, Korhonen, R, A mechanobiological model to predict proteoglycan loss in injured cartilage: numerical analysis integrated with experimental results, World Congress of Biomechanics, July 8-12, Dublin, Ireland, 2018.
4. Oftadeh, R, Heilig, J, Zaucke, F, Niehoff, A, Grodzinsky, AJ, High-bandwidth Atomic Force Microscopy (AFM) based rheology of murine cartilage reveals degeneration of collagen IX knock out mice cartilage compared to wild type cartilage in terms of equilibrium and dynamic fluid–solid interaction properties, 2018 OARSI World Congress on Osteoarthritis, Liverpool, April 26-29, 2018.
5. Krishnan, Y, Rees, HA, Rossitto, CP, Hung, HK, Frank, EH, Hammond, PT, Liu, DR, Grodzinsky, AJ, Cationic GFPs: Cartilage-Targeted, Chondrocyte Penetrating Proteins that are Potential Delivery Carriers for PTOA, 64th Trans Orthop Res Soc, New Orleans, March 10-14, 2018.
6. Ibañez, JR, Zlotnick, HM, Leonard, A, Friedman, NL, Grodzinsky, AJ, Bioabsorbable Solid Scaffold with Cell-Seeded Hydrogel Improves Early Cartilage Neotissue Synthesis and Strength, 64th Trans Orthop Res Soc, New Orleans, March 10-14, 2018.
7. Conizzo, BK, Grodzinsky, AJ, Bone and Muscle Degradation Impact Tendon Viability in a Murine Rotator Cuff Explant Organ Culture Model, 64th Trans Orthop Res Soc, New Orleans, March 10-14, 2018.
8. Orozco, G, Tanska, P, Eskelinen, AS, Florea, C, Grodzinsky, AJ, Korhonen, RK, Mechanisms to reveal how normal dynamic loading causes proteoglycan loss in mechanically injured cartilage: A mechanobiological model combined with experimental findings, 64th Trans Orthop Res Soc, New Orleans, March 10-14, 2018.
9. Dwivedi, G, Flaman, L, Krishnan, Y, Hung, HK, Geishecker, E, Chubinskya, S, Rosen, V, Cirit, M, Grodzinsky, AJ, Development and characterization of human cartilage-bone-synovium microphysiological system for studies on Earth and in Space, 64th Trans Orthop Res Soc, New Orleans, March 10-14, 2018.
10. Geiger, BC, Wang, S, Grodzinsky, AJ, Hammond, PT, Cartilage Penetrating Nanocarrier Formulation Improves Pharmacokinetics and Efficacy of Growth Factor in a Rat Surgical Model of Osteoarthritis, 64th Trans Orthop Res Soc, New Orleans, March 10-14, 2018.
11. Brianne K. Connizzo, Alan J. Grodzinsky, Aged supraspinatus tendons have altered dynamic compressive and poroelastic properties, Summer Biomechanics, Bioengineering and Biotransport Meeting, Tucson, June 21-24, 2017.
12. Oftadeh, R, Grodzinsky, AJ, Biological tissues show poroelastic and viscoelastic behavior at different frequency spectrums, Summer Biomechanics, Bioengineering and Biotransport Meeting, Tucson, June 21-24, 2017.

13. Wang, Y, Wan, S Drago, J, White, FM, Grodzinsky, AJ, Phosphoproteomics analysis of signaling changes in human chondrocytes following treatment with IL-1, IGF-1 and dexamethasone, 2017 OARSI World Congress on Osteoarthritis, Las Vegas, April 27-30, 2017.
14. Wang, Y, Lorenzo, P, Chubinskaya, S, Grodzinsky, AJ, Önnarfjord, P, Dexamethasone treatment alters the response of human cartilage explants to inflammatory cytokines and mechanical injury as revealed by discovery proteomics, 2017 OARSI World Congress on Osteoarthritis, Las Vegas, April 27-30, 2017.
15. Zanotto, GM, Liebesny, P, Barrett, M, Zlotnick, H, Grodzinsky, AJ, Frisbie, D, Trypsin Pre-Treatment Combined With Growth-Factor Functionalized Self-Assembling Peptide Hydrogel For Integrative Cartilage Repair In A Rabbit Model, 63rd Trans Orthop Res Soc, San Diego, March 19-22, 2017.
16. Zlotnick HM, Apostol AA, Chen HJ, Liebesny PH, Mrosczyk KA, Grodzinsky AJ, Clinically Relevant Enzyme Pretreatment Promotes Cell Migration Across Wound Edge in a Cartilage Defect Model, 63rd Trans Orthop Res Soc, San Diego, March 19-22, 2017.
17. Behrendt P; Moritz J. Feldheim, MJ, Haake, M, Preusse-Prange A, Grodzinsky AJ, Seekamp A, Rolauuffs B, Kurz B, IL-10 Promotes Chondro-Regeneration In Articular Chondrocytes After Injurious Compression, 63rd Trans Orthop Res Soc, San Diego, March 19-22, 2017.
18. Behrendt P; Feldheim JM; Preusse-Prange, A; Bayer A; Grodzinsky AJ; Seekamp, A; Lippross S; Kurz B, Platelets Rich in Growth Factors Modulates Apoptosis And Extracellular Matrix Degeneration After Injurious Compression Of Human Articular Cartilage, 63rd Trans Orthop Res Soc, San Diego, March 19-22, 2017.
19. Connizzo BK, Grodzinsky, AJ, Dynamic Compressive Mechanical Properties of Supraspinatus Tendons Are Altered in Aged Mice, 63rd Trans Orthop Res Soc, San Diego, March 19-22, 2017.
20. Zlotnick, HM; Liebesny, PH; Mrosczyk, KA; Hung, HH; Frank, EH; Grodzinsky, AJ, Heparin-Binding-IGF-1 Improves Interfacial Integration Between a Chondrocyte-Seeded Peptide Hydrogel and a Bovine Cartilage Annulus, International Cartilage Repair Society Conference, Chicago, September 24-27, Sorrento-Naples, Italy, 2016.
21. Liebesny, PH; Frank, EH; Kim, KS; Ibañez, JR; Patwari, P; Grodzinsky, AJ, Uptake kinetics of heparin-binding insulin-like growth factor-1 into adult human cartilage, International Cartilage Repair Society Conference, Chicago, September 24-27, Sorrento-Naples, Italy, 2016.
22. Önnarfjord, P, Wang, Y, Li, Y, Lorenzo, P, Holmgren, K, Grodzinsky, AJ, Dexamethasone treatment in a mechanical injury cartilage explant culture model studied by proteomics, 2016 OARSI World Congress on Osteoarthritis, Amsterdam, March 31, April 3, 2016.
23. Grodzinsky, A, Novel Approaches to Delivery of Intra-articular Therapy in OA, Breakfast Workshop, 2016 OARSI World Congress on Osteoarthritis, Amsterdam, March 31, April 3, 2016.
24. Z. Hajjarian, S. Ahn, H. Tavakoli Nia, D. Tshikudi, A. Grodzinsky, and S. Nadkarni, Laser speckle micro rheology for micromechanical mapping of biomaterials, SPIE Photonics West, San Francisco, February 13-18, 2016.
25. Mrosczyk, KA, Zlotnick, HM, Liebesny, P, Hung, HH, Grodzinsky, AJ, Release of Heparin Binding- IGF-1 from a Self-Assembling Peptide Hydrogel Coupled with an Enzyme Pre-Treatment for

Integrative Cartilage Repair, International Cartilage Repair Society Conference, Chicago, May 8-11, 2015.

26. Liebesny, PH, Mroszczyk, KA; Zlotnick, HM; ¹Hung, HH; Frisbie, DD, Kisiday JD, Grodzinsky, AJ, Growth Factor-Mediated Migration of Trabecular Bone-Derived Progenitor Cells for Accelerated Scaffold Population, International Cartilage Repair Society Conference, Chicago, May 8-11, 2015.
27. Y. Wang, Y. Li, A. Khabut, S. Chubinskaya, E. Ahrman, A. J. Grodzinsky, P. Onnerfjord, Quantitative proteomics analysis of cartilage response to mechanical injury and cytokine treatment, 2015 OARSI World Congress on Osteoarthritis, Seattle, April 30 – May 3, 2015.
28. Azadi, M, Nia, HT, Gauci, S, Ortiz, C, Fosang, A, Grodzinsky, AJ, Effect of aggrecanase and collagenase resistant knock-in, age and joint-overuse on murine cartilage, 2015 OARSI World Congress on Osteoarthritis, Seattle, April 30 – May 3, 2015.
29. Bajpayee, AG, Scheu, M, Vega, RD, Varady, NH, Yannatos, IA, Porter, RM, Grodzinsky, AJ, Single dose intra-cartilage delivery of dexamethasone from Avidin, a cationic drug carrier, attenuates injury induced catabolic effects in knee Joints of mature rabbits in vivo, 2015 OARSI World Congress on Osteoarthritis, Seattle, April 30 – May 3, 2015.
30. Varady, N, Grodzinsky, AJ, Osteoarthritis Year in Review: Mechanics, 2015 OARSI World Congress on Osteoarthritis, Seattle, April 30 – May 3, 2015.
31. Bajpayee, AG, Vega, RD, Scheu, AM, Varady, NH, Yannatos, IA, Grodzinsky, AJ, Porter, RM, Sustained intra-articular delivery of corticosteroids using the cationic carrier Avidin to prevent post-traumatic osteoarthritis, Harvard Orthopaedic Trauma Research Day, Harvard Medical School, June 6, 2015.
32. Nia, HT, Azadi, M, Bozchalooi, IS, Li, Y, Han, L, Hung, HH, Frank, E, Yousef-Toumi, K, Ortiz, C, Grodzinsky, AJ, AFM-Based High-Frequency Rheology of Cartilage as a Sensitive Method to Measure Matrix Degradation, NanoBIONODE Nanoindentation Workshop, University of Illinois at the Urbana-Champaign campus on April 1-2, 2015.
33. H.T. Nia, L. Han, M. Azadi, C. Ortiz, A. J. Grodzinsky, Fluid-Solid Interactions within Aggrecan Proteoglycan Networks: Molecular Origins of Tissue-Level Biomechanics and Functioning of Cartilage, NanoBIONODE Nanoindentation Workshop, University of Illinois at the Urbana-Champaign campus on April 1-2, 2015.
34. Hosseine A, Wang, Y, Torriani, M, Grodzinsky, AJ, Li G, Correlation of T1rho and T2 relaxation times with glycosaminoglycan and water content of articular cartilage, 61st Trans Orthop Res Soc, San Francisco, March 28-31, 2015.
35. Rothdiener, M, Felka, T Uynuk-Ool, T, Ochs, BG, Stoeckle, U, Grodzinsky, AJ, Rolauffs, B, OA chondrons: a biosynthetically active cell population capable of responding to biomechanical loads within the implant, 61st Trans Orthop Res Soc, San Francisco, March 28-31, 2015.
36. Bae, JH, Hosseini, A, Wang, Y, Jasty, N, Torriani, T, Gill, TJ, Grodzinsky, AJ, Li, G, Quantitative analysis of T2 relaxation times of the knee cartilage 3 years after ACL reconstruction, 61st Trans Orthop Res Soc, San Francisco, March 28-31, 2015.
37. Behrendt, P, Preusse-Prange, A, Grodzinsky, AJ, Kurz, B, IL-10 Reduces Apoptosis And Extracellular Matrix Degeneration After Injurious Compression Of Bovine Articular Cartilage, 61st Trans Orthop Res Soc, San Francisco, March 28-31, 2015.

38. Azadi, M, Nia, HT, Grodzinsky, AJ, Ortiz, C, AFM Nanodynamics a complementary tool to conventional micromechanical afm-contact assessment for time dependent biomaterial, AFM BioMed Conference San Diego, December (13)14-17, 2014.
39. M. Azadi, H. Tavakoli Nia, C. Ortiz, and A. Grodzinsky, Comparison of Nano and Micro scale Mechanics of Murine Articular Cartilage, IEEE Engin in Medicine and Biology, Chicago, Aug 26-30, 2014.
40. R Kodihalli, Ca Chopko, Y Wang, JY Ramseier, JS Wishnok, LG Griffith, AJ Grodzinsky, SR Tannenbaum, Functional Proteomics of Matrix Metalloproteases in a Model of Osteoarthritis, Amer Chem Soc, San Francisco, CA, August 10-14, 2014.
41. Ali Hosseini¹, Yang Wang², Martin Torriani³, Alan J Grodzinsky², Guoan Li, Correlation of T_{1ρ} and T₂ relaxation times values with Glycosaminoglycan Articular Cartilage, World Congress of Biomechanics, Boston, July 6-11, 2014.
42. Smith, D, Gardner, B, Grodzinsky, AJ, Aggrecan in cartilage, World Congress of Biomechanics, Boston, July 6-11, 2014.
43. Wang, Y, Li, Y, Bajpayee, AG, Grodzinsky AJ, Chondrocyte response to overload injury: relevance to post-traumatic osteoarthritis, World Congress of Biomechanics, Boston, July 6-11, 2014.
44. Azadi, M, Nia, HT, Grodzinsky AJ, Ortiz, C, Nonlinear nanomechanics of murine articular cartilage, World Congress of Biomechanics, Boston, July 6-11, 2014.
45. Nia, HT, Han, L, Azadi, M, Roughley, P, Ortiz, C, Grodzinsky, AJ, Fluid-solid interactions within aggrecan proteoglycan networks: molecular origins of tissue-level biomechanics and functioning of cartilage, World Congress of Biomechanics, Boston, July 6-11, 2014.
46. Dean, DMD, Han, L, Ortiz, C, Grodzinsky, AJ, Nanomechanics of aggrecan macromolecules, World Congress of Biomechanics, Boston, July 6-11, 2014.
47. Prokopovich, P, Perni, S, Khan, IS, Nia HT, Grodzinsky AJ, In vitro replication of the time-response mechanical properties changes of articular cartilages following in vivo maturation, World Congress of Biomechanics, Boston, July 6-11, 2014.
48. Bajpayee, AG, Scheu, AM, Porter, RM, Grodzinsky, AJ, Electrostatic interactions enable rapid penetration, enhanced uptake, and retention of intraarticularly injected Avidin in rat knee joints, Proc 2013 OARSI World Congress on Osteoarthritis, Paris, France, April 24-27, 2014.
49. Hansson, M, Swärd, P, Wang, Y, Lohmander, S, Grodzinsky, A, Struglics, A, Does joint capsule and synovial fluid contain proteases capable of degrading aggrecan? , Proc 2014 OARSI World Congress Osteoarthritis, Paris, France, April 24-27, 2014.
50. Bajpayee, AG, Scheu, M, Porter, R, Grodzinsky, AJ, Avidin as a carrier for drug delivery into cartilage: electrostatic interactions enable rapid penetration, enhanced uptake, and retention of intra-articular injected avidin in rat knee joints, 60th Trans Orthop Res Soc, New Orleans, March 15-18, 2014.
51. Ali Hosseini, A, Wang, Y, Jasty, N, Torriani M, Grodzinsky, AJ, Li, G, Correlation of T₂ relaxation times with glycosaminoglycan and h₂O content in articular cartilage: a validation study, 60th Trans Orthop Res Soc, New Orleans, March 15-18, 2014.

52. Ogawa, H, Kozhemyakina, E, Hung, HK, Grodzinsky, AJ, Lassar, AB, Mechanical motion promotes expression of prg4 in articular cartilage via multiple creb-dependent, fluid flow shear stress-induced signaling pathways, 60th Trans Orthop Res Soc, New Orleans, March 15-18, 2014.
53. Nia, HT, Gauci, S, Hung, HK, Azadi, M, Frank, EH, Fosang, A, Ortiz, C, Grodzinsky, AJ, High-bandwidth AFM-based rheology is a sensitive differentiator of GAG-depletion in mouse cartilage, 60th Trans Orthop Res Soc, New Orleans, March 15-18, 2014.
54. Li, Qing¹; Gamer, LW, Doyran, B, Spiller, K, Yin, J, Grodzinsky, AJ, Rosen, V, Han, L, Nanomechanical Phenotype of BMP-2 Deficient Murine Meniscus, 60th Trans Orthop Res Soc, New Orleans, March 15-18, 2014.
55. Hadi Tavakoli Nia, Lin Han, Iman Soltani, Kamal Youcef-Toumi, Christine Ortiz, Alan Grodzinsky, Molecular Mechanisms Underlying Cartilage Poroelasticity, ASME, AMD Summer Meeting and Society of Engineering Science Joint Meeting, Providence, RI, July 28-31, 2013.
56. M Batista, HT Nia, K Cox, AJ Grodzinsky, C Ortiz, D Heinegård, L Han, Role of Chondroaderin in Nanoscale Tissue Assembly and Biomechanics of Murine Articular Cartilage, 59th Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
57. E Florine, RT Lee, P Patwari, AJ Grodzinsky, HB-IGF-1 Adsorbed to Self-Assembling Peptide Enhances Matrix Production by Encapsulated Chondrocytes and Co-Cultured Cartilage Explants, 59th Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
58. HT Nia, Y Li, Y Wang, I Bozchalooi, SG Chubinskaya, K Yousef-Toumi, C Ortiz, AJ Grodzinsky, Depth-dependent self-stiffening, energy dissipation and poroelastic properties of normal human cartilage via broad-spectrum dynamic nanoindentation, 59th Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
59. Y Wang, Y Li, P Kopesky, SG Chubinskaya, B Schoeberl, AJ Grodzinsky, IGF-1 and Dex Reduced Matrix Degradation in IL-1 α -Treated Bovine Cartilage and IL-1 α -Injury-treated Human Cartilage, Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
60. AG Bajpayee, CR Wong, MG Bawendi, AJ Grodzinsky, Size Dependent Transport of Nanoparticles and Macromolecules into Cartilage: Relevance to Particle Based Osteoarthritis Drug Delivery Systems, 59th Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
61. HTavakoli Nia, LHan, I Bozchalooi, K Youcef-Toumi, AJ Grodzinsky, C Ortiz, Frequency-Dependent Nanomechanical Behavior of Aggrecan Demonstrates that Aggrecan is the Dominant Constituent Responsible for the Frequency Dependence of Cartilage Poroelasticity, 59th Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
62. UP Palukuru, MJ Shockley, CM McGoverin, PB Glenn, RG Spencer, EH Frank, AJ Grodzinsky, N Pleshko, Inferior Mechanical Properties Reflect Suboptimal Spatial Distribution of Matrix Components in Engineered Cartilage, 59th Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
63. T Felka, C Pacione, R Mehling, U Stoeckle, W Aicher, S Chubinskaya, AJ Grodzinsky, MA Wimmer, B Rolauuffs, Cell Death due to Biomechanical Wear Damage Leads to a Population of Surviving but Spatially Thinned Out Chondrocytes, 59th Trans Orthop Res Soc, San Antonio, Jan 26-29, 2013.
64. Nia, HT, Bozchalooi, IS, Li, Y, Han, L, Hung, HK, Frank, E, Yousef-Toumi, K, Ortiz, C, Grodzinsky, AJ, AFM-Based High-Frequency Rheology of Cartilage as a Sensitive Method to Measure Matrix Degradation, Trans Materials Research Society, Boston, Nov 26-30, 2012.

65. Nia, HT, Han, L, Bozchalooi, IS, Yousef-Toumi, K, Grodzinsky, AJ, Ortiz, C, Dynamic Nanomechanics of End Grafted Aggrecan Monolayers Reveals Energy Dissipation and Self-stiffening Properties of Cartilage at the Nanoscale, Trans Materials Research Society, Boston, Nov 26-30, 2012.
66. Han, L, Grodzinsky, AJ, Boyce, MC, Ortiz, C, Novel mechanics from biology: bridging nanoscience and tissue functions, East Lake International Forum on Frontiers of Science and Technology, Wuhan, China, Oct 6-8, 2012.
67. Grodzinsky AJ, Nia, HT, Lee H-Y, Han L, Ortiz, C, Aggrecan molecular mechanics meets cartilage tissue nanomechanics: relevance to cartilage repair via BMSCs in hydrogel scaffolds, 18th Australia New Zealand Orthopaedic Research Soc, Aug 30 – Sept 1, Perth Australia, 2012.
68. L. Han, L, Pazin, D, Rosen, V, Batista, M, Ortiz, C, Grodzinsky, AJ, Biomechanical properties of murine meniscus via nanoindentation, 9th World Biomaterials Congress (WBC), June 1-5, Chengdu, China, 2012.
69. Hansson, M, Swärd, P, Lohmander, S, Byun, S, Grodzinsky, A, Struglics, A, Co-incubation of bovine cartilage explants with joint capsule tissue increases aggrecan proteolysis while mechanical injury alone does not affect aggrecan degradation, Proc 2012 OARSI World Congress Osteoarthritis, Barcelona, April 26-29, 2012, in Osteoarthritis Cartilage, Suppl 1, 2012.
70. Batista, M, Grodzinsky, AJ, Ortiz, C, Heinegård, D, Han, L, Nanomechanics of murine articular cartilage reveals the effects of chondroadherin knock-outs, 9th WBC, June 1-5, Chengdu, China, 2012.
71. Han, L, Pazin, D, Rosen, V, Batista, M, Ortiz, C, Grodzinsky, AJ, Biomechanical properties of murine meniscus via nanoindentation, 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
72. Batista, M, Grodzinsky, AJ, Ortiz, C, Heinegård, D, Han, L, Nanomechanics of murine articular cartilage reveals the effects of chondroadherin knock-outs, 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
73. Rojas, FP, Lindburg, CA, Dean, D, Grodzinsky, AJ, Ortiz, C, Han, L, Molecular adhesion between cartilage extracellular matrix constituents, 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
74. Florine, EM, Miller, RE, Lee, RT, Patwari, P, Grodzinsky, AJ, Heparan sulfate is retained in peptide hydrogel scaffold via ionic interactions: Potential for delivery of HB-IGF1, 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
75. Rothdiener, M, Felka, T, Wang, Q, Uynuk-Ool, T, Ochs, BG, DeZwart, P, Ateschrang, A, Loewe, W, Albrecht, A, Badke, A, Stoeckle, U, Grodzinsky, AJ, Aicher, W, Rolauffs, B, OA chondrons outperform OA chondrocytes: possible future application in OA cartilage repair? 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
76. Li, Y, Kopesky, P, Schoeberl, B, Grodzinsky, AJ, IGF-1 reduced matrix degradation and enhanced biosynthesis in IL-1 α -treated injuriously compressed cartilage, 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
77. Goel, A, Valenica, PM, Karnik, R, Grodzinsky, AJ, Investigation of PLGA nanoparticle transport into cartilage relevant to osteoarthritis drug delivery systems, 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
78. Tavakoli Nia, H, Soltani, I, Li, Y, Frank, E, Yousef-Toumi, K, Grodzinsky, AJ, Ortiz, C, The effect of GAG depletion on cartilage nanoscale hydraulic permeability, 58th Trans Orthop Res Soc, San Francisco, Feb 3-7, 2012.
79. Rijas, FP, Batista, M, Grodzinsky, AJ, Ortiz, C, Han, Lin, Molecular interactions between cartilage extracellular matrix constituents determine its tissue integrity, 4th International Conference on the Mechanics of Biomaterials and Tissues, Waikola Beach, Hawaii, USA, Dec 11-14, 2011.

80. Nia, HT, Han, L, Li, Y, Ortiz, C, Grodzinsky, AJ, Poro/viscoelasticity of Cartilage at the Nanoscale, 4th International Conference on the Mechanics of Biomaterials and Tissues, Waikola Beach, Hawaii, USA, Dec 11-14, 2011.
81. Batista, MA, Grodzinsky, AJ, Ortiz, C, Heinegard, D, Han, L, Nanomechanics of murine articular cartilage reveals the effects of chondroadherin knockouts, Trans Materials Research Society, 004.2, Boston, Nov 28-Dec 2, 2011.
82. Rojas, F, Grodzinsky, AJ, Ortiz, C, Han, L, Molecular interactions between aggrecan and collagen from the cartilage extracellular matrix, Trans Materials Research Society, 004.3, Boston, Nov 28-Dec 2, 2011.
83. Lammentausta, E, Frank, EH, Grodzinsky, AJ, Dahlberg, LE, Contrast diffusion in dGEMRIC in vitro and in vivo, Trans International Society for Magnetic Resonance in Medicine, Montreal, Canada, May 7-13, 2011.
84. O. Irrechukwu, S. von-Thaer, E. H. Frank, D. Reiter, A. Grodzinsky, R. Spencer, Relationship between Relaxation Component T2 values and Weight Fractions and Mechanical Moduli in Native Cartilage, Trans International Society for Magnetic Resonance in Medicine, Montreal, Canada, May 7-13, 2011.
85. Lammentausta, E, Frank, EH, Grodzinsky, AJ, Dahlberg, LE, Contrast diffusion in dGEMRIC: exploring Donnan equilibrium in vitro and in vivo, 57th Trans Orthop Res Soc, Long Beach, Jan 13-16, 2011.
86. Tavakoli Nia, H, Han, L, Li, Y, Ortiz, C, Grodzinsky, AJ, Poroelasticity is the dominant energy dissipation mechanism in cartilage at the nano-scale, 57th Trans Orthop Res Soc, Long Beach, Jan 13-16, 2011.
87. Florine, EM, Miller, RE, Grodzinsky, AJ, Effects of Dexamethasone on human BMSCs in agarose and self-assembling peptide hydrogels, 57th Trans Orthop Res Soc, Long Beach, Jan 13-16, 2011.
88. Li, Y, Frank, EH, Grodzinsky, AJ, Intact superficial zone lowers GAG loss mediated by dynamic compression of injured/cytokine-treated cartilage, 57th Trans Orthop Res Soc, Long Beach, Jan 13-16, 2011.
89. Li, YF, Li, Y, Xu, L, Servais, J, Frank, EH, Lazarev, A, Olsen, BR, Grodzinsky, AJ, Medici, D, 57th Trans Orthop Res Soc, Long Beach, Jan 13-16, 2011.
90. Nia, HT, Han L, Grodzinsky AJ, Ortiz C, Micro- and nanoscale poroelasticity of cartilage, Materials Research Society, Boston, Nov 29 – Dec 3, 2010.
91. Miller RE, Li Y, Li J, Das R, Malfait AM, Sandy J, Plaas A, Hung H-H, Frank EF, Grodzinsky AJ, Effects of dynamic loading on injured articular cartilage *in vitro* and *in vivo*, Amer College Rheumatology Meeting, Atlanta, GA, Nov 7-11, 2010.
92. Rolauffs, B, Rothdiener, M, Bahrs, C, Badke, A, Weise, K, Kuettner, KE, Kurz, B, Aurich, M, Grodzinsky, AJ, Aicher, WK, Onset of pre-clinical osteoarthritis: the angular spatial organization permits early diagnosis, Trans Combined Orthopaedic Research Society, Kyoto, Japan, October, 2010.
93. L. Han, L, Lee, B, Frank, EH, Greene, JJ, Hung, H-H, Ortiz, O, Grodzinsky, AJ, Nanoscale visco(poro)elasticity of native and engineered cartilage, 16th US National Congress of Theoretical and Applied Mechanics (UCTAM), State College, PA, June 27 – July 2, 2010.

94. Hufeland, M, Schunke, M, Grodzinsky AJ, Kurz, B, Mechanical injury of meniscal tissue: an in vitro model, German Society of Anatomists, Hamburg, March, 2010.
95. Sui, Y, Evans, C, Plaas, AHK, Sandy, JD, Grodzinsky, AJ, Short-term glucocorticoid treatment of cartilage abolishes the combined catabolic effects of mechanical injury and inflammatory cytokines via post-transcriptional pathways, 56th Trans Orthop Res Soc, New Orleans March 6-9, 2010.
96. Lee, H-Y, Sandy, J, Plaas, AHK, Ortiz, C, Grodzinsky, AJ, Ultrastructure of reconstituted cartilage proteoglycan aggregates studied by atomic force microscopy, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
97. Lee, CM, Kisiday, JD, McIlwraith, CW, Grodzinsky, AJ, Frisbie, DD, Co-culture of injured cartilage with synoviocytes, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
98. Miller, RE, Grodzinsky, AJ, Cummings, K, Lee, RT, Patwari, P, Intra-articular injection of HB-IGF-1 sustains delivery of IGF-1 to cartilage through binding to chondroitin sulfate, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
99. Miller, RE, Grodzinsky, AJ, Vanderploeg, EJ, Lee, C, Ferris, DJ, Barrett, MF, Kisiday, JD, Frisbie, DD, Repair of full-thickness articular cartilage defect using self-assembling peptide, growth factors, and BMSCs, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
100. Liang, F, Grodzinsky, AJ, Roughley, PJ, Ortiz, C, Ultrastructure of Individual Aggrecan Molecules from Human Intervertebral Disc, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
101. Vanderploeg, EJ, Dobner, S, Kopesky, PW, Lee, RT, Grodzinsky, AJ, A high throughput technique for evaluating BMSC chondrogenesis in 3D self-assembling peptide hydrogels, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
102. Imgenberg, J, Schunke, M, Grodzinsky, AJ, Kurz, B, 17 β -Estradiol reduces apoptosis and extracellular matrix degeneration after injurious compression of bovine articular cartilage explants, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
103. Florine, EM, Vanderploeg, EJ, Kopesky, PW, Miller, RE, Grodzinsky, AJ, Dexamethasone suppresses aggrecan catabolism in BMSC-seeded peptide hydrogels, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
104. Galley, NK, Chen, S, Frank, EH, Flannery, CR, Grodzinsky, AJ, Bonassar, LJ, Role of lubricant in articular cartilage surface damage and frictional changes after injurious compression, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
105. Byun, S, Tortorella, MD, Malfait, A-M, Fok, K, Frank, EH, Grodzinsky, AJ, Physiochemical determinants of the transport of a peptide inhibitor of PACE4 into articular cartilage, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
106. Chen, S, Nguyen, QT, Flannery, CR, Sah, RL, Grodzinsky, AJ, Induction of lubricin gene expression and protein secretion by cartilage mechanical injury is regulated through the TGF- β pathway, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
107. Hosseini, A, Van de Velde, SK, Kozanek, M, Gill, TJ, Grodzinsky, AJ, Rubash, HE, Li, G, In-vivo creep deformation of tibiofemoral articular cartilage, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.

108. Kisiday, JD, Vanderploeg, EJ, Hale, BW, McIlwraith CW, Grodzinsky AJ, Frisbie DD, Mechanical injury of explants from the articulating surface of the inner meniscus, 56th Trans Orthop Res Soc, New Orleans, March 6-9, 2010.
109. Telluride Han, L, Lee, BB, Lee, H-Y, Grodzinsky, AJ, Ortiz, C, & Christine Ortiz, Nanotechnological Studies of Tissue Engineered Cartilage, Telluride Workshop on Interfacial Phenomena in Nanostructured Materials and Devices, Telluride, CO, Feb 8-11, 2010.
110. Liang, F, Roughley, PJ, Grodzinsky, AJ, Ortiz, C, Aggrecan degradation in human intervertebral disc, Trans Materials Research Society, 004.3, Boston, Nov 30-Dec 4, 2009.
111. Lee, HY, Byun, S, Sandy, JD, Ortiz, C, Grodzinsky, AJ, Molecular-level Structure of Aggregated Cartilage Proteoglycans Reconstituted *in Vitro*, Trans Materials Research Society, 004.3, Boston, Nov 30-Dec 4, 2009.
112. Sui, Y, Evans, C, Grodzinsky, AJ, Short-term glucocorticoid treatment abolished the combined catabolic effects of TNF- α and mechanical injury, Proc 2009 OARSI World Congress on Osteoarthritis, Montreal, September 9-12, 2009, in Osteoarthritis Cartilage, Suppl 1, 17:S243-S244.
113. Chen, S, Nguyen, QT, Sah, RL-Y, Grodzinsky, AJ, The relationship between TGF- β signaling, mechanical injury, and PRG4, Proc 2009 OARSI World Congress Osteoarthritis, Montreal, September 9-12, 2009, in Osteoarthritis Cartilage, Suppl 1, 17:S249-S250.
114. Miller, RE, Grodzinsky AJ, Vanderploeg, EJ, Kopesky, PW, Florine, E, Kisiday, D, Frisbie, DD, Self-assembling peptide heals rabbit defects *in vivo*, Proc 2009 OARSI World Congress on Osteoarthritis and Cartilage, Montreal, September 9-12, 2009, in Osteoarthritis Cartilage, Suppl 1, 17:S256-S257.
115. Miller, R, Grodzinsky AJ, Cummings, K, Lee, RT, Patwari, P, Heparin-binding IGF-1 to cartilage *in vivo*, Proc 2009 OARSI World Congress on Osteoarthritis and Cartilage, Montreal, September 9-12, 2009, in Osteoarthritis Cartilage, Suppl 1, 17:S295.
116. Vanderploeg, EJ, Kopesky, PW, Byun, S, Grodzinsky, AJ, Adsorbing TGF- β 1 to self-assembling peptide scaffolds enhances BMSC chondrogenesis, Proc 2009 OARSI World Congress on Osteoarthritis and Cartilage, Montreal, September 9-12, 2009, in Osteoarthritis Cartilage, Suppl 1, 17:S257-S258.
117. Rolauuffs, B, Ochs, BG, Bahrs, C, Stuby, F, Weise, K, Grodzinsky AJ, Aicher, WK, The homogeneity of superficial zone horizontal chondrocyte organization in articular cartilage is age-dependent, 8th Intern Cartilage Repair Soc, Miami, May 23-26, 2009.
118. Lee, H-Y, Lee, B, Han, L, Ortiz, C, Grodzinsky, AJ, Nanoscale-Assessment of Cartilage Matrix Constituents using Atomic Force Microscopy, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, 2009.
119. Lee, B, Hung, HK, Kopesky, PW, Vanderploeg, EJ, Kurz, B, Frank, EH, Grodzinsky, AJ, Ortiz, C, Mechanical Properties of Stem Cells and their PCM During Chondrogenesis in 3D-Gel Culture, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 300, 2009.
120. Han, L, Plaas, AHK, Sandy, JD, Frank, EH, Hung, HH, Anemaet, W, Ortiz, C, Grodzinsky, AJ, Nanomechanics of Murine Knee Joints Reveals Effects of Maturation and Inflammation, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 324, 2009.
121. Galley, N, Chen, S, Flannery, C, Grodzinsky, AJ, Frank, EH, Jones, A, Bonassar, LJ, Strain Rate Dependence of Articular Cartilage Surface Damage and Frictional Changes During Injurious, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 117, 2009.

122. Lee, H-Y, Kopesky, PW, Plaas, AHK, Diaz, M, Sandy, JD, Frisbie, D, Kisiday, JD, Ortiz, C, Grodzinsky AJ, Adult Equine MSCs Synthesize Aggrecan Having Nanomechanical Compressibility and Biochemical Composition Characteristic of Young Growth Cartilage, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 172, 2009.
123. Vanderploeg, EJ, Kopesky, PW, Grodzinsky, AJ, Incorporating Collagen into Self-Assembling Peptide Hydrogels Influences Mesenchymal Stem Cell Morphology, Proliferation and Biosynthesis During Chondrogenesis, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 933, 2009.
124. Lee, H-Y, Roughley, P, Grodzinsky, AJ, Ortiz, C, Variations in Single Molecule Human Aggrecan Molecular Structure and Conformation after Removal of Chondroitin Sulfate and Keratan Sulfate, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 1042, 2009.
125. Sui, Y, Sinskey, Y, Byun, S, Grodzinsky, AJ, Mechanical Injury and the Inflammatory Cytokines TNF- α and IL-6/sIL-6R Combine to Upregulate Gene Expression of Matrix Proteases and iNOS, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 1056, 2009.
126. Swaminathan, K, Stevens, AL, Indrakanti, R, Miller, RE, Wishnok, J, Tannenbaum, SR, Grodzinsky, AJ, Additive Effects of Injurious Compression and Inflammatory Cytokines on Cartilage Damage and Chondrocyte Response: a Proteomics Approach, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 1087, 2009.
127. Byun, S, Sinskey, Y, Sui, Y, Frank, EH, Grodzinsky, AJ, Transport and Binding of Tumor Necrosis Factor- α to Matrix Sites in Articular Cartilage, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 1186, 2009.
128. Kopesky, PW, Vanderploeg, EJ, Kisiday, JD, Frisbie, D, Sandy, JD, Grodzinsky, AJ, A Single-Dose of TGF- β Induces Chondrogenesis in MSC-Seeded Peptide and Agarose Hydrogels, 55th Trans Orthop Res Soc, Las Vegas, Feb 22-25, p. 1303, 2009.
129. Vanderploeg, EJ, Kopesky, PW, Grodzinsky, AJ, Doping self-assembling peptide hydrogels with collagens promotes chondrogenesis of mesenchymal stem cells, Trans Tissue Engineering and Regenerative Medicine International Society (TERMIS), San Diego, Dec 7-10, 2008.
130. Kopesky, PW, Vanderploeg, EJ, Kurz, B, Grodzinsky, AJ, Self-assembling peptide hydrogels enhance msc proliferation and accumulation of a cartilage-like ECM, Trans Tissue Engineering and Regenerative Medicine International Society (TERMIS), San Diego, Dec 7-10, 2008.
131. Lee B, Hung, HK, Kopesky, PW, Vanderploeg, EJ, Kurz, B, Frank, EH, Grodzinsky, AJ, Ortiz, C, Mechanical properties of individual mesenchymal stem cells and their pericellular matrix during chondrogenesis in 3D tissue engineered constructs, Trans Materials Research Society, Boston, Dec 1-5, 2008.
132. Lee, H-Y, Roughley, PJ, Grodzinsky, AJ, Ortiz, C, Variations in single molecule aggrecan molecular structure and conformation after removal of selected GAG constituents, Trans Materials Research Society, Boston, Dec 1-5, 2008.
133. Lee, H-Y, Kopesky, PW, Daher, L, Pelegrina, AM, Frisbie, D, Kisiday, JD, Ortiz, C, Grodzinsky, AJ, Morphology of aggrecan produced by equine mesenchymal stem cells and chondrocytes in self-assembling peptide hydrogels, Trans Materials Research Society, Boston, Dec 1-5, 2008.
134. Fan, Y, Grodzinsky, AJ, Modulation of lubricin gene expression following cartilage mechanical injury, AICHE Annual Meeting, paper 116bb, Phila, PA, November 16-21, 2008

135. Wheeler, C, Perez, A, Kurz, B, Grodzinsky AJ, Influence of Op-1 And Igf-1 on Cartilage Subjected to Combined Mechanical Injury and Co-Culture with Joint Capsule, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 53, 2008.
136. Lee, H-Y, Han, L, Daher, L, Bonaparte, R, Roughley, PJ, Ortiz, C, Grodzinsky, AJ, Age-Related Changes in Human Aggrecan Molecular Structure and Its Nanomechanical Properties, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 64, 2008.
137. B Lee, L Han, E H Frank, S Chubinskaya, C Ortiz, A J Grodzinsky, Dynamic Mechanical Properties of Growth Factor-Stimulated Chondrocytes After 3D-Gel Culture, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 151, 2008.
138. Kopesky, PW, Vanderploeg, EJ, Grodzinsky, AJ, Self-Assembling Peptide Hydrogels Enhance Proliferation and Chondrogenesis of Marrow-Derived Mesenchymal Stem Cells, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 288, 2008.
139. T Tokunou, R Miller, P Patwari, M Davis, R Lee, AJ Grodzinsky, A Novel IGF-1 Fusion Protein for Cartilage Delivery 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 311, 2008.
140. Han, L, Greene, JJ, Frank, EH, Hung, HK, Grodzinsky, AJ, Ortiz, C, Effect of Length Scale on Frequency-Dependent Cartilage Oscillatory Nanomechanics, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p 448, 2008.
141. Chai, DH, Grodzinsky, AJ, Chondrocyte MAPKinase & Akt Signaling Response to Compression During ECM Accumulation is Distinct from Tissue Behavior, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 457, 2008.
142. Smith, D, Zhang, L, Gardiner, B, Pivonka, P, Grodzinsky, AJ, Numerical investigation of the functional role of IGFBP-3 in modulating the uptake and half-life of IGF-I in articular cartilage, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 459, 2008.
143. H-Y Lee, PW Kopesky, LDaher, AM Pelegrina, D Frisbie, JD Kisiday, AJ Grodzinsky, C Ortiz, Morphology of Aggrecan Produced By Adult Equine Mesenchymal Stem Cells and Chondrocytes in Self-Assembling Peptide Hydrogels, 54th Trans Orthop Res Soc, San Francisco, March 2-5, p. 553, 2008.
144. B Rolaufts, D Chai, C Muehleman, E Frank, AJ Grodzinsky, Impairment of biomechanical properties occurs prior to GAG loss after injury and can be predicted by the injurious stress strain curve, 54th Trans Ortho Res Soc, San Francisco, March 2-5, p. 614, 2008.
145. S Chen, JP Gleghorn, NK Galley, AJones, C Flannery, LJ Bonassar, AGrodzinsky, Depth-Dependent Effects of Injury on Cartilage via Mechanical Characterizations, 54th Trans Orthop Soc, San Francisco, March 2-5, p. 637, 2008.
146. D. Schumann, B. Kurz, C. Wheeler, AJ Grodzinsky, Influence of cyclic, mechanical stress on cartilage explants in co-culture with synovial capsule tissue, synovial fluid or cytokines, 54th Trans Orthop Soc, San Francisco, March 2-5, p. 713, 2008.
147. Y Sui, JH Lee, CA Wheeler, HK Hung, AHK Plaas, SM Blake, AJ Grodzinsky, Proteoglycan Catabolism in Response to TNF- α , IL-6/sIL-6R and Mechanical Injury in Bovine and Human Articular Cartilage, 54th Trans Orthop Soc, San Francisco, March 2-5, p. 716, 2008.

148. CA Wheeler, A Perez, B Kurz, AJ Grodzinsky, Antioxidant Treatment Increases Gag Loss in Bovine Cartilage Following Cytokine Treatment and Mechanical Injury, 54th Trans Orthop Soc, San Francisco, March 2-5, p. 720, 2008.
149. S Byun, EH Frank, Y Sui, JH Lee, A Soderman, AJ Grodzinsky, Mechanical injury alters transport properties of cartilage, 54th Trans Orthop Soc, San Francisco, March 2-5, p. 733, 2008.
150. L. Han, J. J. Greene, H. K. Hung, E. H. Frank, C. Ortiz, A. J. Grodzinsky, Nanoscale oscillatory deformation of cartilage, Trans Materials Research Society, Boston, Nov 26-Nov 30, 2007.
151. H.-Y. Lee, L. Daher, P. Roughly, A. J. Grodzinsky, C. Ortiz, Age-related Architectural Variations in Individual Human Cartilage Aggrecan Macromolecules, Trans Materials Research Society, Boston, Nov 26-30, 2007.
152. B. Lee, L. Han, E. Frank, AJ Grodzinky, C. Ortiz, Dynamic oscillatory compression of individual cartilage chondrocytes, Trans Materials Research Society, Boston, Nov 26-30, 2007.
153. Wheeler, CA, Perez AR, Grodzinsky, AJ, Influence of OP-1 and IGF-1 on cartilage subjected to combined mechanical injury and co-culture with joint capsule, Proc 2007 OARSI World Congress on Osteoarthritis, Ft Lauderdale, Dec 7-10, 2007, in Osteoarthritis and Cartilage, 15:Supp C, p C121, 2007.
154. Kopesky, P, Vanderploeg, E, Grodzinsky, AJ, Self-assembling peptide hydrogels functioning as a synthetic ECM differentially mediate chondrogenesis of marrow-derived mesenchymal progenitor cells, 47th Amer Soc Cell Biol, Washington DC, Dec 1-5, 2007.
155. E. Pfeiffer, S.M. Vickers, E. Frank, A.J. Grodzinsky, M. Spector, The effects of glycosaminoglycan content on the compressive modulus of chondrocyte-seeded type II collagen scaffolds, 7th World Congress of the International Cartilage Repair Society, Warsaw, Poland, September 29 – October 02, 2007.
156. Kopesky, PW, Lee, CSD, Miller, RE, Kisiday, JD, Grodzinsky, AJ, Comparable Matrix Production By Adult Equine Marrow-Derived MSCS And Primary Chondrocytes In A Self-Assembling Peptide Hydrogel: Effect Of Age And Growth Factors, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
157. Stevens, AL, Wishnok, JS, Tannenbaum, SR, Grodzinsky, AJ, Mechanical Injury And Inflammatory Cytokines Cause Loss Of Cartilage Integrity, Catabolism, Immunity And Inflammation As Well As Possible Repair: A Proteomics Study, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
158. Sui, Y, Song, X-Y, Lee, JH, DiMicco, M, Blake, SM, Hung, H, James, I, Lark, MW, Grodzinsky, AJ, Mechanical Injury Potentiates The Combined Effects of TNF- α And IL-6/sIL-6R On Proteoglycan Catabolism In Bovine Cartilage, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
159. Wheeler, CA, Chubinskaya, S, Grodzinsky, AJ, Stimulatory Dose-Dependent Transcriptional Behavior Of Mechanically Injured Bovine Cartilage Following OP-1 Or IGF-1 Treatment In Vitro, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
160. Lee, BB, Han, L, Frank, E, Ortiz, C, Grodzinsky, AJ, Temporal Evolution Of Viscoelastic Properties Of Individual Cartilage Chondrocytes And Their Pericellular Matrix In Vitro, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
161. Wheeler, CA, Wilkinson, ST, Grodzinsky, AJ, Kurz, B, Antioxidant Superoxide Dismutase Stimulates Anabolic Factors And Decreases Catabolic Factors In Cartilage Subjected To Mechanical Injury And Inflammatory Cytokines, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.

162. Chai, DC, Wheeler, CA, Grodzinsky, AJ, Evolution Of Chondrocyte Gene Expression And Mechanotransduction In Agarose Culture, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
163. Han, L, Greene, JJ, Frank EH, Hung, HK, Grodzinsky, AJ, Ortiz, C, Nanostructure And Time-Dependent Nanomechanics Of Bovine Cartilage And Its Type II Collagen Network, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
164. Jones ARC, Chen, S, Chai, D, Stevens, AL, Grodzinsky, AJ, Flannery, CR, Dysregulation Of Lubricin/SZP Biosynthesis Following Cartilage Mechanical Injury, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
165. Wheeler, CA, Chubinskaya, S, Grodzinsky, AJ, Stimulatory Dose-Dependent Transcriptional Behavior Of Mechanically Injured Bovine Cartilage Following OP-1 Or IGF-1 Treatment In Vitro, 53rd Orthop Res Soc, San Diego, Feb 11-14, 2007.
166. Smith, DW, Zhang, L, Gardiner, BS, Pivonka, P, Grodzinsky, AJ, Effects Of ECM Binding On Solute Transport In Cyclically Deformed Cartilage, 53rd Orthop Res Soc, San Diego, Feb 11-14-2007.
167. A.L. Stevens, J.S. Wishnok. S.R. Tannenbaum, A.J. Grodzinsky, A 2D LC/MS/MS Approach to In Vitro Joint Injury Biomarkers and Biology, in Proc 2006 OARSI World Congress on Osteoarthritis, Prague, Dec 7-10, 2006, in Osteoarthritis and Cartilage, 14:Supp B, p S31, 2006.
168. Y. Sui, X.Y. Song, J.H. Lee, M A. DiMicco, S.M. Blake, H.H. Hung, I. James, M.W. Lark, A.J. Grodzinsky, Mechanical Injury potentiates the combined effects of TNF- α and IL-6/sIL-6R on proteoglycan catabolism in bovine cartilage, in Proc 2006 OARSI World Congress on Osteoarthritis, Prague, Dec 7-10, 2006, in Osteoarthritis and Cartilage, 14:Supp B, p S43, 2006.
169. L. Han, D. Dean, H. K. Hung, J. D. Sandy, C. Ortiz, A. J. Grodzinsky, Effect of m-Calpain Degradation on Cartilage Aggrecan Nanomechanical Properties, Trans Materials Research Society, Boston, Nov 27-Dec 1, 2006.
170. L. Han, J. J. Greene, H. K. Hung, E. H. Frank, A. J. Grodzinsky, C. Ortiz, Quasistatic and Dynamic Microscale Poroviscoelasticity of Cartilage, Trans Materials Research Society, Boston, Nov 27-Dec 1, 2006.
171. L. Han, H. K. Hung, A. H. K. Plaas, W. K. Anemaet, C. Ortiz, A. J. Grodzinsky, Nanomechanics of Small Volume Tissue Samples: Murine Cartilage, Trans Materials Research Society, Boston, Nov 27-Dec 1, 2006.
172. B. Lee, L. Han, E.H. Frank, A. J. Grodzinsky, C Ortiz, Temporal Evolution of Poroviscoelastic Behavior of Individual Cartilage Chondrocytes and Their Pericellular Matrix Cultured in vitro, Trans Materials Research Society, Boston, Nov 27-Dec 1, 2006.
173. Wheeler, CA, Fitzgerald, JB, Grodzinsky, AJ, Transcriptional Effects Of Combined Static Mechanical Compression And IGF-1 Stimulation On Chondrocyte Biosynthesis Bovine Cartilage Explants, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
174. Szafranski, JD Plaas, AH, Grodzinsky, AJ, Effect Of Mechanical Loading On The Fine Structure Of Newly Synthesized Chondroitin Sulfate In Bovine Cartilage Explants, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
175. Chen, S, Grodzinsky, AJ, Dynamic Tissue Shear Deformation Can Enhance Chondrocyte Biosynthesis In 3-D Agarose Gel Culture: Effects Of Medium Supplement And Developing Matrix, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.

176. Chai, DH, Grodzinsky, AJ, Arner, EC, Griggs, DW, Blocking Integrins Alter Chondrocyte Response To Dynamic Compression In Agarose Gel Culture, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
177. Fitzgerald, JB, Grodzinsky, AJ, Mechanically Induced Gene Transcription In Cartilage Explants Is Dependent On Spatiallocation, Loading Direction And Frequency, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
178. Han, L, Dean, D, Daher, LA, Grodzinsky, AJ, Ortiz, C, Shear Nanomechanics Of Opposing Cartilage Aggrecan Via Lateral Force Microscopy, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
179. Han, L, Dean, D, Daher, LA, Grodzinsky, AJ, Ortiz, C, Biomolecular Adhesive Interactions Between Cartilage Aggrecan Macromolecules, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
180. Ng, LJ, Chubinskaya, S, Ortiz, C, Grodzinsky, AJ, Nanomechanical Properties Of Individual Chondrocytes And Their Developing Pericellular Matrix: Effect Of IGF-1 And OP-1, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
181. Dean, D, Han, L, Daher, L, Plaas, AHK, Ortiz, C, Grodzinsky, AJ, Nanomechanical Properties Of Aggrecan From Bovine Fetal Epiphyseal And Mature Nasal Cartilage, 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
182. Kisiday, JD, Kopesky, PW, Szafranski, JD, Evans, CH, Grodzinsky, AJ, McIlwraith, CW, Frisbie, DD, Evaluation Of Chondrogenesis Of Bone Marrow And Adipose-Derived Stem Cells Encapsulated In Agarose And Self-Assembling Peptide Hydrogels, Trans 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
183. Kisiday, JD, Evans, CH, Frisbie, DD, Grodzinsky, AJ, Effects Of Dynamic Compression On Chondrogenesis Of Adult Equine Mesenchymal Stem Cells Encapsulated In Agarose Hydrogel, Trans 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
184. Lemke, AK, Lee, J, Sandy, J, Grodzinsky, AJ, Mentlein, R, Fay, J, Schunke, M, Kurz, B, IL-1-Induced Matrix Degradation And Gene Expression In The Meniscus Depends On The Anatomical Location, Trans 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
185. Rolauuffs, B, Frank, EH, Li, J, Margulis, A, Kuettner, KE, Cole, AA, Grodzinsky, AJ, Muehleman, C, Quantitative Analyses Of Structural Failure Of Articular Cartilage Following Injurious Compression To 50% Versus 80% Strain, Trans 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
186. Lee, JH, Bai, Y, Flannery, CR, Sandy, JD, Plaas, A, Grodzinsky, AJ, Cartilage Mechanical Injury And Co-Culture With Joint Capsule Tissue Increase Abundance Of ADAMTS-5 Protein And Aggrecan G1-NITEGE Product, Trans 52nd Orthop Res Soc, Chicago, Mar 19-22, 2006.
187. Kisiday, Kopesky, PW, Szafranski JD, Evans, CH, Grodzinsky, AJ; McIlwraith, CW, Frisbie, DD, Evaluation of TGF-beta1 mediated chondrogenesis of bone marrow and adipose-derived stem cells encapsulated in agarose and self-assembling peptide hydrogels, Int Cart Repair Soc, San Diego, Jan 8-11, 2006.
188. Ng, L, Chubinskaya, S, Ortiz, C, Grodzinsky, AJ, Effects of IGF-1 and OP-1 on nanomechanical properties of newly developing pericellular matrix of individual chondrocytes Int Cart Repair Soc, San Diego, Jan 8-11, 2006.
189. L. Han; D. Dean; L. A. Daher; A. J. Grodzinsky; C. Ortiz, Rate Dependent Nanoscale Shear Deformability of Cartilage Aggrecan, Trans Materials Research Society Conference, #L5.14, Boston, Nov 28-Dec 2, 2005.

190. L. Han, D. Dean, L. A. Daher, A. J. Grodzinsky, C. Ortiz, Biomolecular Adhesion Between Opposing Cartilage Aggrecan Macromolecules, Trans Materials Research Society Conference, #NN10.19, Boston, Nov 28-Dec 2, 2005.
191. D. Dean, L. Han, L. Daher, C. Ortiz, A. J. Grodzinsky, Cartilage aggrecan exhibits a reduction in nanoscale compressibility with age, Trans Materials Research Society Conference, Boston, Nov 28-Dec 2, 2005.
192. Rolauffs, B, Li, J, Kuettner, KE, Cole, AA, Muehleemann, C, Grodzinsky, AJ, Biomechanics and Diffraction-Enhanced X-ray Imaging (DEI) of Mechanically Injured Human Talar Cartilage, Trans 10th World Congress on Osteoarthritis (OARSI), Boston, Dec 8-11, 2005. Osteoarthritis Cartilage, 13SA:S104-105, 2005.
193. Stevens, AL, Bhat, VB, Fitzgerald, J, Wishnok, JS, Grodzinsky, AJ, Tannenbaum, SR, Proteomics Study of Cartilage Degradation Caused by Mechanical Injury and Inflammatory Cytokines IL-1 β and TNF- α , Trans 10th World Congress on Osteoarthritis (OARSI), Boston, Dec 8-11, Osteoarthritis Cartilage, 13SA:S101, 2005.
194. Lee, JH, JD, Flannery, CR, Sandy, JD, Grodzinsky, AJ, Aggrecan Content of Cartilage is Decreased with Aggrecanase Cleavage Products Formed Following Injury and during Co-Culture with Joint capsule Tissue, Trans 10th World Congress on Osteoarthritis (OARSI), Boston, Dec 8-11, Osteoarthritis Cartilage, 13SA:S63, 2005.
195. Gordon Research Conference on Polymers, East, Mount Holyoke College South Hadley, MA, June 19-24, 2005.
196. L Han, D Dean, AJ Grodzinsky, C Ortiz, Normal and Lateral Nanomechanics of Cartilage Aggrecan BioMacromolecules, Gordon Research Conference on Organic Thin Films at Salve Regina University in Newport, Rhode Island, July 10-15, 2005.
197. Bathe M, Grodzinsky, AJ, Rutledge, GC, Tidor, B, Effects of chemical composition on chondroitin sulfate osmotic pressure and aggrecan conformation, 2005 Summer Bioengineering Conference, Vail Co., June 22-26, 2005.
198. Bathe M, Rutledge, GC, Grodzinsky, AJ, Tidor, B, Proteoglycan conformation and mechanical properties: a molecular modeling investigation, German Physical Society Spring Meeting, Berlin, March 4-9, 2005.
199. Kisiday, JD, Lee, JH, Flannery, CR, Sandy, JD, Frisbie, DD, Grodzinsky, AJ, Dynamic Compression Can Induce Enzymatic Degradation of Extracellular Matrix Within A Chondrocyte-Seeded Peptide Hydrogel, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
200. Rolauffs, B, DiMicco, MA, Kisiday, JD, Frank E, Aurich, M, Wethmar, A, Margulis, A, Kuettner, KE, Cole, AA, Grodzinsky, AJ, The Effect of Injurious Compression of the Superficial Zone and Deeper Zones of Human Articular Cartilage Explants of Normal and Degenerative Joints, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
201. Kisiday, JD, Morrisset, S, Grodzinsky, AJ, Frisbie, DD, In Vitro Migration of Equine Mesenchymal Stem Cells in Response to Select Growth Factors, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
202. Stevens, AL, Bhat, V, DiMicco, MA, Ko, D, Choi, MH, Wishnok, JS, Grodzinsky, AJ, Tannenbaum, SR, Cartilage Extracellular Matrix (ECM) Degradation in Response to Mechanical Injury and the Inflammatory Cytokines TNF- α and IL-1 β : A Proteomics Approach, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.

203. Fitzgerald, JB, Grodzinsky, AJ, Involvement of Protein Synthesis and the MAP Kinase Pathway in Gene Transcription Induced by Static Compression of Cartilage, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
204. Fitzgerald, JB, Frank, EH, Grodzinsky, AJ, Effect of Dynamic Shear Induced Mechanical Deformation on Chondrocyte Gene Expression in Cartilage Explants, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
205. Szafranski, JD, Eavarone, DA, Grodzinsky, AJ, Effect of Mechanical Loading on Enzymes Involved in Aggrecan Post-Translational Modifications, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
206. DiMicco, MA, Kisiday, JD, Gong, H, Grodzinsky, AJ, Fibrillar Structure of Type VI Collagen-Rich Pericellular Matrix Assembled by Agarose-Embedded Chondrocytes, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
207. Lee, JH, DiMicco, MA, Kisiday, JD, Flannery, CR, Sandy, JD, Grodzinsky, AJ, Co-Incubation With Joint Capsule Tissue Leads To Changes In Gene Expression and Cleavage of Aggrecan in Uninjured and Mechanically Injured Cartilage, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
208. Saatchi, S, Kisiday, JD, Wright, JW, Griffith, LG, DiMicco, MA, Grodzinsky, AJ, A Novel Osteochondral Composite Consisting of A Self-Assembling Peptide Hydrogel and 3D-Printed Polycaprolactone Scaffold, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
209. Dean, D, Han, L, Ortiz, C, Grodzinsky, AJ, Aggrecan-Aggrecan Interaction Forces Assessed Via High Resolution Force Spectroscopy of End-Grafted Macromolecules Compressed Between A Planar Substrate and Probe Tip, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
210. Han, L, Dean, D, Plaas, AHK, Grodzinsky, AJ, Ortiz, C, Lateral Deformability and Nanomechanical Behavior of Cartilage Aggrecan Via Lateral Force Microscopy Imaging and Micro-Contact Printing Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
211. Ng, L, Bathe, M, Ortiz, C, Tidor, B, Grodzinsky, AJ, Aggrecan Confirmation Depends On GAG-GAG Interactions: The Effects of Aggrecan Concentration, GAG Molecular Weight, and Bath Ionic Strength Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
212. Ng, L, Ortiz, C., Grodzinsky, AJ, Visualization and Nanomechanical Properties of Individual Chondrocytes With An Increasingly Thick Pericellular Matrix, Trans 51st Orthop Res Soc, Washington, DC, Feb 20-23, 2005.
213. Han, L, Dean, D, Grodzinsky, AJ, Ortiz, C, Lateral and Compressive Imaging of Cartilage Aggrecan via Atomic Force Microscopy as a Function of Ionic Strength, Trans Materials Research Society, Fall Meeting, Boston, Nov 29-Dec 3, 2004.
214. Ng, L, Grodzinsky, AJ, Ortiz, C, Variation of Ultrastructure and Nanomechanical Properties of Individual Chondrocytes with an Increasingly Thick Pericellular Matrix, Trans Materials Research Society, Fall Meeting, Boston, Nov 29-Dec 3, 2004.
215. Dean, D, Han, L, Ortiz, C, Grodzinsky, AJ, Normal Nanomechanical and Electrical Interaction Forces between Opposing Cartilage Aggrecan Macromolecules, Trans Materials Research Society, Fall Meeting, Boston, Nov 29-Dec 3, 2004.
216. B.S. Gardiner, D.W. Smith, P. Pivonka and A.J. Grodzinsky, Active transport of IGF-I through Articular Cartilage, The Annual Conference of Engineering and Physical Sciences in Medicine (EPSM 04), Geelong, Australia, 14-18 November, 2004.

217. B.S. Gardiner, D.W. Smith, P. Pivonka and A.J. Grodzinsky, Transport of large molecules through articular cartilage subjected to dynamic load, 10th Annual Scientific Meeting of the Australian and New Zealand Orthopaedic Research Society, Sydney, Australia, 22-24 October, 2004.
218. Lee, JH, DiMicco, MA, Grodzinsky, AJ, In Vitro Models of Cartilage Response to Injury, Biomed Eng Soc Meeting, Philadelphia, Oct 13-16, 2004.
219. Stevens, AL, Bhat, VB, Choi, MH, Wishnok, JS, Grodzinsky, AJ, Tannenbaum, SR, Role of inflammatory cytokines TNF- α and IL-1 β and nitric oxide (NO) in cartilage extracellular matrix (ECM) degradation, Amer Chem Soc, 228:U393, 107-TOXI, Aug 24, 2004.
220. Grodzinsky, AJ, Ng, L, Dean, D, Seog, J, Kisiday, J, Fitzgerald, J, Ortiz, C, Probing molecular properties of cartilage: relevance to cartilage tissue engineering, molecular mechanics, and mechanobiology, Trans 2004 Polymer Networks Conference, p. 35, Bethesda, MD, Aug 15-20, 2004.
221. Kisiday JD, Gouze JN, Pilapil C, Ghivizzani SC, Evans CH, Frisbie DD, Grodzinsky AJ, Cell condensation and chondrogenesis of mesenchymal progenitor cells encapsulated in a self-assembling peptide hydrogel and exposed to TGF-beta via adenoviral gene transfer, Internat Cartilage Repair Soc, p. 78, Gent, Belgium, May 26-29, 2004.
222. Saatchi, S, Kisiday, J, Wright, J, DiMicco, M, Grodzinsky, AJ, A Novel Osteochondral Composite Consisting of a Self-Assembling Peptide Hydrogel and 3D Printed PCL Scaffold: Potential for Articular Cartilage Repair, Trans Internat Cartilage Repair Soc, p. 75, Gent, Belgium, May 26-29, 2004.
223. DiMicco, MA, Kisiday, JD, Gong, H, Grodzinsky, AJ, Structure of type VI collagen-rich pericellular matrix assembled by chondrocytes in agarose gel culture, Trans Internat Cartilage Repair Soc, p. 50, Gent, Belgium, May 26-29, 2004.
224. Gong, H, Jurkunas UV, Plaas, A, Frank EH, Grodzinsky AJ, A novel role for keratocytes in corneal stromal swelling, Investigative Ophthalmology and Visual Science 45:U318 Suppl. 2, Apr, 2004
225. FitzGerald, J, Lee, J, Ng, L, Dean, D, Ortiz, C, Grodzinsky, AJ, Mechanical Regulation of Chondrocyte Gene Expression and Biosynthesis in Cartilage Explants: Links to Molecular Mechanics, "Molecular Approaches to Osteoarthritis," Imperial College, London, April 18-20, 2004.
226. Pufe, T, Lemke, A, Kurz, B, Petersen, W, Tillmann, B, Grodzinsky, AJ, Mentlein, R, "Induction of VEGF (vascular endothelial growth factor) by Mechanical Overload in Cartilage Explants," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:337, 2004.
227. Kurz, B, Lemke, A, Klusener, C, Sandy, JD, Sellckau, R, Grodzinsky, AJ, Schunke, M, "Influence of IL-1 on Glycosaminoglycan Content, Biomechanical Properties, Biosynthetic Activity and Expression of Matrix-Degrading Enzymes in Bovine Meniscus Tissue," 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:624, 2004.
228. Rolaufts, B, DiMicco, M, Kisiday, J, Frank, EH, Cole, AA, Grodzinsky, AJ, "Effect of Injurious Compression of the Superficial Zone and Deeper Zones of Bovine Articular Cartilage Explants," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:141, 2004.
229. Kisiday, JD, Palmer, GD, Ghivizzani, SC, Pilapil, C, Steinert, A, Gouze, E, Evans, CH, Grodzinsky, AJ, Gouze, JN, "Chondrogenesis of C3H1051/2 Mesenchymal Stem Cells Encapsulated in a Self-Assembling Peptide Hydrogel and Exposed to Growth Factor Combinations Via Adeno Viral Gene Transfer," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:737, 2004.
230. Bathe, M, Rutledge, GC, Grodzinsky, AJ, Tidor, B, "Molecular Modeling of GAGS: Investigating the Relationship Between Chemical Composition, Molecular Structure, and In Vivo Aggrecan Structure and Function," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:49, 2004.

231. Ng, L, Patwari, P, Sandy JS, Plaas, A, Ortiz, C, Grodzinsky, A, "Aggrecan Conformation, Persistence Length, and Stiffness Depend on the Nano-Molecular Properties of its Constituent GAG Chains," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:51, 2004.
232. Fitzgerald, JB, Grodzinsky, AJ, Jin, M, Zheng, MH, Wood, DJ, "Low-Multitude Dynamic Compression Regulates Expression of Anabolic and Catabolic Genes in Cartilage Explants," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:830, 2004.
233. Patwari, P, Gao, G, Grodzinsky, AJ, Sandy, JD, "Evidence For Involvement of MT4-MMP In Activation of ADAMTS-4 in Cartilage Tissue," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:108, 2004.
234. Dean, D, Ng, L., Seog, J, Ortiz, C, Grodzinsky, AJ, "Measurement of Nano-Mechanical and Electrical Interaction Forces Within Intact Aggrecan Molecules Using High Resolution Force Spectroscopy," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:335, 2004.
235. Lee, JH, Jin, M, Grodzinsky, AJ, "Transcriptional Response of Chondrocytes to In Vitro Injurious Loading," Trans 50th Orthop Res Soc, San Francisco, CA, March 7-10, 29:139, 2004.
236. Bathe, M, Rutledge, GC, Grodzinsky, AJ, Tidor, B, "Solution Structure and Mechanical Properties of Anionic Glycosaminoglycans Computed via Molecular Simulation," Annual meeting of the American Physical Society, (DBP/DCOMP), 2004.
237. Bathe, M, Rutledge, GC, Grodzinsky, AJ, Tidor, B, "Computational Biomechanics of Aggrecan: Connecting Molecular Composition with Macroscopic Mechanical Properties of Cartilage," ASME Summer Bioengineering Conference, Key Biscayne, June 25-29, 2003.
238. Grodzinsky, AJ, Szafranski, J, Ng, L, Seog, J, Dean, D, Ortiz, C, Jin, M, Mechanobiological Regulation of Aggrecan Structure and Its Nanomechanical Function, 3rd Internat Symp Mechanobiology of Cartilage and Chondrocyte, Brussels, 3:34-35, May 16-17, 2003.
239. Patwari, P, Cole, A, Grodzinsky, AJ, Synergistic Loss of Proteoglycan after Interleukin-1 Treatment of Human and Bovine Articular Cartilage Subjected to Injurious Compression, 3rd Internat Symp Mechanobiology of Cartilage and Chondrocyte, Brussels, May 16-17, 2003.
240. Frank, EH, Evans, R, Lee, C, Treppo, S, Spector, M, Grodzinsky, AJ, Quantitative Electrical Impedance Analysis of Cartilage Degradation, 3rd Internat Symp Mechanobiology of Cartilage and Chondrocyte, Brussels, 3:20-21, May 16-17, 2003.
241. Ng, L.J., K. Tai, A.H.K. Plaas, A. J. Grodzinsky, C. Ortiz, "Ultrastructure and Nanomechanics of Biological Tissues: Cartilage And Bone," The Annual Meeting of the American Chemical Society, Polymer Science and Engineering Division, Symposium on Scanning Probe Microscopy of Polymers, New Orleans, Polymer Preprints., Mar 23-27, 2003.
242. Ng, L.J., J. Sandy, A.H.K. Plaas, A. J. Grodzinsky, C. Ortiz, "Structure of Individual Cartilage Aggrecan Molecules and Their Constituent Glycosaminoglycan Chains Visualized via Atomic Force Microscopy," American Physics Society, Austin, TX, Mar 3-4, 2003.
243. Dean, Seog, Ortiz, and Grodzinsky; "Modeling Electrostatic Forces Between Opposing Polyelectrolyte Brushes: Interdigitation versus Compression", Annual meeting of the American Physical Society Vol. 48 No. 1, Austin, TX, March 3-4, 2003,
244. Kisiday JD, Gouze J, Siparsky PN, Grodzinsky AJ. Effects of dynamic compression on GAG matrix biosynthesis, accumulation, and catabolism in a chondrocyte-seeded peptide hydrogel. Hilton Head Workshop on Engineering Tissues, Hilton Head SC, Feb 26- March 3, 2003.

245. Cheung, RK, Adkisson, HD, Tippen, M, Strauss-Schoenberger, J, Kizer, N, Feder, J, Frank, EH, Grodzinsky, AJ, "Effect Of Donor Age And Culture Duration On Niomechanics & Biochemical Properties," Trans 48th Orthop Res Soc, New Orleans, LA , 28: 940, Feb 1-5, 2003.
246. Gouze, JN, Gouze, E, Palmer, GD, Liew, VS, Pascher, A, Betz, OB, Evans, CH, Grodzinsky, AJ, Ghivizzani, SC, "The Ability Of Human IL-1Ra To Antagonize IL-1 When Administered As A Recombinant Protein Or By Gene Transfer: An In Vitro Comparison." Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:889, 2003.
247. Gouze, JN, Ghivizzani, SC, Gouze, E, Palmer, GD, Pascher, A, Betz, OB, Evans, CH, Grodzinsky, AJ, "Adenovirus-Mediated Gene Transfer Of Glutamine/Frucose-6 Phosphate Amidotransferase Down-Regulates The Effects of Interleukin-1 Beta On Bovine Chondrocytes," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:888, 2003.
248. Lemke, A, Patwari, P, Grodzinsky, AJ, Domm, C, Schunke, M, Kurz, B, "Influence Of Age On Mechanical Induction Of Apoptosis In Articular Cartilage," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28: 71, 2003.
249. Patwari, P, Chubinskaya, S, Hakimiyan, A, Kumar, B, Cole, AA, Kuettner, KE, Rueger, DC, Grodzinsky, AJ, "Injurious Compression Of Adult Human Donor Cartilage Explants: Investigation Of Anabolic And Catabolic Processes," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:695, 2003.
250. Patwari, P, Norris, SA, Kumar, S, Lark, MW, Grodzinsky, AJ, "Inhibition Of Bovine Cartilage Biosynthesis By Coincubation Of Joint Capsule Tissue Is Mediated By An Interleukin-1-Independent Signaling Pathway," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:158, 2003.
251. Szasz, N, Hung, H, Sen, S, Grodzinsky, AJ, "Electric Field Regulation Of Chondrocyte Biosynthesis In Agarose Gel Constructs," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:672, 2003.
252. Jin, M, Fitzgerald, J, Plaas, A, Grodzinsky, AJ, "Changes In mRNA Levels Of Anabolic, Catabolic, And Anti-Catabolic Genes In Chondrocytes In Response To Short-Term Static Compression," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:339, 2003.
253. DiMicco, MA, Siparsky, PN, Patwari, P, James, IE, Kumar, S, Pratta, MA, Lark, MW, Kim YJ, Grodzinsky, AJ, "Mechanisms Of Tissue Degradation Following In Vitro Cartilage Injury," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:067, 2003.
254. Ng, L, Plaas, A, Ortiz, C, Grodzinsky, AJ, "AFM Imaging Of The Conformation And Interactions Of Aggrecan, Hyaluronan, And Their Constitutents," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:569, 2003.
255. Kisiday, JD, Siparsky, PN, Grodzinsky, AJ, "Anabolic And Catabolic Response To Dynamic Compression In A Chondrocyte-Seeded Self-Assembling Peptide Hydrogel," Trans 49th Orthop Res Soc, New Orleans, LA, Feb 1-5, 28:304, 2003.
256. Kisiday, JD, Zhang, S, Cosman, Christina, Saachi, S, Grodzinsky, AJ, Self-Assembling Peptide Hydrogel Scaffolds for Cartilage Tissue Engineering, AAOS/NIH Workshop on Tissue Engineering in Musculoskeletal Clinical Practice, Sante Fe, Jan 16-19, 2003
257. Patwari, P, Jin, M, DiMicco, MA, Grodzinsky, AJ, "Response of the Chondrocytes to Injurious Mechanical Compression," American College of Rheumatology, Basic Science Symposium on Biomechanical Determinants of Bone and Cartilage, New Orleans, Oct 24-29, 2002.

258. Kisiday, J, Zhang, S, Jin, M, Grodzinsky, AJ, "Self-Assembling Peptide Scaffold for Cartilage Tissue Engineering: Effects of Cyclic Compression and Culture Conditions," European Orthop Res Soc, Lausanne, Oct 11-13, 2002
259. FitzGerald, J, Jin M, Grodzinsky AJ, "Gene Expression Patterns Induced in Cartilage Explants in Response to Static Compression," Australia New Zealand Orthopaedic Research Society, Melbourne, Oct 11-12, 2002.
260. Ng, LJ, Plaas, A, Grodzinsky, AJ, Ortiz, C, Atomic Force Microscopy Studies of Cartilage Aggrecan and Related Constituents, 224th American Chemical Society National Meeting, Boston, Aug 18-22, 2002.
261. Dean, D, Seog, J, Ortiz, C, Grodzinsky, AJ, "Modeling Electrostatic Forces between GAG Molecules," 224th American Chemical Society National Meeting, Boston, Aug 18-22, 2002.
262. Ng, L.J., A.H.K. Plaas, A.J. Grodzinsky, C. Ortiz, "Structure, Conformation, And Self-Assembly of Cartilage Polyelectrolyte Macromolecules Studied Via Atomic Force Microscopy," Polymer Preprints, 224: 351-POLY Part 2 Amer Chem Soc (ACS), Division of Polymer Chemistry, Boston, Aug 18, 2002.
263. Grodzinsky, AJ, Jin, M, Patwari, P, Frank, EH, "Glycosaminoglycans and Arthritis," 224th American Chemical Society National Meeting, Boston, Aug 18-22, 2002.
264. Patwari, P, Jin, M, DiMicco, M, Grodzinsky, AJ, "Response of the Chondrocyte to Mechanical Stimuli: Physiologic and Injurious Compression," World Congress of Biomechanics, Calgary, Aug 4-8, 2002.
265. Grodzinsky, AJ, Ortiz, C, Seog, J, Dean D, Ng, L, Jin, M, Kisiday, J, Frank, EH, "Cartilage Nanomechanics, Mechanotransduction, and Tissue Engineering," World Congress of Biomechanics, Calgary, Aug 4-8, 2002.
266. Ortiz, C, Seog, J, Dean, D, Ng L, Grodzinsky, AJ, "Nanomechanics of Cartilage: Direct Measurement of Glycosaminoglycan Intermolecular Interactions via High-Resolution Force Spectroscopy," Gordon Research Conference on Musculoskeletal Biology and Bioengineering, Andover NH, July 28-Aug 2, 2002.
267. Wong-Palms, S, Gong, H, Frank, EH, Grodzinsky, AJ, Plaas, AHK, "Keratocyte-Mediated Catabolism of the Collagen-Pg Network During Explant Culture Of Rabbit Cornea" Gordon Research Conference on Proteoglycans, Andover NH, July 7-12, 2002.
268. Grodzinsky, AJ, Kerin, A, Kisiday, J, "Biomechanics in Cartilage Tissue Engineering," 3rd European Cells and Materials Conf on Cartilage and Joint Repair," Davos, Switzerland, July 1-3, 2002.
269. Szasz, N, Hung, HH, Grodzinsky, AJ, "Electric Field Regulation of Chondrocyte Biosynthesis in Agarose Gel Cultures," 24th Bioelectromagnetics Society, Quebec City, June 23-27, 2002.
270. Kurz, B, Kehn M, Domm, C, Frank, E, Grodzinsky, AJ, Schunke, M, "Antioxidants and Aging alter the Apoptotic Response of Articular Chondrocytes to Mechanical Overload," International Cartilage Repair Society Conf, Toronto, June 15-18, 2002.
271. Kisiday, JD, Jin, M, Grodzinsky, AJ, "Effects of Dynamic Compressive Loading on Extracellular Matrix Biosynthesis and Accumulation during In Vitro Culture of a Chondrocyte-Seeded Peptide Hydrogel," International Cartilage Repair Society Conf, Toronto, June 15-18, 2002.
272. Kisiday, J, Jin, M, DiMicco, MA, Zhang, S, Grodzinsky, AJ, "Self-Assembling Peptide Scaffolds for Cartilage Tissue Engineering," Institute for International research Conference on Orthopaedic Tissue Engineering, Boston, May 20-22, 2002.

273. Kisiday, J, Zhang, S, Grodzinsky, AJ, "How Similar Must Engineered Cartilage be to Natural Cartilage," Novartis Foundation Symposium, London, April 8-11, 2002.
274. J Seog, E Frank, D Dean, S Wong-Palms, A Plaas, A Grodzinsky, C Ortiz, "Measurement of GAG-GAG interactions via high resolution force spectroscopy," M33.032, Ann Amer Phys Soc Meeting, Div High Polymer Phys, Indianapolis, IN, March 18-22, 2002.
275. D Dean, J Seog, C Ortiz, AJ Grodzinsky, "Modeling of Electrostatic Forces between GAGs, M33.031, Amer Phys Soc Meeting, Div High Polymer Phys, Indianapolis, IN, March 18-22, 2002.
276. L Ng, AJ Grodzinsky, C Ortiz "Atomic Force Microscopy Studies of the Conformation of Cartilage Aggrecan", M33.108, Ann Amer Phys Soc Meeting, Div High Polymer Phys, Indianapolis, IN, March 18-22, 2002.
277. Lee, CR, Grodzinsky, AJ, Hsu, H, Spector, M, "Repair of canine articular cartilage defects treated with cultured chondrocyte-seeded type II collagen scaffolds," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:54, 2002.
278. Dean, D, Seog, J, Ortiz, C, Grodzinsky, AJ, "Nanomechanical modeling of electrostatic forces between glycosaminoglycan molecules," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:80, 2002.
279. Kisiday, J, Semino, C, Zhang, S, Grodzinsky, AJ, "Evaluation of ITS-supplemented medium for applications to 3-D encapsulated chondrocyte culture," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:72, 2002.
280. Kisiday, J, Jin, M, Grodzinsky, A, "Effects of dynamic compressive loading duty cycle on in vitro conditioning of chondrocyte-seeded peptide and agarose scaffolds," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:16, 2002.
281. Patwari, P, Kurz, B, Berger, E, James, IE, Blake, SM, Badger, AM, Lark, MW, Grodzinsky, AJ, Hunziker, EB, "Comparative evaluation of apoptotic and necrotic cell death after injurious compression of bovine articular cartilage using electron microscopy and TUNEL staining," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:08, 2002.
282. Fay, J, Patwari, P, Grodzinsky, A, "Cartilage degradation after injurious mechanical compression in the presence of joint capsule tissue or exogenous interleukin-1," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:64, 2002.
283. Kurz, B, Kehn, M, Domm, C, Frank, E, Grodzinsky, AJ, "Mechanical induction of apoptosis in articular cartilage inhibited by a superoxide dismutase mimetic," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:31, 2002.
284. Seog, J, Frank, E, Dean, D, Wong-Palms, S, Plaas, AJ, Grodzinsky, A, Ortiz, C, "Measurement of GAG-GAG nano-electromechanical interactions using high resolution force spectroscopy," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:60, 2002.
285. Emkey, G, Jin, M, Grodzinsky, A, Trippel, S, "Combined effects of dynamic tissue shear deformation and insulin-like growth factor I on chondrocyte biosynthesis in cartilage explants," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:34, 2002.
286. Jin, M, Fanning, P, Emkey, G, Wuerz, T, Trippel, S, Grodzinsky, AJ, "Upregulation of ERK1/2 phosphorylation and transcriptional level of type II collagen and aggrecan core protein in response to tissue shear deformation in cartilage explants," Trans 48. Orthop Res Soc, Dallas, TX, Feb 10-13, 27:31, 2002.
287. Kisiday J, Semino C, Zhang S, Grodzinsky AJ, "Optimization of ITS-Supplemented Medium for Cartilage Tissue Engineering," Biomedical Engineering Soc., North Carolina, Oct 4-7, 2001.

288. Jin M, Frank EH, Quinn TM, Hunziker EB, Grodzinsky AJ, ``Tissue Shear Regulates Chondrocyte Biosynthesis: Differential Effects on PG and Protein," Conference on The Many Faces of Osteoarthritis, Lake Tahoe, June 22-27, 2001.
289. Kisiday J, Jin M, Kurz B, Hung H, Zhang S, Grodzinsky AJ, ``Self Assembling Peptide Scaffold for Cartilage Tissue Engineering," Conference on The Many Faces of Osteoarthritis, Lake Tahoe, June 22-27, 2001.
290. Jin M, Wong M, Grodzinsky, AJ, Hunziker EB, ``Matrix Molecules and Micromechanics," Conference on The Many Faces of Osteoarthritis, Lake Tahoe, June 22-27, 2001.
291. Frank EH, Evans, R, Lee C, Quan E, Butts, E, Spector, M, Cole, A, Kuettner, KE, Grodzinsky, AJ, ``Quantitative Electrical Impedance Analysis of Cartilage Degradation," Conference on The Many Faces of Osteoarthritis, Lake Tahoe, June 22-27, 2001.
292. Quinn, TM, Schmid, P, Buschmann, MD, Grodzinsky, AJ, Hunziker, EB, ``Assembly of De Novo Cell Associated Matrix and Volume Regulation by Chondrocytes in Agarose Gel," Trans 4th Combined Orthop Res Soc Meeting, Rhodes, Greece, June 1-3, p. 258, 2001.
293. Quinn, TM, Studer, C, Grodzinsky, AJ, Meister J-J, ``Freeze Substitution for Measurement of Solute Transport in Compressed Cartilage Explants," Conf on Physical Forces and Gravity in Skeletal Tissues, Camogli, Italy, May 12-13, 2001.
294. Plaas, AHK, Wong-Palms, S, Barkeley, L, Overby, D, Grodzinsky, AJ, ``Decorin and Lumican Turnover in a Novel Long-Term Mammalian Corneal Explant Culture System," Assoc Res Vision Ophthalmology (ARVO), April 29-May 4, Fort Lauderdale, 2001 (Invest Ophth Visual Sci, 42 (4):4957, Suppl. S Mar 15, 2001).
295. Grodzinsky, AJ, Seog, J, Dean, D, Ortiz, C, ``Cartilage Molecular Electromechanics," 2nd International Symposium on Mechanobiology of Chondrocytes and Cartilage, Paris, April 27-28, 2:6, 2001
296. Grodzinsky, AJ, Jin, M, Patwari, P, Kerin, A, Frank, EH, ``Chondrocyte Mechanobiology," Euromech Colloquium #420 on Mechanobiology of Cells and Tissues, April 24-26, Nancy, France, 2001.
297. Ortiz, C, Seog, J, Dean, D, Wong-Palms, S, Plaas, A, Grodzinsky, AJ, ``Nanomechanics of Cartilage: Intermolecular Interactions," 221st Amer Chem Soc National Meeting in San Diego, Paper #243, April 1-5, 2001.
298. J Seog, D Dean, A Plaas, S Wong Palms, Christine Ortiz, AJ Grodzinsky, "Modeling and measurement of glycosaminoglycan electrostatic interactions", 221st Amer Chem Soc National Meeting in San Diego, Paper #243, April 1-5, 2001. (Best Poster Award).
299. Grodzinsky, AJ, ``Mechanical Influences on Cartilage and the Chondrocyte," FASEB Experimental Biology Meeting, Symposium 366 on Mechanical Modulation of Gene Expression in the Musculoskeletal System, March 31-April 4, Orlando, 2001
300. Ortiz, C, Seog, J, Dean, D, Grodzinsky, AJ, Plaas, A, Wong-Palms, S, ``Nanomechanics of Cartilage: Investigation of Biomacromolecular Intermolecular Interactions Via High Resolution Force Spectroscopy," Amer Physical Society Meeting, Biopolymers Session A18, Seattle, March 12-16, 2001.
301. Frank, E, Blake, S, Badger, A, Swift, B, Newman-Tarr, Liang, P, Grodzinsky, AJ, Lark, M, ``Loss of Mechanical Properties Precede Remodeling In A Guinea Pig Ligament Transection Model," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:711, 2001.

302. Gouze, JN, Grodzinsky, AJ, Glucosamine Inhibits Compression-Induced Changes In Chondrocyte Biosynthesis And Gene Expression In Alginate Gel Culture, Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:554, 2001.
303. Jin, M, Grodzinsky, AJ, ``Molecular Model Of The Role Of Electrostatic Interactions Between GAG Chains In The Shear Stiffness Of Cartilage," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:424, 2001.
304. Patwari, P, Thompson, V, Mok, Y, Kurz, B, Grodzinsky, AJ, Sandy, J, ``Effect of Mannosamine On Mechanical Properties Of Cartilage," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:419, 2001.
305. Kerin, A, Margulis, A, Cole, A, Kuettner, K, Grodzinsky, AJ, ``Effect of Static and Dynamic Compression On Biosynthesis In Human Knee And Ankle Cartilages," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:333, 2001.
306. Evans, R, Lee, C, Frank, E, Butts, E, Spector, M, Grodzinsky, ``Quantitative Impedance Analysis Of Cartilage Graft Tissue Following Implantation Into Canine Defects," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:203, 2001.
307. Fanning, P, Emkey, G, Smith, R, Grodzinsky, A, Trippel, S, ``Response Of Cartilage To Mechanical Loading Is Correlated With Sustained ERK1/2 Activation," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:172, 2001.
308. Jin, M, Frank, E, Quinn, T, Hunziker, Grodzinsky, AJ, ``Tissue Shear Regulates Chondrocyte Biosynthesis: Differential Effects on PG and Proteins," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:170, 2001.
309. Kurz, B, Jost, B, Kehn, M, Grodzinsky, AJ, Frank, EH, Schunke, M, ``Antioxidative Substances Decrease Development Of Osteoarthritis: Evidence For The Importance Of Free Oxygen Radical Species In Mechanically Induced Degeneration Of Articular Cartilage," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:155, 2001.
310. Kerin, A, Hung, G, Verzijl, N, DeGroot, J, TeKoppele, J, Grodzinsky, AJ, ``The Effect Of Non-Enzymatic Glycation On Mechanical Properties Of Articular Cartilage," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:130, 2001.
311. Lark, M, Patwari, P, Badger, A, Blake, S, Cook, M, Bradley, B, Grodzinsky, AJ, ``Injurious Compression Of Bovine Articular Cartilage Induces MMP-3 Expression," Trans 47th Orthop Res Soc, San Francisco, Ca, Feb 25-28, 26:126, 2001.
312. Seog, J, Dean, D, Plaas, A, Wong-Palms, S, Lee, I, Laibinis, P, Grodzinsky, AJ, Ortiz, C, ``Cartilage Molecular Mechanics: Detection of GAG Electrostatic Interactions By High-Resolution Force Spectroscopy," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:55, 2001.
313. Kisiday, J, Jin, M, Hung, H, Kurz, B, Zhang, S, Grodzinsky, AJ, ``Self-Assembling Peptide Scaffold For Cartilage Tissue Engineering," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:54, 2001.
314. Lee, C, Grodzinsky, AJ, Spector, M, ``Effects of Short term Dynamic Loading On Adult Cartilage Chondrocytes Seeded Into Porous Collagen-Glycosaminoglycan Scaffolds," Trans 47th Orthop Res Soc, San Francisco, CA, Feb 25-28, 26:53, 2001.
315. J Kisiday, M Jin, B Kurz, H Hung, S Zhang, AJ Grodzinsky, ``Cartilage Tissue Engineering Using A New Self-Assembling Peptide Scaffold," Biomed Eng Soc Meeting, Seattle, Oct 12-14, 2000.

316. B Kurz, M Jin, P Patwari, MW Lark, I James, AJ Grodzinsky, "Influence of mechanical Overload on Cell Viability, Biosynthetic Activity and Mechanical Properties of Articular Cartilage In Vitro," European Orthopaedic Research Society, Wiesbaden, Germany, October, 2000.
317. Grodzinsky, AJ, "Signal Transduction of Mechanical Stimuli," Articular Cartilage Repair 2000, Association of Bone and Joint Surgeons Workshop, Tampa FL, Nov 9-12, 2000.
318. Grodzinsky, AJ, "Biomechanical Regulation and Physical Diagnostics of Chondrocyte Behavior in Cartilage and Tissue Engineered constructs," Conference on Advances in Tissue and Genetic Engineering for Arthritic Diseases, Boston, Sept 11-12, 2000.
319. Grodzinsky, AJ, "Chondrocyte Mechanotransduction: Cellular, Intracellular, and Molecular Responses to Tissue Level Forces," Force Transduction in Biology Workshop, NSF, Arlington, VA, July 24-26, 2000.
320. AJ Grodzinsky, "Mechanical Regulation of Cellular Response," TMJ Assoc Meeting, May 22-23, 1:37-39, 2000.
321. EC Quan, S Treppo, E Butts, AA Cole, KE Kuettner, EH Frank, AJ Grodzinsky, "Detection of Cartilage Degeneration in Human Patellae Using a Spectroscopic Impedance Probe," Trans 3rd Int Cart Repair Soc Symp, Gothenburg, Sweden, Apr 27-29, 3:98, 2000.
322. J Kisiday, M Jin, B Kurz, H Hung, S Zhang, AJ Grodzinsky, "A New Self-Assembling Peptide Gel for Cartilage Tissue Engineering: Chondrocyte Encapsulation and Matrix Production," Trans 3rd Int Cart Repair Soc Symp, Gothenburg, Sweden, Apr 27-29, 3:69, 2000.
323. P Patwari, B Kurz, V Thompson, AJ Grodzinsky, JD Sandy, "Mannosamine Inhibits Aggrecanase-Mediated Degradation of the Mechanically Functional Portion of Aggrecan," Trans 3rd Int Cart Repair Soc Symp, Gothenburg, Sweden, Apr 27-29, 3:55, 2000.
324. A Kerin, AA Cole, KE Kuettner, A Margulis, AJ Grodzinsky, "The Effect of Mechanical Compression on the Biosynthesis of Human Articular Cartilage Macromolecules," Trans 3rd Int Cart Repair Soc Symp, Gothenburg, Sweden, Apr 27-29, 3:8A6, 2000.
325. Kurz, B, Jin, M, Patwari, P, Lark, MW, James, IE, Grodzinsky, AJ, "Mechanical Overload Alters Cell Viability, Biosynthetic Activity And Mechanical Properties Of Articular Cartilage: An In Vitro-Model, Annual Meeting of the German Connective Tissue Society in Erlangen, April 13-15, 2000.
326. Schaefer, D, Martin, I, Junt, G, Seidel, J, Bergin, I, Grodzinsky, AJ, Vunjak-Novakovic, G, Freed, LE, "Tissue Engineered Composites For the Repair of Large Osteochondral Defects," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:619, 2000.
327. Obradovic, B, Martin, I, Padera, R, Grodzinsky AJ, Freed, LE, Vunjak-Novakovic, G, "Integrative Potential of Tissue Engineered Cartilage Bioreactor Studies," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:616, 2000.
328. Kurz, B, Wong-Palms, S, Grimm, D, Habuchi, O, So, P, Grodzinsky, AJ, Plaas, A HK, "Two-Photon Microscopic Localization of GFP-Chondroitin-Sulfotransferase Fusion Protein in CHO Cells in Monolayer and Rat Chondrosarcoma Cells in 3-D Alginate Gel Culture," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:946, 2000.
329. Ragan, PM, Housman, DA, Grodzinsky, AJ, "Inhibition of Extracellular Matrix Synthesis by Static Compression Does Not Depend on Gene Transcription," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:640, 2000.
330. Ragan, PM, Badger, AM, Cook, M, Grodzinsky, AJ, Lark, MW, "Chondrocyte Gene Expression of Aggrecan and Type IIA Collagen is Upregulated by Dynamic Compression and the Response is Related

- to the Surrounding Extracellular Matrix Density," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:639, 2000.
331. Quinn, TM, Dierickx, P, Grodzinsky, AJ, "Proteoglycan Network Architecture During Cartilage Compression Can Induce Anisotropic Hydraulic Permeability: Relevance to Loading," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:947, 2000.
 332. Szasz, N, Buell, L, Frank, E, Grodzinsky, A, Morales, T, "IGF Binding Proteins Specifically Affect the Diffusive Transport of IGF-I Within Bovine Articular Cartilage," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:940, 2000.
 333. Kurz, B, Jin, M, Patwari, P, Lark, MW, Grodzinsky, AJ, "Biosynthetic Response and Mechanical Properties of Articular Cartilage After Injurious Compression: The Importance of Strain Rate," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:180, 2000.
 334. Patwari, P, Kurz, B, Sandy, JD, Grodzinsky, AJ, "Mannosamine Inhibits Aggrecanase-Mediated Degradation of Mechanical Properties of Cartilage, Trans 46 Orthop Res Soc, Orlando, FL, March 12-15, 25:184, 2000.
 335. Jin, M, Frank, EH, Levenston, ME, Grodzinsky, AJ, "The Effect of Electrostatic Interaction on the Shear Properties of Articular Cartilage," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:894, 2000.
 336. Quan, EC, Treppo, S, Butts, E, Frank, EH, Koepf, H, Cole, AA, Grodzinsky, AJ, "Detection of Cartilage Degeneration in Human Patellae Via Tissue Impedance Measurements Using a Hand Held Surface Spectroscopy Probe," Trans 46th Orthop Res Soc, Orlando, FL, Mar 12-15, 25:129, 2000.
 337. Lee, CR, Grodzinsky, AJ, Spector, M, "Articular Chondrocytes Can Express Smooth Muscle Actin And Contract Matrices For Tissue Engineering," Davos Tissue Engineering Workshop, Davos Switzerland, Feb 16-20, 2000.
 338. Grodzinsky, AJ, Jin, M, Loening, AM, Patwari, PK, Ragan, PM, Treppo, S, Frank, EH, "Cartilage Biomechanics and Repair: Physical Regulation of Chondrocyte Metabolism," Plenary Paper: Proc Pan Pacific Conn Tiss Soc Symp, Queenstown, New Zealand, Nov 15-19, 1999.
 339. Kurz, B, Grimm, D, Wong-Palms, S, Habuchi, O, So, P, Grodzinsky, AJ, Plaas, AHK, "Intracellular Localization and Activity of GFP-Chondroitin-Sulfotransferase Fusion Protein in CHO Cells and Rat Chondrosarcoma Chondrocytes," Arbeitstagung der anatomischen Gesellschaft, Wurzburg, Germany, Sept. 29 - Oct 1, 1999.
 340. Kurz, B, Schunke, M, Jin, MS, Patwari, PK, Grodzinsky, AJ, "Influence of Injurious Compression on the Biosynthetic Activity and Mechanical Properties of Articular Cartilage in Vitro," Arbeitstagung der anatomischen Gesellschaft, Wurzburg, Germany, Sept. 29 - Oct 1, 1999.
 341. Grodzinsky, AJ, Ragan, P, Jin, M, Loening, AM, Levenston, M, Frank, EH, "Physical Regulation of Chondrocyte Metabolism in Normal and Injured Cartilage," Trans World Congress Osteoarthritis Res. Soc. Int., Vienna, Sept. 16-19, 1999.
 342. Grodzinsky, AJ, "Cartilage Metabolism and Response to Injury," American Orthop Soc for Sports Medicine, Instructional Course, June 19-22, Traverse City, MI, 1999.
 343. Masuda, K, Hejna, M, Chen SS, Chen, AC, Ragan, PM, Grodzinsky, AJ, Sah, RL, Thonar, EJ-M A, "The Alginate Recovered-Chondrocyte (ARC) Method for the Formation of Cohesive Cartilaginous tissue for Articular Cartilage Repair," Trans International Symposium on Molecular Cell Biology of Cartilage Development and Repair, Lake Tahoe, June 2-6, p. 70, 1999.

344. Kurz, B, Grimm, D, Wong-Palms, S, Habuchi, O, Grodzinsky, AJ, Plaas, AHK, "Intracellular Localization and Activity of GFP-Chondroitin-Sulfotransferase Fusion Protein in CHO Cells and Rat Chondrosarcoma Chondrocytes," Trans International Symposium on Molecular Cell Biology of Cartilage Development and Repair, Lake Tahoe, June 2-6, p. 24, 1999.
345. Patwari, P, Kurz, B, Sandy, JD, Grodzinsky, AJ, "Inhibition by Mannosamine of Interleukin(-induced changes to Mechanical Properties of Cartilage" Trans International Symposium on Molecular Cell Biology of Cartilage Development and Repair, Lake Tahoe, June 2-6, p. 21, 1999.
346. Chin, VI, Masuda, K, Ragan, PM, Thonar, EJ-M A, Grodzinsky, AJ, "Response of a Cartilaginous Tissue Construct to Dynamic Compression" Trans International Symposium on Molecular Cell Biology of Cartilage Development and Repair, Lake Tahoe, June 2-6, p. 20, 1999.
347. Chen, SS, Masuda, K, Thonar, EJ-M A, Ragan, PM, Chen AC, Grodzinsky, AJ, Sah, RL, "Biomechanical Properties of Tissue-Engineered Cartilage Synthesized Using the Alginate-Recovered-Chondrocytes (ARC) Method," Trans International Symposium on Molecular Cell Biology of Cartilage Development and Repair, Lake Tahoe, June 2-6, p. 19, 1999.
348. Kurz, B, Patwari, P, Kong, JT, Jin, M, Frank, E, Grodzinsky AJ, "Chondrocyte Regulation of Aggrecan Microstructure in Response to Mechanical Forces: A Molecular Biomechanical Hypothesis," "Trans International Symposium on Molecular Cell Biology of Cartilage Development and Repair, Lake Tahoe, June 2-6, p. 68, 1999.
349. Ragan, PM, Badger, AM, Cook, M, Gowen, M, Grodzinsky AJ, Lark, MW, "Modulation In Chondrocyte Aggrecan and Type II Collagen Expression Correlates With Increases In Static Compression Magnitude and Duration," Trans 45th Orthop Res Soc, 24:725, Anaheim, CA, Feb 1-4, 1999.
350. Grodzinsky, AJ, Berger, E, Hung, HK, Frank, EH, Hunziker, EB, "Compression of Cartilage Alters Morphology of Intracellular Organelles: A Potential Link Between Mechanical Stimulation and Aggrecan Structure," Trans 45th Orthop Res Soc, Anaheim, CA, Feb 1-4, 24:671, 1999.
351. Staples, AK, Ragan, PM, Grodzinsky, AJ, Tubo, R, Binette, F., "Mechanical Modulation of Gene Expression During Differentiation of Human Articular Chondrocytes," Trans 45th Orthop Res Soc, 24:697, Anaheim, CA, Feb 1-4, 1999.
352. Lee, CR, Grodzinsky, AJ, Hsu, HP, Martin, SD, Spector, M., "Harvest and Selected Cartilage Repair Procedures Affect Mechanical and Biochemical Properties of Uninvolved articular Cartilage In the Canine Knee," Trans 45th Orthop Res Soc, Anaheim, CA, Feb 1-4, 24:639, 1999.
353. Jin, M., Levenston, ME, Frank, EH, Grodzinsky, AJ, "Regulation of Cartilage Matrix Metabolism By Dynamic Tissue Shear Strain," Trans 45th Orthop Res Soc, Anaheim, CA, Feb 1-4, 24:169, 1999.
354. Loening, AM, Levenston, ME, James, IE, Nuttal, ME, Hung, HK, Gowen, M., Grodzinsky, AJ, Lark, MW, "Injurious Compression of Bovine Articular Cartilage Induces Chondrocyte Apoptosis Before Detectable Mechanical Damage," Trans 45th Orthop Res Soc, Anaheim, CA, Feb 1-4, 24:42, 1999.
355. Bhakta, NR, Morales, TI, Frank, EH, Grodzinsky, AJ, "Insulin-Like Growth Factors (IGF) Bind Specifically to Endogenous IGF Binding Proteins in Adult Articular Cartilage," "Trans 45th Orthop Res Soc, Anaheim, CA, Feb 1-4, 24:129, 1999.
356. Grodzinsky, AJ, "Biomechanics and Cell Response", International Cartilage Repair Society, Nov 16-18, Boston, 2:106, 1998.

357. Treppo, S, Quan, EC, Batra, N, Frank, EH, Grodzinsky, AJ, ``Development of a Surface Electromechanical Spectroscopy Probe For In Vivo Cartilage Diagnostics," Trans. International Cartilage Repair Society, Nov 16-18, Boston, 2:106, 1998.
358. Staples, AK, Ragan, PM, Grodzinsky, AJ, Tubo, RA, Binette, F, ``Mechanical Induction of Adult Human Articular Chondrocyte Differentiation," Trans. International Cartilage Repair Society, Nov 16-18, Boston, 2:95, 1998.
359. Levenston, ME, James, IE, Loening, AM, Nuttall, ME, Hung, HK, Gowen, M, Grodzinsky, AJ, Lark, MW, ``Injurious Compression Induces Apoptosis in Cartilage," Trans. International Cartilage Repair Society, Nov 16-18, Boston, 2:51, 1998.
360. Lee, CR, Grodzinsky, AJ, Hsu, HP, Martin, SD, Spector, M, ``Selected Cartilage Repair Procedures Affect Uninvolved Articular Cartilage in the Canine Knee," Trans. International Cartilage Repair Society, Nov 16-18, Boston, 2:50, 1998.
361. Bhakta, N, Frank, EH, Morales, TI, Grodzinsky, AJ, ``Role of Endogenous Insulin-Like Growth Factor (IGF) Binding Proteins (IGF-BPs) in the Binding of IGF to Cartilage Disks," Trans. International Cartilage Repair Society, Nov 16-18, Boston, 2:9, 1998.
362. Garcia, AM, Frank, EH, Grodzinsky, AJ, ``Mechanisms of Molecular Transport through Articular Cartilage," AIChE, Paper 89c, Miami, Nov 15-20, 1998.
363. Grodzinsky, AJ, ``Regulation of Matrix Enzymatic Degradation by Physical Forces," New York Academy of Sciences Conference on Inhibition of Matrix Metalloproteinases: Therapeutic Applications, Tampa, Oct 21-24, 1998.
364. Bonassar, LJ, Grodzinsky, AJ, Davila, SG, Trippel, SB, ``The Effects of Dynamic Compression on the Response of Cartilage to IGF-1," Trans 44 Orthop Res Soc, 23:579, New Orleans, LA, March 16-19, 1998.
365. Lin, BY, Sebern, EL, Frank, EH, Dube N, Grodzinsky, AJ, Gross, GJ, Hookfin, EB, Deutsch, AG, Prenger, MC, Meyer, JM ``Changes in Physical and Biochemical Properties of Cartilage in the Guinea Pig Spontaneous OA Model Are Consistent With Hypertrophic Remodeling, ' Trans 44 Orthop Res Soc, 23:130, New Orleans, LA, March 16-19, 1998.
366. Treppo, S, Koepp, H, Quan, EC, Cole, AA, Kuettner, KE, Grodzinsky, AJ, ``Comparison of Biomechanical and Biochemical Properties of Cartilage From Human Knee and Ankle Pairs," Trans 44 Orthop Res Soc, 23:202, New Orleans, LA, March 16-19, 1998.
367. Ragan, PM, Staples, AK, Hung, HK, Chin, VI, Binette, F, Grodzinsky, AJ, ``Mechanical Compression Influences Chondrocyte Metabolism in a New Alginate Disk Culture System," Trans 44 Orthop Res Soc, 12:991, New Orleans, LA, March 16-19, 1998.
368. Treppo, S, Otterness, JG, Milici, AJ, Berkenblit, SI, Grodzinsky, AJ, ``Effects of MMP-1 and MMP-13 Induced Matrix Degradation on Electrokinetic and Dielectric Properties of Adult Articular Cartilage by Surface Spectroscopy," Trans 44 Orthop Res Soc, 23:153, New Orleans, LA, March 16-19, 1998.
369. Ragan, PM, Badger, AM, Dodds, RA, Cook, M, Connor, JR, Grodzinsky, AJ, Lark, MW, ``Mechanical Compression Affects Chondrocyte Matrix Gene Expression in Cartilage Explants," Trans 44 Orthop Res Soc, 23:918, New Orleans, LA, March 16-19, 1998.
370. Grodzinsky, AJ, Ragan, PM, Levenston, ME, Loening, AM, Quinn, TM, ``Pressure, Deformation, and Chondrocyte Response," Trans. Tissue Engineering Keystone Symposium, January 10-15, Copper Mt, CO., p19, 1998.

371. Levenston, ME, Frank, EH, and Grodzinsky, AJ, "A Finite Deformation Theory and Finite Element Formulation for Coupled Electrokinetic and Fluid Flow in Soft Tissues: Application to electroosmotic Flow," ASME Annual IMECE Conf, Dallas, TX, Nov 17-21, BED-Vol. 36, ASME Advances in Bioeng, p. 187-188, 1997.
372. Grodzinsky, AJ, "Cartilage Biomechanics: Matrix Molecular Interactions Essential to Normal Cartilage Function," 1st Fribourg International Symposium on Cartilage Repair, Fribourg, Switzerland, Oct 29-31, 1997, p. 11.
373. Grodzinsky, AJ, "Effects of Static and Dynamic Compression on Cartilage," International Conference on New Advances in Arthritis Therapies, Phila, PA, Oct 7-8, 1997.
374. Grodzinsky, AJ, Treppo, S, Berkenblit, SI, Quan, E, Tsay, J, "Physical Diagnostics of Cartilage Degeneration," International Symposium on Advances in Osteoarthritis, 25th Japanese Soc Rheumatism and Joint Surgery, Kobe, Japan, Oct 2, Symposium Proceedings p. 7, 1997.
375. Levenston, ME and Grodzinsky, AJ, "Electrokinetic Phenomena During Indentation Tests of Articular Cartilage," Biomed Eng Soc Meeting, San Diego, in Annals Biomed Eng, pg. S74, Oct 2-5, 1997.
376. Bonassar, LJ, Trippel, SB, Davila, SG, Srinivasan, A, Grodzinsky, AJ, "Interaction of Growth Factors and Physical Stimuli in the Regulation of Cartilage Metabolism," Biomed Eng Soc Meeting, San Diego, in Annals Biomed Eng, pg. S78, Oct 2-5, 1997.
377. Quinn, TM, Treppo, S, Bonassar, LJ, Frank, EH, Grodzinsky, AJ, "Loading-Induced Degradation versus Repair in Cartilage: Implications for Acute and Chronic Changes in Material Properties," Osteoarthritis Workshop at 27th International Workshop on Hard Tissue Biology, Sun Valley, Idaho, Aug 11-15, 1997.
378. Grodzinsky, AJ, "Response of Cartilage to Mechanical Stress: In Vitro Studies," 3rd International Congress of Osteoarthritis Research Society, Singapore, June 7-9, 1997. In Osteoarthritis and Cartilage J, 5:34, Supplement A, 1997.
379. Bonassar, LJ, Grodzinsky, AJ, Srinivasan, A, Trippel, SB, "Interaction Between Mechanical Compression and IGF-1 in the Regulation of Articular Cartilage Biosynthesis," Trans 43 Orthop Res Soc, 22:407, San Francisco, CA, Feb 9-13, 1997.
380. Quinn, TM, Grodzinsky, AJ, Buschmann, MD, Kim, YJ, Hunziker, EB, "Mechanical Compression Alters Proteoglycan Matrix Assembly and Deformation Around Individual Cells in Cartilage Explants," Trans 43 Orthop Res Soc, 22:202, San Francisco, CA, Feb 9-13, 1997.
381. Garcia, AM, Frank, EH, Trippel SB, Grodzinsky, AJ, "IGF-1 Transport in Cartilage: Effects of Binding and Intratissue Fluid Flow," Trans 43 Orthop Res Soc, 22:410, San Francisco, CA, Feb 9-3, 1997.
382. Levenston, ME, Frank, EH, and Grodzinsky, AJ, "Nonuniform Spatial Profiles of Compression-Induced Electromechanical Fields: Relevance to Chondrocyte Biosynthesis," Trans 43 Orthop Res Soc, 22:204, San Francisco, CA, Feb 9-13, 1997.
383. Quinn, TM, Grodzinsky, AJ, Hunziker, EB, and Sandy, JD, "Injurious Mechanical Compression of Cartilage Modifies Cell-Mediated Biochemical Pathways of Matrix Catabolism," Trans 43 Orthop Res Soc, 22:408, San Francisco, CA, Feb 9-13, 1997.
384. McGibbon, CA, Krebs, DE, Riley, PO, Lin, JW, Frank, EH, Grodzinsky, AJ, Trahan, CA, Trippel, SB, and Mann, RW, The Effect of Femoral Head Local Contact Pressures on Acetabular Cartilage, Proc 1st Ann N Amer Soc Gait and Clinical Movement Anal, Birmingham, AL, Gait and Posture 4(2):199, 1996.

385. Grodzinsky, AJ, "Cartilage Degradation: Effects of Mechanical Loading, Enzymes, and Inhibitors," Sixth International Conf on Therapeutic Advances in Arthritis, New Orleans, Dec 9-10, 1996.
386. Levenston, ME, Frank, EH, and Grodzinsky, AJ, "Variationally Derived 3-Field Lagrange Multiplier and Augmented Lagrangean Poroelastic Finite Elements of Soft Tissues," Winter Annual Meeting of ASME, Atlanta, Nov 17-22, 1996, pBIO-8A-2.
387. Grodzinsky, AJ, "Tissue Engineering and Cellular Mechanics," Invited Lecture at Emerging Directions in BME Session at 1996 AIChE Meeting, Chicago, Nov 10-15, 1996, p218e.
388. Quinn, TM, Grodzinsky AJ, "Extracellular Matrix Assembly and Deformation Around Individual Chondrocytes in Mechanically Compressed Cartilage Explants," AIChE 1996 Annual Meeting, Chicago, Nov 10-15, 1996, p57e.
389. Cheng, GC, Briggs, WH, Grodzinsky, AJ, Libby, P, Lee, RT, "Mechanical Strain Tightly Controls FGF-2 Release From Cultured Human Vascular Smooth Muscle Cells," 69th Amer Heart Assoc, Nov, 1996.
390. Sandy, JD, Quinn, TM, Bonassar, LJ, and Grodzinsky, AJ, "Cellular Mechanisms in Cartilage Matrix Turnover," Biomed Eng Soc, University Park, PA, Oct 3-6, 1996, p. 291.
391. Grodzinsky, AJ, "Electromechanical Effects on Cartilage Metabolism", UK Arthritis Rheumatism Council Plenary Lecture at the British Connective Tissue Society, Oxford Univ, England, September 26-27, 1996.
392. Bonassar, LJ, Grodzinsky, AJ, Srinivasan, A, and Trippel, SB, "Interaction Between IGF-1 and Mechanical Compression in the Regulation of Articular Cartilage," British Connective Tissue Society, Oxford, England, September 26-27, 1996, p. 27.
393. Grodzinsky, AJ, "Biomechanics of Joint Cartilage," Symposium on The Biology of Synovial Joints, University of Wales, Cardiff, UK, June 30-July 2, 1996, in *Connective Tiss Res*, 36:99-100, 1997.
394. Integration and Reductionism, Stockholm, Sweden, June 16-19, 1996.
395. Grodzinsky, AJ, "The Influence of Molecular Structure on Cartilage Matrix Physical Properties and Chondrocyte Metabolism," Wenner Gren International Symposium on Connective Tissue Biology:
396. Levenston, ME, Frank, EH, Grodzinsky, AJ, "A Comparison of Analytical and Numerical Poroelastic Models for Radially Unconfined Compression of Articular Cartilage Explants," ASME Conf on Mechanics and Materials, Johns Hopkins Univ, Baltimore, June 12-14, 1996, p. 30.
397. Bonassar, LJ, Sandy, JD, Plaas, AHK, Hagmann, WK, Esser, CK, Lark, MW, Grodzinsky, AJ, "Release of G1 Domain and Hyaluronan Induced by IL1(and Retinoic Acid Can Be Prevented by an MMP Inhibitor," *Trans 42 Orthop Res Soc*, 21:147, Atlanta, GA, Feb 19-22, 1996.
398. Garcia, AM, Lark, MW, Trippel, SB, Grodzinsky, AJ, "Transport of TIMP and IGF-1 in Cartilage: Contributions of Fluid Flow and Electrical Migration," *Trans 42 Orthop Res Soc*, 21:12, Atlanta, GA, Feb 19-22, 1996.
399. Basser, PJ, Lewis, MS, and Grodzinsky, AJ, "Electrostatic Forces between Charged Macromolecules Measured By equilibrium sedimentation: Relevance to Cartilage Mechanics," *Trans 42 Orthop Res Soc*, 21:9, Atlanta, GA, Feb 19-22, 1996.
400. Quinn, TM and Grodzinsky, AJ, "A Microstructurally-Based Model for Anisotropic Hydraulic Permeability in Mechanically Deformed Polymer Gels and Tissue Matrices," *Trans AIChE Meeting*, Miami, Nov 13-17, Paper 106h, p. 254, 1995.

401. Buschmann, M.D., Kim, Y-J., Hunziker, E.B., and Grodzinsky, A.J., "Stimulated Aggrecan Synthesis Correlates with Expansive Solid Matrix Strain and Increased Fluid Flow in Dynamically Compressed Cartilage," Combined Orthopaedic Research Societies Meeting, San Diego, Nov 6-8, 2:, 1995.
402. Garcia, AM, Frank, EH, Grimshaw, PE, Jen M, and Grodzinsky, AJ, "Use of cartilage Electrokinetic Phenomena to Study Macromolecular Transport Through the Extracellular Matrix," Annals Biomed Eng 23:S-107, Biomed Eng Soc Meeting, Boston, Oct 6-8, #502, 1995.
403. Berkenblit, SI, Bombard DL, Treppo, S, Frank, EH, and Grodzinsky, AJ, "Variable Frequency-Wavelength Surface Electrokinetic Spectroscopy For Detection of Cartilage Degradation," Annals Biomed Eng, 23:S-104, Biomed Eng Soc Meeting, Boston, Oct 6-8, #491, 1995.
404. Cheng, GC, Grodzinsky, AJ, and Lee, RT, "Induction of DNA Synthesis in Human Vascular Smooth Muscle Cells by a Transient Three-Dimensional Strain," paper CTE2.4, Symposium on Electrokinetics, ASME-AICHe-ASCE Summer Bioengineering Conference, Beaver Creek, CO., June 28 - July 2, 1995.
405. Berkenblit, SI, Frank, EH, Bombard, DL, and Grodzinsky, AJ, "Electrokinetic Interactions in Cartilage: Relevance to Chondrocyte Metabolism and Diagnostics for Tissue Degeneration," paper TM1.1, Symposium on Electrokinetics, ASME-AICHe-ASCE Summer Bioengineering Conference, Beaver Creek, CO., June 28 - July 2, 1995.
406. Basser, P.J., Lewis, M., and Grodzinsky, A.J., "Electrostatic Interactions Between Polyelectrolytes Measured in a Centrifuge," paper TM1.5, Symposium on Electrokinetics, ASME/AICHe/ASCE/ Summer Bioengineering Conference, Beaver Creek, CO., June 28 - July 2, 1995.
407. Lohmander, LS, Lark, MW, Sandy, JD, and Grodzinsky, AJ, "Consequences and Mechanisms of Aggrecan Degradation in Arthritic Cartilage," XIIIth European Congress of Rheumatology (EULAR), Amsterdam, June 18-23, Rheum in Europe, S2, 24:62-65, 1995.
408. Grodzinsky, AJ, "Cartilage Function and Biomechanics," Eric K. Fernstrom Symposium on Molecular Markers for Joint and Skeletal Diseases, Lund, Sweden, May 21-24, 1995.
409. Grodzinsky, AJ, "Metabolic Response of Cartilage to Compression: A Link to Physical Diagnostics of Cartilage Degeneration," XIIth British Society for Rheumatology, Glasgow, Scotland, April 5-7, 1995.
410. Grodzinsky, AJ, "Matrix Physical Properties: Relation to Molecular Structure and Molecular Interactions," Int. Symposium on Structure and Function of Extracellular Matrix, Swiss Conn Tissue Soc, Ringberg, Germany, Mar 20-21, 1995.
411. Buschmann, MD, Hunziker, EB, Kim, YJ, and Grodzinsky, AJ, "Coordinated Changes in Biosynthesis and Morphology of Cells in Articular Cartilage Under Compression," Trans 41st Orthop Res Soc, Orlando, FL, Feb 13-16, 20:289, 1995.
412. Garcia, AM, Grimshaw, PE, Jen, MC, and Grodzinsky, AJ, "Contributions of Fluid Convection and Electrical Migration To Molecular Transport in Cartilage: Relevance to Loading," Trans 41st Orthop Res Soc, Orlando, FL, Feb 13-16, 20:198, 1995.
413. Inhibited by TIMP," Trans 41st Orthop Res Soc, Orlando, FL, Feb 13-16, 20:126, 1995.
414. Bonassar, LJ, Stinn, JL, Frank, EH, Moore, VL, Lark, MW, and Grodzinsky, AJ, "Degradation of Cartilage and Changes in Physical Properties Induced By IL-1(, Retinoic Acid, and APMA are
415. Berkenblit, SI, Frank, EH and Grodzinsky, AJ, "Spatial Localization of Cartilage Degradation Using Variable Wavelength Surface Spectroscopy," Trans 41st Orthop Res Soc, Orlando, FL, Feb 13-16, 20:98, 1995.

416. Grodzinsky, AJ, "Biomechanical Effects on Chondrocyte and Articular Cartilage Metabolism: Relevance to Diagnostics and Therapeutics," Symposium on Osteoarthritis: Advances in Pathobiology, Diagnosis, and Treatment, Washington DC, Nov 30 - Dec 1, 1994.
417. Lee, E, Vaughan, DE, Parikh, SM, Grodzinsky, AJ, Libby, P, Lark, MW, and Lee, RT, "Interactions Between the Plasmin System and the Cytokine-Induced Metalloproteinase System in Human Vascular smooth Muscle Cells," Amer Heart Assoc, paper #2773, Dallas, Nov13-18, 1994, *Circulation*, 90:I-515, No.4, Part 2, Oct, 1994.
418. Chang, DYH, Wang, DIC, and Grodzinsky, AJ, "Augmentation of Mass Transfer Through Electrical Means For Hydrogel-Entrapped Cell Cultures," Trans AICHE Meeting, San Francisco, CA, Paper 41a, Nov 13-18, 1994.
419. Sachs, JR and Grodzinsky, AJ, "Theory of Electromechanical Spectroscopy in Poroelastic Media: Surface Detection of Bulk Properties," Trans 16th IEEE Eng Med Biol Soc, Baltimore, Nov 3-6, pp. 752-753, 1994.
420. Bassar, PJ and Grodzinsky, AJ, "Electrostatic Interactions between Polyelectrolytes Within an Ultracentrifuge," Trans 16th IEEE Eng Med Biol Soc, Baltimore, Nov 3-6, pp. 750-751, 1994.
421. Berkenblit, SI, Frank, EH, Bonassar, LJ, Bombard, DL, Duffin, NJ, and Grodzinsky, AJ, "Electrokinetic Methods for Arthroscopic detection of Cartilage Degeneration in Synovial Joints," Trans 16th IEEE Eng Med Biol Soc, Baltimore, Nov 3-6, pp. 746-747, 1994.
422. Chen, CC, Vanderby Jr., R, McCabe, R, Vallas, AC, Grodzinsky, AJ, "Strain Generated Potentials in a Rabbit Patellar Tendon: Effects of Frequency and pH," Trans 14th Soc Phys Reg Biol Med, Washington, DC, Oct 13-16, 1994.
423. Grodzinsky, AJ, Kim, Y-J, Sah, RL, Plaas, AHK, and Sandy, JD, "Differential Effects of Static and Dynamic Compression on Matrix Metabolism in Cartilage Explants," 9th Meeting for Orthopaedic Research of the Japanese Orthopaedic Association, Kobe, Japan, Oct 6-8, 1994.
424. Mallein-Gerin, F, Ruggiero, F, Quinn, TM, Grodzinsky, AJ, Olsen, BR, and van der Rest, M, "SV 40 Large T Immortalization of Chondrocytes from Normal and Mutant Mice Provides a Tool For Cartilage Matrix In Vitro," Trans XIV Fed Eur Conn Tiss Soc, Lyon, Aug 30-Sept 3, 1994.
425. Grodzinsky, AJ and Sachs, JR, Analysis and Design for Electromechanical Spectroscopy of Cartilage with Applied Mechanical Displacements, Annual SIAM Conf, July, 1994.
426. Grodzinsky, AJ, Kim, Y-J, Buschmann, MD, Quinn, TM, Sah, RL, "Differential Effects of Static and Dynamic Compression on Cartilage Explants and Chondrocyte/Agarose Cultures," FASEB Meeting, Anaheim, CA, #303, April 24-28, 1994.
427. Chang, DYH, Grodzinsky, AJ, Wang, DIC, "Enhancement of Hybridoma Growth and Productivity by Nutrient Enrichment and Cellular Waste Removal Through Electrical Means," 207th Amer Chem Soc Meeting, San Diego, March 13-17, BIOT #7, 1994.
428. Bonassar, LJ, Paguio, CG, Frank, EH, Jeffries, KA, Lark, MW, Moore, VL, and Grodzinsky, AJ, "Effects of Matrix Metalloproteinases on Cartilage Biophysical Properties In Vitro and In Vivo," Trans 40th Orthop Res Soc, NewOrleans, Feb 21-24, 19:310, 1994.
429. Berkenblit, SI, Frank, EH, and Grodzinsky, AJ, "Quantitative Assessment of Cartilage Degradation Via Nondestructive Surface Electromechanical Spectroscopy," Trans 40th Orthop Res Soc, New Orleans, Feb 21-24, 19:214, 1994.

430. Bonassar, LJ, Paguio, CG, Frank, EH, Jeffries, KA, Lark, MW, Moore, VL, and Grodzinsky, AJ, "Effects of MMPs on Cartilage Degradation," Proc New York Academy Sciences Conf on Inhibition of Matrix Metalloproteinases: Therapeutic Potential, Tampa, FL, Jan 19-22, 732:439-443, 1994.
431. Quinn, TM, Grodzinsky, AJ, Buschmann, MD, and Kim, YJ, "Functional Cartilage Matrix Development: Comparison of Chondrocyte Gel and Organ Culture explant Systems," Proc AICHe Conference, St. Louis, Nov 7-12, #121c, p. 287, 1993.
432. Grodzinsky, AJ, "Electrical Properties of the Extracellular Matrix," Int Union Physiol Sci, Glasgow, Aug 1-6, paper 194.4/0, Symposium 38, 1993.
433. Buschmann, MD, Basser, PJ, and Grodzinsky, AJ, "A Microstructural Model for Swelling Pressure and Compressive Modulus of Tissues Containing Charged GAG Chains: Comparison to Donnan Theory," Trans ASME Bioeng Conf, Colorado, June 25-29, BED Vol 24, 80-83, 1993.
434. Sah, RL, Schinagl, RM, Chen, AC, Reindel, ES, Ayroso, AV, Ting, MK, Trippel, SB, and Grodzinsky, AJ, "An In Vitro Model of Articular Cartilage Repair: Growth Factors and Biomechanics," Arthritis Foundation Research Conference, Phoenix, June 18-20, 1993,
435. Buschmann, MD, Gluzband, YA, Grodzinsky, AJ, Kimura, JH, Hunziker, EB, "Chondrocytes in Agarose Culture: Development of a Mechanically Functional Matrix and Biosynthetic Response to Compression," Workshop of Intern Soc Fracture Repair, Ulm, Germany, May 12-15, p. 30, 1993.
436. Grodzinsky, AJ, Sah, RL, Kim, YJ, Plaas, AHK, Sandy, JD, "Physical Regulation of Cartilage Matrix Metabolism," Workshop of Intern Soc Fracture Repair, Ulm, Germany, May 12-15, 1993.
437. Chang, DYH, Grodzinsky, AJ, and Wang, DIC, "In-Situ Ammonia Removal From Hybridoma Culture Through Electrical Means," 205th ACS Meeting, Denver, March 28- April 2, BIOT\#114, 1993.
438. Bonassar, LJ, Frank, EH, Murray, JC, Paguio, CG, Moore, VL, Lark, MW, Grodzinsky, AJ, "Changes in Cartilage Composition and Functional Properties Due to Stromelysin Degradation," San Fran, CA, Trans Orthop Res Soc, Feb 15-18, 18:192, 1993.
439. Sah, RL, Trippel, SB, Grodzinsky, AJ, "Articular Cartilage Metabolism and Function After Treatment With IGF-I or bFGF," San Fran, CA, Trans Orthop Res Soc, Feb 15-18, 18:142, 1993.
440. Buschmann, MD, Gluzband, YA, Grodzinsky, AJ, Kimura, JH, Hunziker, EB, "Proteoglycan-Associated Electrostatic Forces and the Development of Functional Mechanical Properties in Chondrocyte/Agarose Gel Cultures," San Fran, CA, Trans Orthop Res Soc, Feb 15-18, 18:74, 1993.
441. Kim, YJ, Kung, S, Grodzinsky, AJ, Sandy, JD, Plaas AHK, "Effects of Compression on Cartilage Link Synthesis, Aggrecan Structure, and Core Protein Processing: Cellular Mechanisms," Trans Orthop Res Soc, San Fran, CA, Feb 15-18, 18:13, 1993.
442. Shefer, A., Grodzinsky, A.J., Prime, K.L., Whitesides, G.M., and Busnel, J.P., "Novel Model Polyelectrolyte Networks: Synthesis and Characterization," Networks 92, San Diego, Aug 30-Sept 4, 1992, p. 111-112.
443. Buschmann, M.D., Gluzband, Y.A., Grodzinsky, A.J., Kimura, J.H., Hunziker, E.B., "Chondrocytes in Agarose Culture: Development of a mechanically Functional Matrix and Biosynthetic response to Compression," XIIIth Meeting of Federation of European Conn Tiss Soc, Davos, July 12-17, 1992.
444. Grodzinsky, AJ, "Physical Forces Modulate Matrix Synthesis, Assembly, and Degradation in Cartilage Explants and Gel/Chondrocyte Cultures," Keystone Symposium on Tissue Engineering, Keystone, CO., April 3-10, 1992.

445. Kim, Y-J., Grodzinsky, A.J., Plaas, A.H.K., and Sandy, J.D., "The Differential Effects of Static Compression on the Synthesis of Specific Cartilage Matrix Components," Trans 38th Orthop Res Soc, Washington, D.C., Feb 17-20, 1992, p. 108.
446. Grodzinsky, A.J., Sah, R.L-Y., and Kim, Y-J., Physical Regulation of Cartilage Metabolism, Amer Soc Cell Biol, Trans Subgroup Mechanical Stress Factors in Biological Processes, Dec 8, 1991, p. IV-1.
447. Kim, Y-J., Bonassar, L.J., and Grodzinsky, A.J., Cartilage Dynamic Stiffness and Streaming Potential: Experiment, Theory, and Relevance to Organ Culture, 1991 Advances in Bioengineering, Winter Annual Meeting Amer Soc Mech Eng (ASME), Atlanta, Dec 1-6, 1991, vol BED-20, pp 485-488.
448. Freed, L.E., Weinstock, S.B., Mikos, A.G., Marquis, J.C., Nohria, A., Grodzinsky, A.J., and Langer, R., Chondrocytes Cultured on Synthetic Biodegradable Polymers Grow and Secrete a Cartilage-Like Matrix," Trans. AIChE Annual Meeting, Los Angeles, Nov 17-22, 1991, p. 5.
449. Masterman, T.C., Shefer, A., and Grodzinsky, A.J., "Preparation of Novel Polyelectrolyte Hydrogels," Trans. AIChE Annual Meeting, Los Angeles, Nov 17-22, 1991, p. 12.
450. Quinn, T.M. and Grodzinsky, A.J., "Mechanical and Electromechanical Properties of Polyelectrolyte Hydrogels," Trans AIChE Annual Meeting, Los Angeles, Nov 17-22, 1991, p. 43.
451. Buschmann, M.D., Gluzband, Y.A., Grodzinsky, A.J., Kimura, J.H., and Hunziker, E.B., "Mechanical Compression Modulates Matrix Biosynthesis in Chondrocyte/Agarose Gel Culture," Combined Conf USA, Japan, and Canada Orthopaedic Res. Soc., Banff, October 21-23, 1991, p. 75.
452. Sah, R.L., Kim, Y-J., Grodzinsky, A.J., Plaas, A.H.K., and Sandy, J.D., "The Response of Cartilage to Mechanical Loading," International Workshop on Articular Cartilage and Osteoarthritis, Wiesbaden, Germany, May 12-16, 1991, p. 26.
453. Frank, E.H., Salant, E.P., and Grodzinsky, A.J., "Nondestructive Surface Detection of Cartilage Degeneration Based on electromechanical Behavior of Extracellular Matrix," Trans. Orthop. Res. Soc., Anaheim, CA., Mar 4-7, 1991, vol. 16, p. 74.
454. Kim, Y-J., Sah, R.L., Grodzinsky, A.J., Plaas, A.H.K., and Sandy, J.D., "Stimulation of Cartilage Biosynthesis by Dynamic Compression: Physical Mechanisms," Trans. Orthop. Res. Soc., Anaheim, CA., Mar 4-7, 1991, vol. 16, p. 53.
455. Grodzinsky, A.J., "Physical Regulation of Cartilage Metabolism," Proc. 4th Annual Meeting of the Japanese Society of Cartilage Metabolism, Tokyo, Feb 22-23, 1991, p. 24-25.
456. Kim, Y-J., Sah, R.L., Grodzinsky, A.J., Plaas, A.H.K., and Sandy, J.D., "Effects of Static and Dynamic Unconfined Compression of Cartilage Explants on GAG and Core-Protein Synthesis," Trans Southern Conn. Tiss. Soc., Tampa, FL, Feb. 20-22, 1991.
457. Lee, R.T., Grodzinsky, A.J., Frank, E.H., Kamm, R.D., and Schoen, F.J., "Structure-Dependent Dynamic Mechanical Behavior of Fibrous Caps from Human Atherosclerotic Plaques," Paper 3049, Trans. 63rd Amer Heart Assoc., Dallas, Nov. 12-15, Circulation, 82:III-767, 1990.
458. Weiss, A.M., Adler, Grodzinsky, A.J., and Yarmush, M.L., "Network Structure of PMAA Gel Membranes: Effect of Crosslink Density on Macromolecular Transport," AIChE Annual Meeting, Chicago, Nov. 12-16, p. 208I, 1990.
459. Grodzinsky, A.J., "Bioelectrical Properties of Articular Cartilage," Proc. 1st World Congress Biomechanics, San Diego, Aug 30-Sept 4, Vol. II:57, 1990.

460. Kim, Y-J., Sah, R.L-Y., and Grodzinsky, A.J., "Biosynthetic Response of Cartilage Under Dynamic Unconfined Compression," Proc. 1st World Congress Biomechanics, San Diego, Aug 30-Sept 4, Vol. I:22, 1990.
461. Salant, E.P., Frank, E.H., and Grodzinsky, A.J., "Surface Probe for Electrokinetic Detection of Cartilage Degeneration, Proc. 1st World Congress Biomechanics, San Diego, Aug 30-Sept 4, Vol. I:19, 1990.
462. Sachs, J.R. and Grodzinsky, A.J., "A Model For Electromechanical Spectroscopy of Intact Articular Cartilage With Surface Displacement or Current Injection and Segmented Electrodes," Proc. 1st World Congress Biomechanics, San Diego, Aug 30-Sept 4, Vol. II:269, 1990.
463. Buschmann, M.D. and Grodzinsky, A.J., "Molecular Model of the Equilibrium Modulus of Articular Cartilage," Proc. 1st World Congress Biomechanics, San Diego, Aug 30-Sept 4, Vol. II:267, 1990.
464. Grodzinsky, A.J., Grimshaw, P.E., and Yarmush, M.L., "Electrochemical Control of Membrane Permeability," Proc. Controlled Release Society, Reno, July 22-25, 17:108-109, 1990.
465. Weiss, A.M., Adler, K.A., Grodzinsky, A.J., and Yarmush, M.L., "Network Structure of poly(Methacrylic Acid) and its Relation to Diffusive Transport," Tenth Polymer Networks Meeting, Jerusalem, Israel, 1990.
466. Schneiderman, R., Muller, N., Grodzinsky, A.J., Sen, K., Kuettner, K.E., and Kimura, J., "The Effect of Electrical Current on the Rate of Proteoglycan Synthesis by Swarm Rat Chondrosarcoma Cells," Trans. 36th Orthop. Res. Soc., New Orleans, Feb. 5-8, 15: 363, 1990.
467. Freeman, P., Schneiderman, R., Natarajan, R., Grodzinsky, A.J., Kimura, J., and Andriacchi, T., "Analysis of Chondrocyte Deformation Under Load," Trans. 36th Orthop. Res. Soc., New Orleans, Feb. 5-8, 15: 85, 1990.
468. Sah, R.L., Kim, Y.J., Doong, J., Grodzinsky, A.J., Plaas, A.H.K., Sandy, J.D., "Biophysical Regulation of Matrix Metabolism in Cartilage Explants: Static and Dynamic Compression," Trans. 36th Orthop. Res. Soc., New Orleans, Feb. 5-8, 15: 128, 1990.
469. Buschmann, M.D., Gluzband, Y.A., Grodzinsky, A.J., King, K., Kimura, J., Kuettner, K.E., Chondrocytes in Agarose Gel Synthesize a Mechanically Functional Matrix, Trans. 36th Orthop. Res. Soc., New Orleans, Feb. 5-8, 15: 86, 1990.
470. Grimshaw, P.E., Grodzinsky, A.J., and Yarmush, M.L., "Polyelectrolyte Membranes for Controlled Solute Release: Membrane Swelling Kinetics," 1989 AIChE Annual Meeting, San Francisco, Nov. 5-10, 1989, 2nd Topical Conf. on Emerging Technologies in Materials, p. 55-56.
471. Grimshaw, P.E., Grodzinsky, A.J., and Yarmush, M.L., "Dynamic Membranes for Control of Protein Transport and Separation," 1989 AIChE Meeting, San Francisco, Nov. 5-10, 1989, p. 76F.
472. Sachs, J.R. and Grodzinsky, A.J., "Probing an Electromechanically Coupled Porous Medium With Surface Displacement and Displacement/Stress Conditions," SIAM (Soc. for Indust. and Applied Math) Conf. on Geophysical Fluid and Solid Mechanics, Sept. 25-28, 1989
473. Grodzinsky, A.J., Grimshaw, P.E., and Yarmush, M.L., "Electrically Controlled Gel Membranes for Separations and Drug Delivery," Symposium on Polymer Gels, Tsukuba Science City, Japan, Sept. 18-19, 1989, p. 35.
474. Sah, R.L., Doong, J.Y.H., Grodzinsky, A.J., Plaas, A.H.K., and Sandy, J.D., "Proteoglycan Synthesis and Processing by Cartilage Explants: Compressive and Physicochemical Modulation," 19th Southern Connective Tissue Soc., Tampa, March 29-30, 1989, p. 3.

475. Grodzinsky, A.J., "Mechanical Modulation of Cartilage Biosynthesis," Bat Sheva Seminar on Methods Used in Research on Cartilaginous Tissues, Nof Ginossar, Israel, March 16-26, 1989.
476. Sah, R.L., Doong, J.Y.H., Tiao, P.M., Grodzinsky, A.J., Plaas, A.H.K., and Sandy, J.D., "Catabolic Response of Cartilage Explants to Mechanical Stimuli," Trans. 35th Orthop. Res. Soc., Las Vegas, Feb. 6-9, 1989, p. 50.
477. Weiss, A.M. and Grodzinsky, A.J., "Fluorescence Techniques for the Characterization of Polymeric Membranes Whose Permeability Can be Varied in Real Time," 6th Meeting in Israel on Optical Eng., SPIE Vol 1038, R. Finkler and J. Shamir, eds., pp. 36-43, 1989.
478. Buschmann, M.D., Grodzinsky, A.J., and Kimura, J.H., "Electromechanical Detection of Chondrocyte Biosynthesis: In Vitro Model for Electrical and Mechanical Stimulation of Cartilage Cells," Trans. 8th Bioelectrical Repair Growth Soc., Washington D.C., Oct. 9-12, 1988, p.1.
479. Sachs, J.R. and Grodzinsky, A.J., "A Mathematical Model of an Electromechanically Coupled Poroelastic Medium Driven by an Applied Electric Current," SIAM (Soc. for Indust. and Applied Math), Minneapolis, July 11-15, 1988, p. A37.
480. Grodzinsky, A.J., MacGinitie, L.A., and Sah, R.L., "Electric Field Effects on Cartilage," Trans. 10th Bioelectromagnetics Soc., Stamford, June 19-23, 1988, p. 24.
481. Sah, R.L., Doong, J.Y.H., Grodzinsky, A.J., Plaas, A.H.K., and Sandy, J.D., "Biosynthetic Response of Cartilage Explants to Mechanical and Physicochemical Stimuli," Trans 34th Orthop. Res. Soc., Atlanta, Feb. 1-4, 1988, p. 70.
482. Frank, E.H., Eisenberg, S.R., and Grodzinsky, A.J., "Microcontinuum and Macrocontinuum Models of Cartilage Electromechanics: Theory and Experiment," Proc. IEEE Eng. Med. Biol. Soc., Boston, Nov. 13-16, 1987, pp. 438-439.
483. Edelman, E.A., Grodzinsky, A.J., and Langer, R., "Magnetically Controlled Polymer Matrix Drug Delivery Systems: Mechanism and Dynamics," Proc. IEEE Eng. Med. Biol. Soc., Boston, Nov. 13-16, 1987, pp. 375-376.
484. Nussbaum, J.H. and Grodzinsky, A.J., "Electrically Controlled Membranes For Applications in Bioseparations: Theory and Experiment," Proc. AIChE Annual Conf., New York, Nov. 15-20, 1987, p. 172D.
485. Grimshaw, P.E., Weiss, A.M., Grodzinsky, A.J., and Yarmush, M.L., "Protein Transport Across Electrically Controlled Membranes," Proc. AIChE Annual Conf., New York, Nov. 15-20, 1987, p. 155F.
486. MacGinitie, L.A., Grodzinsky, A.J., Gluzband, Y.A., and Varshavsky, A., "Electric Field Modulation of Protein Synthesis in Cartilage and Comparison to Thermal Modulation," Trans. Bioelec. Repair and Growth Soc., Oct. 11-14, Toronto, 7, 1987, p. 59.
487. Sah, R.L., Doong, J.Y.H., Grodzinsky, A.J., Plaas, A.H.K., Sandy, J.D., and Lee, R.C., "The Effect Of Matrix Charge Density On Cartilage Biosynthesis: Mechanical and Enzymatic Modulation of Sulfated Glycosaminoglycan Density," Trans. Bioelec. Repair and Growth Soc., Oct 11-14, Toronto, 7, 1987, p. 6.
488. MacGinitie, L.A., Grodzinsky, A.J., Gluzband, Y.A., Varshavsky, A., "Protein Synthesis in Cartilage in Response to Applied Electric Fields," Trans. 9th Bioelectromagnetics Soc., Portland, Oregon June 22, 25, 1987, p. 16.
489. Gray, M.L., Pizzanelli, A.M., Lee, R.C., Grodzinsky, A.J., Swann, D.A., "The Kinetics of Chondrocyte Biosynthetic Response to Compressive Loads," Trans. 33rd Orthop. Res. Soc., San Francisco, Jan. 19-22, 1987, p. 135.

490. Weiss, A.M., Nussbaum, J.H., Grodzinsky, A.J. and Yarmush, M.L., "Electrically and Chemically Controlled Membrane Permeability," Proc. AIChE Annual Conf. Miami, Nov. 2-7, 1986.
491. Frank, E.H., Morgenthaler, A.W., Grodzinsky, A.J., "Streaming Potentials as an In Situ Molecular Probe of Enzymatically Induced Degradation of Cartilage," Trans. Bioelectrical Repair and Growth Society, Oct. 19-22, Utrecht, The Netherlands, 6, 1986, p. 10.
492. Sah, R.L., Gray, Pizzanelli, A.M., Grodzinsky, A.J. and Lee, R.C., "Electrical and Mechanical Modulation of Cartilage Biosynthesis," Trans. Bioelectrical Repair and Growth Soc., Oct. 19-22, Utrecht, The Netherlands, 6, 1986, p. 42.
493. Frank, E.H., Grodzinsky, A. J., Koob, T.J., and Eyre, D. R., The Kinetics of Enzymatically Induced Cartilage Degradation, Feder. of European Conn. Tiss. Soc., Manchester, UK, July 28-Aug. 1, 1986, p. 337.
494. Gray, M.L., Frank, E.H., Grodzinsky, A.J., Lee, R.C., Swann, D.A., Pizzanelli, A.M., Hey, L.A., and Sah, R.L., "Mechanical Forces Modulate the Biosynthetic Response of Bovine Articular and Epiphyseal Cartilage," Trans. 32nd Orthop. Res. Soc. Conf., New Orleans, Feb. 17-20, 1986, 11, p. 449 (also published in J. Bone Jt. Surg. Orthopaedic Trans., 10, 1986, pp. 324-325).
495. Frank, E.H., Grodzinsky, A.J., Kavesh, N.G., and Eisenberg, S.R., "Continuum Models For Electrokinetic Transduction in Cartilage: Homogeneous & Layered Material Properties," Advances in Bioeng., ASME, N.A. Langrana, ed., pp. 5-6, 1985.
496. Eisenberg, S.R. and Grodzinsky, A.J., "Electromechanical Micromodel of Articular Cartilage," ASME Biomech. Symp., D. Butler, T.K. Hung, R.E. Mates, eds., Vol. AMD 68, pp. 85-88, 1985.
497. Frank, E.H. and Grodzinsky, A.J., The Importance of Electrokinetic Reciprocity and Boundary Conditions to Mechanical and Electrical Stimulation of Cartilage, Trans. Bioelec. Repair and Growth Soc., Boston, Oct. 13-16, 1985, 5, p. 34.
498. MacGinitie, L.A. and Grodzinsky, A.J., Physiologically Generated and Externally Induced Fields: Contrasting Forces and Flows, Proc. 7th IEEE Eng. Med. Biol. Soc., Chicago, Sept. 27-30, 1985, pp. 367-370.
499. Nussbaum, J.H. and Grodzinsky, A.J., A Model for Electrically Stimulated Changes in Membrane Mechanical and Chemical Properties, 190th Amer. Chem. Soc. Conf., Chicago, Sept. 8-13, 1985, p. INDE-51.
500. Weiss, A.M., and Grodzinsky, A.J., "Electrically and Chemically Induced Changes in Membrane Transport," 190th Amer. Chem. Soc. Conf., Chicago, Sept. 8-13, 1985, p. INDE 50.
501. MacGinitie, L.A., Grodzinsky, A.J., Lee, R.C., and Varshavsky, A., Mechanisms of Electromagnetic Field Interaction With Biological Tissues, 7th Meeting Bioelectromagnetics Society, San Francisco, June 16-20, 1985, p. 51.
502. Gray, M.L., Lee, R.C., Pizzanelli, A.M. and Grodzinsky, A.J., "Biosynthetic Response of Epiphyseal Cartilage to Mechanical Stimulation," 30th Meeting Plastic Surgery Research Council, Portland, Oregon, May 22-25, 1985, p. 65
503. Grodzinsky, A.J., "Electrokinetic Energy Conversion in Soft Tissues," American Physical Society Meeting, invited paper in Symposium of Division of Biological Physics, Baltimore, March 25-29, 1985, p. 548-549.
504. Frank, E.H. and Grodzinsky, A.J., "Mechanical Strain Induced in Living Cartilage by Applied Electric Currents," 11th Northeast Bioengineering Conference, Worcester Polytechnic Institute, Worcester MA, March 14-15, 1985.

505. Frank, E.H., Hey, L.A., Kavesh, N.G., Grodzinsky, A.J., and Lee, R.C., "Cartilage Electromechanics in Organ Culture and Frozen Tissue: Streaming Currents and Potentials, and Current-Induced Stress," *Trans. 1985 Orthop. Res. Soc.*, Las Vegas, NA, Jan. 21-24, 10, 1985, p. 345.
506. Gray, M.L., Lee, R.C., and Grodzinsky, A.J., "Response of Epiphyseal Plate in Organ Culture to Low Frequency Electrical Currents," *Proc. Bioelec. Repair and Growth Soc.*, Kyoto, Japan, Nov. 5-8, 4, 1984, p. 46.
507. Kavesh, N.G., Frank, E.H., and Grodzinsky, A.J., "Electromechanical Transduction Mechanisms in Cartilage: Theory and Experiment; Implications for Mechanical and Electrical Stimulation," *Proc. Bioelec. Repair and Growth Soc.*, Kyoto, Japan, Nov. 5-8, 4, 1984, p. 9.
508. Grodzinsky, A.J., "Electromechanical Transduction Properties of Soft Tissues," *Proc. 37th Conf. on Eng. Med. Biol.*, Los Angeles, CA, Sept. 17-19, 37, 1984, p. 342.
509. Eisenberg, S.R. and Grodzinsky, A.J., "The Swelling of Articular Cartilage: Electro-mechanochemical Forces," *Trans. 1984 Orthop. Res. Soc.*, Atlanta, GA, Feb. 7-9, 9, 1984, p. 31.
510. Eisenberg, S.R. and Grodzinsky, A.J., "The Effect of Chemical Transients on the Nonequilibrium Swelling Behavior of Articular Cartilage and Other Connective Tissues," *1983 Advances in Bioengineering*, D.L. Bartell, ed., ASME Winter Annual Meeting, Boston, MA, November 13-18, 1983, pp. 102-103.
511. Frank, E.H. and Grodzinsky, A.J., "Streaming Potential Detection of Cartilage Degeneration Kinetics In Vitro," *Proc. Bioelectrical Repair and Growth Society*, San Francisco, CA, October 2-5, 3, 1983, p. 16.
512. Hey, L.A., Gray, M.L., Grodzinsky, A.J., and Lee, R.C., "Cartilage Organ Culture System for the Study of Electrical and Mechanical Stimuli of Biosynthesis," *Proc. Bioelec. Repair and Growth Soc.*, San Francisco, CA, October 2-5, 3, 1983, p. 41.
513. Grodzinsky, A. J., "Electrochemical Control of Membrane Permeability," *Proc. 163rd Meeting of the Electrochemical Society*, San Francisco, May 8-13, Vol. 83-1, 1983, pp. 1014-1015.
514. Grimshaw, P. E., Eisenberg, S. R. and Grodzinsky, A. J., "The Kinetics of In Vitro Neutralization and Enzymatic Extraction of Cartilage Charge Groups: Characterization by Isometric Compressive Stress," *Trans. 1983 Orthop. Res. Soc.*, Anaheim, CA, March 8-10, 8, 1983, p. 122.
515. Eisenberg, S.R., Grodzinsky, A. J., and Fechner, P.Y., "Changes in Membrane Permeability and Interactions Between Connective Tissue Macromolecules Induced by an Applied Electric Current," *Proc. Bioelec. Repair and Growth Soc.*, Oxford, UK, 2, 1982, p. 36.
516. Hoch, D. H., Grodzinsky, A. J., Koob, T. J., Eyre, D. R., Albert, M.L., "Early Changes in Material Properties in Rabbit Articular Cartilage After Meniscectomy," *Trans. 1982 Orthop. Res. Soc.*, New Orleans, LA, Jan. 19-21, 7, 1982, p. 152.
517. Grodzinsky, A. J., and Eisenberg, S. R., "The Streaming Potential Response of Articular Cartilage: A Continuum Theory and Experimental Results," *Proc. Bioelectrical Repair and Growth Soc.*, Phila., PA., November 9-11, 1, 1981. p. 8.
518. Frank, E. H., Olson, C. S., and Grodzinsky, A. J., "Quantification of Articular Cartilage Biomechanics via Simultaneous Measurement of Dynamic Streaming Potential and Complex Compressional Modulus," *Trans. 1981 Orthop. Res. Soc.*, Las Vegas, NA, February 24-26, 6, 1981, p. 25; (also published in *J. Bone Jt. Surg. Orthop. Trans.*, 5, 210, 1981).
519. Eisenberg, S. R. and Grodzinsky, A. J., "Electric Field-Control of Membrane Permeability," *Proc. 8th New England Bioengineering Conference*, Boston, March 27-28, pp. 240-244, 1980. (awarded one of the three Best of Conference awards).

520. Lee, R. C. and Grodzinsky, A. J., "The Dynamic Bulk Longitudinal Modulus of Articular Cartilage and the Importance of Electrostatic Forces", *Trans. 1980 Orthop. Res. Soc.*, Atlanta, GA, February 5-7, 5, 1980,p.39; (also published in *J. Bone Jt. Surg. Orthop. Trans.*, 4, 1980).
521. Lee, R. C. and Grodzinsky, A. J., *The Electrorheology of Articular Cartilage*, *Trans. Soc. Rheology*, Paper 32-6, Boston, Nov. 2, 1979, p. 66.
522. Grodzinsky, A. J., Roth, V., Fox, P., and Mow, V. C., *The Influence of Electromechanical Transduction on Matrix Interactions of Articular Cartilage*, *Trans. 1979 Orthop. Res. Soc.*, San Francisco, CA, February 20-22, 4, 1979, p. 141.
523. Gordon, S. S., Mow, V. C., Lee, R. C. and Grodzinsky, A. J., *Permeability and Transport Properties of Articular Cartilage*, *Third International Congress of Biorheology*, San Diego, Calif., Aug. 28-Sept. 1, 1978; published in *Biorheology*, 15, 1978, p. 481.
524. Shoenfeld, N. A., Nussbaum, J. H., and Grodzinsky, A. J., "Electromechanical and Reaction-Diffusion Dynamics in Collagen Membranes", *Third International Congress of Biorheology*, San Diego, California, Aug. 28-Sept. 1, 1978; published in *Biorheology*, 15, 1978, p. 484.
525. Grodzinsky, A. J., Lipshitz, H., and Glimcher, M. J., "Electromechanical Properties of Cartilage During Compression and Stress Relaxation", *Trans. 1978 Orthopaedic Res. Soc.*, Feb. 21-23, Dallas, Tx, 3, 1978, p. 11; (also published in *J. Bone Joint Surgery Orthopedic Transactions* 2, 86, 1978)
526. Shoenfeld, N. A. and Grodzinsky, A. J., "Electric Field-Controlled Mechanochemical Transduction Using Collagen Membranes: An Artificial Muscle", *1st Cleveland Symp on Macromolecules*, Cleveland, OH, Oct 11-15, 1976, pp. 44-45.
527. Grodzinsky, A.J., and Melcher, J.R., "Electromechanical of Deformable Charged Polyelectrolyte Membranes", *Proc. of the 27th Annual Conference on Engineering in Medicine and Biology*, Philadelphia, PA., Oct. 6-10, 1974, p. 532.

PATENTS:

1. AJ Grodzinsky and NA Shoenfeld, Electromechanochemical Device, United States Patent #4,161,013, July 10, 1979.
2. PE Grimshaw, AJ Grodzinsky, and ML Yarmush, Dynamically Controlled Membrane, United States Patent #5,085,749, February 4, 1992.
3. EH Frank, E Salant, and AJ Grodzinsky, Probe, System, and Method for Electromechanical Spectroscopic Diagnosis of Cartilage Degeneration, United States Patent, #5,246,013, September 21, 1993.
4. PM Ragan, AJ Grodzinsky, VI Chin, HH Hung, Method of Molding Polymers, United States Patent 6,214,262, April 10, 2001.
5. Treppo, S, Grodzinsky, AJ, Quan, E, Frank, EH, Bombard, D, Breslau, D, Arthroscopic Impedance Probe to Detect Cartilage Degeneration," US Patent 6,735,468 B2, May, 11, 2004.
6. Treppo, S, Grodzinsky, AJ, Quan, E, Frank, EH, Bombard, D, Breslau, D, Arthroscopic Impedance Probe to Detect Cartilage Degeneration," US Patent 6,856,834 B2-Divisional, February 15, 2005.
7. Treppo, S, Grodzinsky, AJ, Quan, E, Frank, EH, Bombard, D, Breslau, D, Arthroscopic Impedance Probe to Detect Cartilage Degeneration," US Patent 6,882,880 B2-Divisional, April 19, 2005.

8. J Kisiday, AJ Grodzinsky, S Zhang, Macroscopic scaffold containing amphiphilic peptides encapsulating cells, US Patent 7,449,180, November 11, 2008.
9. Rolauffs, B, Grodzinsky, AJ, Aicher, W., Biomechanical and physical stimulation of chondrons for therapy of diseases and defects of human and animal articular and disk cartilage, US Patent application April 15, 2009.
10. CE Semino, B Rolauffs, AJ Grodzinsky, RD Kamm, E Garreta, L Quintana, Control of Cells and Cell Multipotentiality in Three Dimensional Matrices, US Patent application, Dec 3, 2009.
11. J Kisiday, AJ Grodzinsky, S Zhang, Peptide Scaffold Encapsulation of Tissue Cells and Uses Thereof, Japanese Patent #507629, September 5, 2012.
12. Nia, HT, Soltani, IB, Youcef-Toumi, K, Ortiz, C, Grodzinsky, AJ, Frank, EH, High-Frequency Rheology System, US Patent 8,516,610, August 20, 2013.
13. Goel Bajpayee, A, Wong, C, Grodzinsky, AJ, Surface Binding of Nanoparticles-based Drug Delivery to Tissue, United States Patent US 9,289,506, March 22, 2016.
14. Patwari, P, Liebesny, P, Grodzinsky, A, Systems and methods for determining therapeutic uptake and dosing, US Patent Application, December 6, 2017.
15. Goel Bajpayee, A, Wong, C, Grodzinsky, AJ, Surface Binding of Nanoparticles-based Drug Delivery to Tissue, Utility patent application, composition of matter, Notice of Allowance: November 7, 2018.

POST-DOCTORAL ASSOCIATES (Supervised by A.J. Grodzinsky)

1. Valleton, Jean-Marc, `Mechanochemical coupling in an enzyme system, Jan. 1984 - Dec 1985; current position: Staff Scientist, CNRS, France.
2. Nussbaum, Jeremy, ``Electromagnetic interactions with cells and tissues," Sept. 1986 - June 1987; current position: Prime Computer.
3. Weiss, Aryeh, ``Fluorescence detection of protein transport," Sept. 1986 - June 1987; current position: Asst. Prof., Department of Electrical Engineering, Jerusalem College of Technology, Israel.
4. Grimshaw, Paul, `` Electrical control of membrane permeability," Sept. 1989 - July 1991; current position: Research Engineer, Cambridge Heart, Inc., Billerica, Mass.
5. Adi Shefer, ``Synthesis of hydrogel membranes," Sept. 1990 - August 1993; current position: Asst. Professor, Department of Chemistry, Rutgers.
6. Robert Sah, ``Growth factor regulation of biosynthesis and physical properties of cartilage," July 1991 - Sept. 1992; current position: Asst. Professor, Department of Biomedical Engineering, UCSD.
7. Marc E. Levenston, ``Long Term Static and Dynamic Compression of Chondrocytes," 1995-1998, NIH NRSA Post-Doctoral Fellow, MIT.
8. Lawrence J. Bonassar, ``Matrix Metalloproteinase Degradation of Articular Cartilage," 1995-1998.

9. Bodo Kurz, "Injurious Compression of Cartilage: Relation to Gene Expression and Matrix Turnover," Oct 1998-Sept 1999.
10. Alex Kerin, "Effects of Mechanical Compression on Chondrocytes in Adult Human Articular Cartilage," May 1999-May 2001.
11. Jean-Noel Guze, "Aggrecan Processing in Chondrocytes and Cartilage", February-August, 2000; March 2001-February 2004.
12. Moonsoo Jin, "ERK Signaling and Gene Expression in Cartilage," 2002.
13. Bernd Rauloffs, "Cartilage Injury," January 2003-December, 2005.
14. Michael A. DiMicco, "Cartilage Injury," September 2001-May, 2005.
15. John Kisiday, "Cartilage tissue Engineering using an Equine Model, April 2003 – March 2005.
16. Delphine Dean, "AFM Measurement and Molecular Modeling of Aggrecan interactions, Jan – June, 2005.
17. Eric Vanderploeg, "Cartilage Tissue Engineering with Self Assembling Peptide Scaffolds, August 2006 – July 2009.
18. Detlef Schumann, "Human Cartilage Injury, October 2006 – October 2008.
19. Paul Kopesky, "Self-Assembling Peptides for Cartilage Tissue Engineering, 2009.
20. Lin Han, "Nanomechanics of Cartilage (Co-Supervised by Prof. C. Ortiz), 2009-2012.
21. Tino Felka, "AFM-Based Imaging and Nanomechanics of Cartilage Matrix Molecules (2013).
22. Mojtaba Azadi, "Biomechanics and Nanomechanics of Cartilage (2013-2014).
23. Ramin Oftadeh, "Nanomechanics of Cartilage from Murine Models of OA (2016 - 2019).
24. Brianne Connizzo, "Tendon degeneration: Role of Aging and Overload (2016 – 2019).
25. Garima Dwivedi, "Chips in Space: In Vitro Models of Joint Injury (2017 — 2021).
26. Cristina Florea, "Cellular and Tissue Nanomechanics and Mechanobiology (2018-2020).

DOCTORAL THESES (Supervised by A.J. Grodzinsky)

1. Lee, Raphael C., "Cartilage Electromechanics: The Relationship Between Physiochemical and Mechanical Properties, September 1979.
2. Eisenberg, Solomon R., "Non Equilibrium Electromechanical Interactions in Cartilage, January 1983.
3. Siegel, Ronald A., "Sustained Release of Drugs from Polymers, February 1984. (Co-Supervised with R. Langer)
4. Weiss, Aryeh M., "Real Time Control of the Permeability of Crosslinked Polyelectrolyte Membranes to Fluorescent Solutes," May 1986.

5. Nussbaum, Jeremy H., "Electric Field Control of Polyelectrolyte Swelling and Permeability," August 1986.
6. Gray, Martha L., "Physical Regulation of Epiphyseal Cartilage Biosynthesis: Responses to Electrical, Mechanical, and Chemical Signals," July 1986. (Co-Supervised: R. C. Lee)
7. Frank, Eliot H., "Electromechanics of Normal and Degenerated Cartilage: Poroelastic Behavior and Electrokinetic Mechanisms," May 1987.
8. Sachs, Jeffrey, "A Mathematical Model of an Electromechanically Coupled Poroelastic Medium," June 1987.
9. MacGinitie, Laura A., "Electrical and Thermal Modulation of Protein Synthesis in Cartilage: A Model for Field Effects on Biological Tissues," December 1987.
10. Grimshaw, Paul E., "Electrical Control of Solute Transport Across Polyelectrolyte Membranes," February 1989.
11. Sah, Robert L., "Biophysical Regulation of Matrix Synthesis, Assembly, and Degradation in Dynamically Compressed Calf Cartilage," January 1990.
12. Buschmann, Michael D., "Extracellular Matrix in Chondrocyte/Agarose Gel Culture: Physical Characterization and Metabolic Stimulation," February, 1992.
13. Kim, Young-Jo, "Mechanical and Chemical Stimulation of Cartilage Matrix Metabolism: Cellular Kinetics," January, 1993.
14. Chang, David Y-S, "Augmentation of Mass Transfer Through Electrical Means and Nutrient Enrichment for Suspension and Entrapment Cell Cultures," May, 1994 (co-supervised with Prof. D.I.C. Wang).
15. Bonassar, Larry, "Matrix Metalloproteinase Activity and Inhibition in Articular Cartilage: Effects on Composition and Biophysical Properties and Relevance to Osteoarthritis," February, 1995.
16. Berkenblit, Scott, "Spatial Localization of Cartilage Degradation using Electromechanical Surface Spectroscopy with Variable Wavelength and Frequency," June, 1996.
17. Quinn, Thomas M., "Articular Cartilage: Matrix Assembly, Mediation of Chondrocyte Metabolism, and Response to Compression," June, 1996.
18. Garcia, A. Minerva, "Mechanisms of Macromolecular Transport Through Articular Cartilage: Relevance to Loading," June, 1996.
19. Treppo, Steven, "Physical Diagnostics of Cartilage Degradation," January, 1999.
20. Ragan Paula M, "Effects of Mechanical Compression on Chondrocyte Gene Expression," June, 1999.
21. Jin, Moonsoo, "Shear Deformation of Cartilage Modulates Matrix Biosynthesis," June 2002.
22. Lee, Cynthia R, "Behavior of Passaged Chondrocytes in Collagen-Glycosaminoglycan Scaffolds: Effects of Cross Linking, Mechanical Loading, and Genetic Modification of the Scaffold (Co-Supervised by M. Spector)," February, 2002.

23. Patwari, Parth K, Mannosamine Inhibits the Degradation of Cartilage Biomechanical Properties induced by IL-1, June, 2003.
24. Szasz, Nora, Transport and Binding of Proteins within Cartilage Explants, June 2003.
25. Soeg, Joonil, Measurement of Chondroitin Sulfate Intermolecular Electrostatic Repulsion Using High Resolution Force Spectroscopy, June 2003 (Co-Supervised by C. Ortiz).
26. Kisiday, John, Self Assembling Peptide Gel Matrix for Cartilage Tissue Engineering, June, 2003.
27. Bathe, Mark, Atomic Model for Persistence length and GAG Electrostatic interactions, (Co-Supervised by B. Tidor and Greg Rutledge), June, 2004.
28. Dean, Delphine, Modeling and Measurement of Intermolecular Interaction Forces between Cartilage ECM Macromolecules, (Co-Supervised by C. Ortiz), February, 2005.
29. Lee, Jennifer H., Chondrocyte Response to *In Vitro* Mechanical Injury and Co-Culture with Joint Capsule Tissue, June, 2005.
30. Szafranski, Jon, Cartilage Mechanobiology: The Effects of Loading on the Fine Structure and Function of Chondroitin Sulfate Glycosaminoglycans, June, 2005.
31. FitzGerald, Jonathan, Chondrocyte Gene Expression and Intracellular Signaling Pathways in Cartilage Mechanotransduction, September, 2005.
32. Ng, Laurel, Structure and Nanomechanics of Aggrecan and the Aggrecan-Rich Pericellular Matrix of Chondrocytes in Cartilage (Co-Supervised by C. Ortiz), September 2005.
33. Stevens, Anna, L. (BE), Mechanical injury and inflammatory cytokines affect cartilage matrix integrity and tissue homeostasis: A mass spectrometric analysis of proteins with relevance to arthritis, September, 2006.
34. Han, Lin, (DMSE), Nanomechanics of Cartilage Extracellular Matrix Macromolecules (Co-Supervised by C. Ortiz), August, 2007.
35. Chai, Diana, H., (BE), Progression of Chondrocyte Signaling Responses to Mechanical Stimulation in 3-D Gel Culture, February, 2008.
36. Cameron A. Wheeler, (BE), Cartilage Response to In Vitro Models of Injury in Combination With Growth Factor and Antioxidant Treatments, February, 2008.
37. Paul Kopesky, (BE), Self-Assembling Peptide Hydrogels Promote *in vitro* Chondrogenesis of Bone Marrow-Derived Stromal Cells: Effects of Peptide Sequence, Cell Donor Age, and Method of Growth Factor Delivery, June, 2009.
38. Shuodan Chen, (EECS), Regulation of Lubricin Gene Expression and Synthesis in Cartilage by Mechanical Injury, September, 2009.
39. Bobae Lee, (DMSE), (Co-Supervised by C. Ortiz), Time-dependent mechanical behavior of newly developing matrix of bovine primary chondrocytes and bone marrow stromal cells using Atomic Force Microscopy, September, 2009.
40. Yihong Sui, (BE), In Vitro Models of Cartilage Degradation Following Joint Injury: Mechanical Overload, Inflammatory Cytokines, and Therapeutic Approaches, February, 2010.

41. Rachel Miller, (BE), In Vitro and In Vivo Growth Factor Delivery to Chondrocytes and Bone-Marrow-Derived Stromal Cells in Cartilage and in Self-Assembling Peptide Scaffolds June, 2010.
42. Sangwon Byun, (EECS), Transport of Proteins, Biopharmaceuticals, and Small Pharmaceutical Compounds into Normal and Injured Cartilage, June, 2010.
43. Hsu-Yi Lee, (EECS, Co-Supervised by C. Ortiz), Molecular Structure and Nanomechanical Properties of Aggrecan from Aged, Diseased, and Engineered Tissues, June, 2010.
44. Emily Florine, (BE), Optimizing Chondrogenic Factors and Protein Delivery Methods for Cartilage Repair, June, 2012.
45. Yang Li, (BE), In Vitro Model of Injury/Cytokine Induced Catabolism Modulated by Dynamic Compressin, Growth Factors, and Glucocorticoids, June 2013.
46. Hadi Tavakoli Nia, (MechE, Co-Supervised by C. Ortiz), Nanomechanics of Cartilage at the Matrix and Molecular Levels, June 2013.
47. Ambika Goel Bajpayee, (MechE), Charge Based Transport And Drug Delivery Into Cartilage For Localized Treatment Of Degenerative Joint Diseases, February, 2015.
48. Paul Liebesny, (BE), Marrow Cell Migration and Chondrogenesis within self-Assembling Peptide Scaffolds for Cartilage Repair, June, 2016.
49. Yang Wang, (BE), Molecular Pathway Analysis and Therapeutics Development in Post-traumatic Osteoarthritis, September, 2016.
50. Yamini Krishnan, (ChemE), Drug Delivery for Post-Traumatic Osteoarthritis, (in progress).
51. Brett Geiger, (BE), Functionalization of Nanoparticles for Drug Delivery, (in progress).
52. Sheryl Wang, (BE), Craniomaxillofacial Bone Regeneration, (in progress).
53. Rebecca Mae Black (BE), Systems Biology of Glucocorticoids in Osteoarthritis (in progress).

M.D. - HST THESES (Supervised by A.J. Grodzinsky)

1. Sukhatme, Vikas, Varying Cell shape in Tissue Culture by Changing Substratum Surface Charge, February 1979.
2. Salant, Evan P., Surface Probe for Electrokinetic Detection of Cartilage Degeneration, October, 1991.

MASTER'S THESES (Supervised by A.J. Grodzinsky) (Required in MechE and EECS)

1. Shoenfeld, Norman, A Class of Macromolecular Interactions Induced by an Imposed Electric Field, August 1977.
2. Nussbaum, Jeremy, H⁺ Binding and Diffusion-Reaction Rates in Collagen Electromechanics, May 1979.
3. Eisenberg, Solomon, Electric Field-Induced Changes in Membrane Permeability, August 1979.

4. Olson, Craig, Structure-Property Relations in Proteoglycan-Extracted Cartilage, June 1981.
5. Gray, Martha, A New Flow Cytometric Technique for Determining Cell Volume, June 1981.
6. Hoch, David, The Mechanical and Electromechanical Properties of Articular Cartilage Associated with a Meniscectomy Model for Osteoarthritis, August 1981.
7. Grimshaw, Paul, The Response of Cartilage in Compression as it Undergoes Diffusion Limited Chemical Changes, September 1982.
8. Frank, Eliot, Dynamics of Articular Cartilage in Compression as it Undergoes Degenerative Changes, September 1983.
9. Phillips, Susan, Charge Density and Stiffness in Cartilage, September 1984.
10. Morgenthaler, Ann, Theoretical and Experimental Studies of the Action of Proteoglycan-Degrading Enzymes Hyaluronidase, Chondroitinase, and Trypsin on Articular Cartilage, October 1987.
11. Adler, Karen, Correlation of Permeability, Hydration, and Crosslink Density in Polyelectrolyte Hydrogel Membranes, May 1988.
12. Kim, Young-Jo, Radially Unconfined Compression of Poroelastic Media with Axisymmetric Boundary Conditions, June 1989.
13. Bonassar, Lawrence, Electrokinetic Transduction in Bovine Articular Cartilage Under Radially Unconfined Compression, May 1991.
14. Quinn, Thomas, Poroelastic Properties and Electrostatic Interactions in Polyelectrolyte Hydrogels, May 1991.
15. Wu, Hsi-Jung, The Effect of Cytoskeletal Disruption on Cartilage Metabolic Response to Compression, January, 1992.
16. Kung, Sophia T-W., Effects of Mechanical Loading on Cartilage Degradation, September, 1993.
17. Paguio, Claribel G., Effects of Endogenous and Exogenous Metalloproteases on Articular Cartilage Explants: Relevance to Osteoarthritis, September, 1993.
18. Stinn, Jennifer L., Inhibition of Metalloproteinases in Articular Cartilage, May, 1995.
19. Bombard, David L., A Surface Probe for In Situ Detection of Cartilage Degradation via Electromechanical Spectroscopy, May, 1995.
20. Lin, John W., Electrokinetic Evaluation of Human Articular Cartilage, May, 1995.
21. Jen, Michelle C., Transport Studies of Component Proteoglycan Molecules Through Cartilage," May, 1995.
22. Lin, Bryant., Characterization of the Properties of Cartilage in the Hartley Guinea Pig spontaneous Osteoarthritis Model, June, 1997.
23. Zhu, Julianne J., Transport Studies of Chondroitin Sulfate Disaccharide Through Articular Cartilage, June, 1997.

24. Emerson Quan, Differential Progression of Arthritic Degradation in Human Knee and Ankle Cartilage: Physical Diagnostics, June, 1998.
25. Loening, Andy, Effects of Dynamic Compression on Cartilage Metabolism, Dec, 1998.
26. Jin, Moonsoo, Effects of Static and Dynamic Shear Deformation on Cartilage Metabolism, February, 1999.
27. Tsay, Jeff, Early Detection of Osteoarthritis by Electromechanical Spectroscopy, February, 1999.
28. Szasz, Nora, IGF-I Transport Through the Extracellular Matrix, June, 1999.
29. Kong, Jiang-Ti, Intermolecular Interaction between Chondroitin Sulfate GAG Chains: Atomic Force Microscopy and Molecular Mechanics, August, 1999.
30. Patwari, Parth, Mannosamine Inhibites Aggrecanase-Mediated Degradation of the Mechanically Functional Portion of Proteoglycans and of the Physical Properties of Articular Cartilage, Feb, 2001.
31. Evans, Robin, Diagnostic Probe for Cartilage Impedance, June, 2001.
32. Dean, Delphine, Measurement and Modeling of GAG Electrostatic Repulsion Forces by Atomic Force Microscopy, June, 2001.
33. Wagner, Tim, Field Distributions Within the Human Cortex Induced by Transcranial Magnetic Stimulation, EECS, June 2001.
34. Suggs, Jeremy, ACL Injuries, MechE, 2002
35. Timp, Winston, Study of Disposable Microdevices for DNA Electrophoresis, Feb, 2003.
36. Cheung, Regina, Characterization of Scaffold-free Chondrocyte-based Tissue Engineering Constructs for Cartilage Repair, June 2003.
37. Cosman, Christina, Effects of shear deformation on matrix biosynthesis by chondrocytes in self-assembling peptide gel culture, June 2003.
38. Saatchi, Sanaz, A novel osteochondral composite consisting of a self-assembling peptide hydrogel and 3D-printed polycaprolactone scaffold: potential for articular cartilage repair, June, 2004.
39. Lee, Gary, IGF-1 and Extended Mechanical Stimulation of Cartilage for Growth and Repair, EECS, June, 2004.
40. Norris-Lee, Stephanie, Co-Culture of Injured Cartilage with Joint Capsule Tissue causes enhanced enzymatic degradation of cartilage, August, 2004.
41. Chen, Schuodan, Effects of Dynamic Shear Deformation on Chondrocyte Biosynthesis in Agarose Gel Culture, June, 2005.
42. Motion, J.P. Michael, Mechanically Reduced Intercellular Remodeling of Cardiomyocytes by Magnetic Micromanipulation, February, 2006.

43. Wheeler, Cameron, Cartilage Mechanobiology and Transcriptional Effects of Combined Mechanical Compression and IGF-1 Stimulation on Bovine Cartilage Explants, June, 2006.
44. Cheng, HE, High-Throughput Singler Cell Force Spectroscopy Array, DMSE/SMA, 2010.
45. Krishna Swaminathan, BE, A Quantitative Proteomics Study of the Additive Effect of Inflammatory Cytokines and Injurious Compression on Cartilage Damage, May, 2011.
46. Fei Liang, ChemE, Molecular Studies of Aggrecan: Experiments and Simulations, May, 2011.
47. Nicole Casasnovas, BE, Molecular Imaging for Cartilage Tissue Engineering and Osteoarthritis, June, 2012.
48. Keri Mroszczyk, (MechE), BMSC A Tissue Engineering Strategy for Integrative Cartilage Repair, June, 2014.
49. Seongjun Park (MechE), Opto-mechanical Control of Nerve Growth (co-advised with Prof. P. Anikeeva), June, 2015.
50. Uyanga Tsedev (MechE), Engineering M13 Bacteriophage Platforms for Cancer Therapy Applications (co-advised with Prof. AM Belcher), June 2015.
51. Whitney Young, (MechE), Cartilage Stress Relaxation Induced by Intra-tissue Transport of Cationic Nanoparticles: Implications for post-traumatic osteoarthritis drug delivery, June, 2016.
52. Jennifer Ibañez (BE), Use of Synthetic Solid Scaffolds to Mechanically Support a Chondrocyte-Seeded Peptide Hydrogel for Articular Cartilage Repair, June, 2017.

BACHELOR'S THESES (Supervised by A.J. Grodzinsky)

1. Picheny, Michael, Diffusion Potentials Measured Across Charged Collagen Membranes, June 1975.
2. Kazen, Jerry, Modeling of Currents Induced by High Voltage Transmission Lines in Living Organisms, June 1976.
3. Palmer, Miles, Measurements of Charge on Artificial Skin Composite Materials, June 1976.
4. Cremer, Jay, A Membrane Diffusion Potential Monitoring System with Forced Convection, June 1976.
5. Shoenfeld, Norman, Electric-Field-Controlled Transduction in Polyelectrolyte Membranes: An Artificial Muscle, June 1976.
6. Bediako, Emmanuel, Control of the Electric Response of the Collagen Membrane, June 1976 (co-supervised with Professor T. L. Johnson).
7. Eisenberg, Solomon, Time and Space Periodic Collagen Membrane Electromechanics, May 1977. (Awarded the Department's Guillemin Prize for Best Undergraduate Thesis).
8. Scott, William, The Effect of Internal Fixed Charge Groups and External Chemical Environments on the Electrical Conductance of Connective Tissue Proteins, May 1978.

9. Longley, Lester, "Experimental Evidence for Diffusion-Limited Reaction Kinetics in Intact Collagen Structures," May 1978.
10. Nussbaum, Jeremy, "Some Techniques of Data Collection, Reduction and Analysis," May 1979.
11. Grossman, Walter, "Electromechanical Measurements of Calcium Binding in Cartilage," May 1979.
12. Wozniak, John, "Changes in Membrane Permeability Due to Mechanical Stimuli," May 1979.
13. Frank, Eliot, "Electromechanical Dynamics of a Charged, Hydrated Polymer," January 1980. (Awarded the Department's Guillemin Prize for Best undergraduate Thesis).
14. Kwok, Edward, "Chemical Modification of Molecular Fixed Charge Groups in Articular Cartilage," May 1980.
15. Chen, Terence L., "Physical Characterization of Electrosurgical Coagulation," May 1980.
16. Chung, Jay, "Stress Relaxation Kinetics in Charged and Neutral Polyacrylamide Gels," May 1980.
17. Grimshaw, Paul, "Real-time Analysis of Cartilage Compression/Stress Relaxation Response Using a Microcomputer," May 1980.
18. Hoch, David, "A Method for the Preparation and Detection of Oriented Collagen Fibril Gels Using Orientation Polarization and Optical Birefringence," September 1980.
19. Fechner, Patricia, "The Influence of Applied Electric Fields on Neutral Isotope Transport Across Membranes," June 1981.
20. Kazdan, David, "Examination of an Analytic Model for the Teorell Membrane Oscillator," June 1981.
21. Bart, Stephen, "The Mechanism of Electrosurgical Coagulation: Steam Evolution Versus Dielectric Breakdown," May, 1982.
22. Pratt, Randy, "The Effect of Solvent Composition on the Absorption and Fluorescence of Organic Dyes in Solution," May 1983.
23. Brenner, Jacqueline, "Transport of Insulin Across PMAA Membranes," June 1984.
24. Kavesh, Neal, "Electromechanical Transduction Properties of Bovine Articular Cartilage," June 1984.
25. Gerber, Monica, "The Effect of Matrix Depletion by Chondroitinase ABC on Proteoglycan Synthesis in Live Articular Cartilage," May 1984.
26. Hey, Lloyd, "The Effect of Mechanical and Electrical Forces on Cartilage Biosynthesis," December 1984.
27. Brown, Paula, "Electrically and Chemically Stimulated Changes in Polyelectrolyte Membrane Swelling," June 1985.
28. Lee, R. Todd, "Optical Measurement of Charge Densities in Crosslinked PMAA Membranes," May 1986.
29. Jablonski, Mark, "Characterization of the Net Charge of Fluorescent Dyes," February 1986.

30. Siu, Hoi Man, ``Chemically Controlled Transport of Protein-Fluorescent Dye Conjugates Through Poly(MAA/DEAEMA/HEMA) Copolymer Membranes," June 1987.
31. Lee, Janet, ``Chymopapain - Induced Depolymerization of Proteoglycans in Human Intervertebral Disc," August 1987.
32. Liu, Thomas, ``Swelling and Permeability of Polymethacrylic Acid Polymer Membranes," May 1988.
33. Hollerbach, Karin, ``The Electromechanical and Biochemical Behavior of Chondrosarcoma Cell Cultures," May 1988.
34. Tiao, Paul, ``Electroextraction of Proteoglycans from Calf Articular Cartilage In Vitro," June 1989.
35. Chen, Suephy, ``Nondestructive Measurements of Fixed Charge Density in Biomaterials," May 1989.
36. Chwang, Sophia, ``Electromechanical Properties of a Piezo Film in Probe for Cartilage Degeneration," June 1990.
37. Su, Catherine, ``Characterization of Swelling and Electroosmotic Transport in Polyelectrolyte Hydrogel Membranes," June 1990.
38. Holcroft, Christina, ``Effects of Dynamic Loading on Cartilage Metabolism," June 1990.
39. Kim, Frank, ``Experimental Measurement of Solute Transport Through Gel Membranes," June 1991.
40. Davis, Charles, ``A Feasibility Study on Auto-Focusing Glasses and Contact Lenses," May 1991.
41. Janselwitz, Steven, ``A Device for Characterization of Mechanical and Electrical Properties of Cartilage, May 1992.
42. Paguio, Claribel, ``Effects of Enzymatic Degradation on Articular Cartilage: Relevance to Osteoarthritis," May, 1992.
43. Lee, Ming-Shing, ``Effect of Retinoic Acid and pH on the Biosynthetic Activity of Articular Cartilage," June, 1992.
44. Hung, Claudia, ``Permeability and Transport Characteristics of Poly(Acrylic Acid) Gel Membranes," May 1993.
45. Chu, Lillian, ``Electromechanical Properties of Alginate Gel Prepared for Chondrocyte Culture," May 1993.
46. Jeffries, Kimberly A., ``Effects of Stromelysin and Its Inhibitors on Rabbit Articular Cartilage In Vivo," February, 1994.
47. Duffin, Nolan J., ``Development of an Electromechanical Indentation Device Used in the Detection of Streaming Potentials in Articular Cartilage," May, 1994.
48. Koot, Gretchen E., ``Long Term Effects of Static Compression on Bovine Articular Cartilage," May, 1994.
49. Jen, Michelle, ``Transport Studies in Cartilage Using Protease Inhibitor - Supplemented Buffers," May, 1994.

50. Hsieh, Susan J., "IL-1 and Retinoic Acid Induced Degradation of Cartilage Matrix and the Inhibitory Effects of Proteinase Inhibitors: Relevance to Osteoarthritis," May, 1995.
51. Maung, Adrian, "Role of Mechanical Compression in Cartilage Extracellular Matrix Metabolism," May, 1996.
52. Kong, Jiang-Ti, "The Effect of Mechanical Compression and TGF β on Matrix Biosynthesis in Bovine Articular Cartilage," June, 1997.
53. Davila, Salomon G., "Biosynthetic Response of Cartilage Explants to Dynamic Compression and Changes in pH in the Presence of IGF-1," June, 1997.
54. Sebern, Elizabeth L., "Characterization of Electromechanical Properties of Cartilage in the Hartley Guinea Pig Spontaneous Osteoarthritis Model," June, 1997.
55. Nirav Bhakta, "Electroosmotic Fluid flow in Articular Cartilage," EECS (AUP), June, 1998.
56. Nikhil N. Batra, "Parameter Estimation of Material Properties: Experimental Approaches," Civil Eng., June, 1998.
57. Hung, Gilbert, "Effects of Artificial Aging (Non-enzymatic Glycation) on the Mechanical Properties of Articular Cartilage," June, 2000.
58. Cosman, Christina, "Effects of IGF-1 on Repair of Injurious Compressed Tissue," June, 2001.
59. Norris, Stephanie, "Co-Culture Model for Joint Injuries," June, 2001.
60. Rojas, Fredrick, "Molecular interactions between collagen and aggrecan from cartilage extracellular matrix, (DMSE), June, 2011.
61. Avedillo, Jose E., "Mouse models of Osteoarthritis and joint injury, (MechE), June 2012.
62. Yannatos, Isabel, "Mechanical Properties of Healthy and Osteoarthritis Rabbit Meniscus, (Tufts University) June, 2015.
63. Zlotnick, Hannah M., "Visualizing Integrative Repair Cells at the Interfacial Boundary of a Focal Cartilage Defect *In Vitro*, June, 2017.
64. DiIorio, Sarah E., "Transport of Supercharged Green Fluorescent Proteins into and Across Cartilage for Drug Delivery, (BE), June 2019 (in progress).

DOCTORAL THESIS COMMITTEE: READER

1. Tung, Lesley, "A Bi-Domain Model for Describing Ischemic Myocardial Potentials, EECS, May 1978.
2. Baden-Kristensen, Keld, "An Investigation of the Mechanisms of Generation of Intracellular Electric Potentials of Cochlear Hair and Supporting Cells of the Alligator Lizard," EECS, September 1979.
3. Kawate, Keith, "Electrical Surface Studies on Hexagonal Ice and Their Interpretation," EECS, September 1979.

4. Odette, Louis, ``Dynamics of Photoreception in Invertebrates," EECS, February 1981.
5. Smith, Frank III, ``Electrostatic Effects on Restricted Diffusion of Macromolecules," September 1981 (Dept. of Chemical Engineering).
6. Parker, Kevin, ``The Generation and Analysis of Hypothermia by Ultrasound," HST, September 1981.
7. Lang, Elizabeth, ``Charge Effects on the Solution Behavior of Hyaluronic Acid," September 1982 (Dept Nutrition and Food Science).
8. Sheppard, Norman, ``Structure/Dielectric Property Relationships of Model Polymer Networks," EECS, September 1984.
9. McLeod, Kenneth, ``The Interaction of Very Low Frequency Electric Fields with Cells in a Tissue Equivalent Matrix," EECS, May 1985
10. Freeman, Dennis, ``Theoretical Studies of Passive Models of Ciliary Tuft Motion," EECS, June 1986.
11. Johnson, Mark, ``Transport Properties of the Juxtacanicular Meshwork," Mechanical Engineering, February 1986.
12. Saltzman, Mark, ``A Microstructural Approach For Modeling Diffusion of Bioactive Macromolecules in Porous Polymers," HST, April 1987.
13. Zaretsky, Mark, ``Theory and Applications of Measuring Complex Permittivities of Insulating Media Using Microdielectrometry," EECS, May 1987.
14. Sung, Cynthia, ``A Study of Polyethylene Oxide-Polysiloxane Networks as Biomaterials for Drug Release," HST, December 1988.
15. Williams, R. P. W., ``Cartilage Proteoglycans and Osmotic Flow," May 1989, (Monash University, Australia).
16. Olson, William, ``Electrophoretic Elution and Adsorption Techniques for Immunoabsorption," (Dept. of Chemical Engineering) January 1989.
17. Phillips, Ronald, ``The Hindered Transport of Compact Macromolecules In Fibrous Media," Chemical Engineering, 1990.
18. Shapiro, Andrew, ``Electroosmotic Removal of Chemical Species from Porous Media," Mechanical Engineering, January 1990.
19. Lin, Nelson, ``Hindered Diffusion of Linear Polyelectrolytes," Chemical Engineering, January, 1991.
20. Shockley, Ty, ``Uptake and Spatial Distribution of Anti-Tumor Monoclonal Antibodies in Melanoma Tumors," Chemical Engineering, January 1991.
21. Gajar, Stephanie A., ``An Ionic Liquid-Channel Field Effect Transistor," EECS, June, 1992.
22. Loree, Howard M. II., ``The Mechanics of Atherosclerotic Plaque Rupture," Mechanical Engineering, June, 1992.

23. Shen, Jian, "Signal Transduction by Fluid Shear Stress in Vascular Endothelial Cells," Mechanical Engineering, September, 1992.
24. Oliver, James D. III, "Analysis of Glomerular Permeability in the Rat Using Theoretical Methods of Hindered Transport," HST, October, 1992.
25. Melcher, Jennifer R., "The Cellular Generators of the Brainstem Auditory Evoked Potential," EECS, February, 1993.
26. Ito, Keita, "Movement-Induced Orientation of Collagen Fibrils in Cartilaginous Tissues," Mechanical Engineering, May, 1994.
27. Malek, Adel M., "Molecular Characterization of the Vascular Endothelial Response to Fluid Shear Stress," HST, May 1994.
28. Wong, Joyce YW, "Electrically Conducting Polymers for Non-Invasive Control of Mammalian Cell Behavior," Chemical Engineering, May, 1994.
29. Boxerman, Jerrold L., "Non-Invasive Measurement of Physiology Using Dynamic Susceptibility-Contrast NMR Imaging," HST, January, 1995.
30. Washabaugh, Andrew P., "Flow Electrification in Electric Power Transformers," EECS, January, 1995.
31. Shieh, Lisa, "Erosion and Drug Release from Bioerodable Polyanhydrides," HST, January, 1995.
32. Szajda, Kenneth S., "A High Resolution Integrated Circuit Biomedical Temperature Testing System," EECS, January, 1995.
33. Johnson, Erin M., "Partitioning and Diffusion of Macromolecules in Charged Gels," Chemical Engineering, September, 1995.
34. Lee, Elaine, "Effects of Cytokines and Monocytes on Matrix Metalloproteinases in Human Vascular Smooth Muscle Cell Cultures," HST, September, 1995.
35. Lee, Woojin, "Polymer Gel-Based Actuator: Dynamic Model of Gel for Real Time Control," EECS, June, 1996.
36. Cheng, George, "Regulation of Vascular Smooth Muscle Cell Function by Mechanical Strain," HST, June, 1996.
37. Lesho, Matthew J., "The Design of Conductometric Biosensors Based on Responsive Hydrogels," Dept' Biomedical Engineering, Johns Hopkins University, June, 1996.
38. Abnet, C. Cameron, "Measuring Mechanical Properties of the Tectorial Membrane," Mechanical Engineering, December, 1997.
39. Swartz, Melody A., "Interstitial-Lymphatic Transport Phenomena," Chemical Engineering, May, 1998.
40. Bolton, Glen R., "Permeation of Ficoll and Ficoll Sulfate through Glomerular Basement Membrane: Effects of Molecular Size and Charge," Chemical Engineering, May, 1998.
41. Breinan, Howard A., "Development of a Collagen-Glycosaminoglycan Analog of Extracellular Matrix to Facilitate Articular Cartilage Regeneration," HST, May, 1998.

42. Chen, T., Skin Electroporation, Chemical Engineering, June, 1999.
43. Johnston, Scott T., Convective Transport of Macromolecules in Gels, Chemical Engineering, July, 1999.
44. Younis, Hesham F., Modeling of Disease-Free and Atherosclerotic Human Carotid Bifurcation based on In Vivo Magnetic Resonance Imaging Data: Correlations to Atherogenesis,” Mechanical Engineering, September, 2001.
45. Chi-Pong Kwan, Glycosaminoglycan-protein interactions: the fibroblast growth factor paradigm, Biological Engineering Division, 2002.
46. Dawn Hastreiter, A Collagen-GAG Matrix for Growth of Intervertebral Disc Tissue,” (MEMP), June, 2002.
47. Brian Stoll, Factors Affecting the Development and Remodeling of Microvascular Architecture in Solid Tumors, ChemE, June, 2003.
48. Rahul Raman, Glycomics: An Emerging Paradigm in Protein Carbohydrate Interactions (BE), June, 2003.
49. Timothy P. Padera, Lymphatic Pathophysiology of Tumors, Chemical Engineering-MEMP, June, 2003.
50. Kevin Pojasek, Development of Enzymatic and Analytical Tools for the Analysis of Chondroitin Sulfate and Dermatan sulfate Oligosaccharides, Biological Engineering, June, 2003.
51. Emily Cooper, Silicon field-effect sensors for biomolecular assays, EECS, June, 2003.
52. Kimberly Brian, Diffusion and Convection in Composite Hydrogels, ChemE, June, 2004.
53. Mariah Hahn, EECS, Characterization of the Vocal Fold Lamina Propria Towards Voice Restoration, June, 2004
54. Lily Laiho, Tissue Spectroscopic characterization based on fluorescence, Second Harmonic Generation, and Reflected Light, MechE, August, 2004.
55. Chris Hartemink, “The Cross-Linking Mechanism of Filamin A in the Actin Cytoskeleton,” ME-MEMP, September, 2004.
56. Louis Defrate, The biomechanics of the knee following injury and reconstruction of the posterior cruciate ligament, MechE, June, 2005.
57. Thomas Gervais, Mass Transfer and Structural Analysis of Microfluidic Devices, BE, September, 2005.
58. Paul George, Novel Polypyrrole Derivatives to Enhance Conductive Polymer-Tissue Interactions, (ChemE-MEMP) September, 2005.
59. Kinu Masaki (HST, EECS), May, 2006.
60. Michael Garcia-Webb, An Apparatus for High Throughput Muscle Cell Experimentation, BE, August, 2006.
61. Alex Rabodzey, Flow-induced Mechanotransduction in Cell-cell Junctions of Endothelial Cells, BE, August, 2006.

62. Rouzbeh Taghizadeh, Development of methods for the ex vivo expansion of human hematopoietic stem cells (BE), May, 2006.
63. Jianping Fu (MechE), Nanofluidic Devices for Rapid Analysis of DNA and Proteins, June, 2007.
64. Kuangshin Tai (DMSE), Nanomechanics of Bone: Fundamental Insights Regarding Structure-Function, Mineral-Organic Deformation, And Heterogeneity, June, 2007.
65. Jeremy Suggs (MechE), Investigation of In-vivo Total Knee Arthroplasty Biomechanics Using a Dual Fluoroscopic Imaging System, August, 2007.
66. Hongshen Ma (EECS), Electrochemical Impedance Spectroscopy using Adjustable Nanometer-Gap Electrodes, August, 2007.
67. Ricardo Brau (BE), Exploring the Mechanome with Optical Tweezers and Single Molecule Fluorescence, September, 2007
68. Rooz Ghafari (HST, EECS), The Functional Role of the Mammalian Tectorial Membrane in Cochlear Mechanics, February, 2008.
69. Shelly Levy-Tzedek (BE), A Study of Motor Control in Healthy Subjects and in Parkinson's Disease Patients, March, 2008.
70. Kristin Mattern (ChemE), Permeability Studies in Biomimetic Glycosaminoglycan-Hydrogel Membranes, June, 2008.
71. Eli Weinberg (MechE), Multiscale Simulations of the Aortic Heart Valve: Applications in Disease and Surgery, June, 2008.
72. Brian Taff (EECS), Design and Development of a Scaled Addressable Dielectrophoretic Cell Sorting Array for Complex Phenotype and Cell Population Heterogeneity Analyses, June, 2008.
73. Sangjin Ryu (MechE), On Contractile Force Developed by the Spasmoneme, a Biological Spring of a Ciliate Peritrich *Vorticella convallaria*, September, 2009.
74. Kartik Varadarajan (MechE), In Vivo Knee Biomechanics and Implications fo Total Knee Arthroplasty Implant Design, February, 2010.
75. Hsin-Fu Huang (EECS), Electromechanics and Electrorheology of Fluid Flow with Internal Micro-particle Electrorotation, June, 2010.
76. Ali Hosseini (MechE), In Vivo Kinematics and Forces in the Human Anterior Cruciate Ligament, June, 2010.
77. Michael Vahey (EECS), Development of Technology and Theory for Sorting Cells and Particles According to Differences in their Electrical Properties, June, 2010.
78. Venkataramanan Soundararajan (BE), Tools for Decoding the Structure-Function Relationships of Biopolymers in Nanotechnology and Glycobiology, June, 2010.
79. Nathan Hammond (MechE), Structure and Mechanical Properties of Self-Assembling Peptide Gels, August, 2010.

80. Chen-rei Wan (MechE). Characterization of the Cardiogenesis of Embryonic Stem Cells, February, 2011.
81. Shan Wu (BE), Quantitative Signal response Relationships Governing Stem Cell Migration, June 2011.
82. Lily Jeng (BE), Application of Endostatin Using Nonviral Gene Delivery Toward the Regeneration of Articular Cartilage, June 2011.
83. Shaobai Wang (MechE), Quantify Lumbar Spine Intervertebral Disc Kinematics and Predict Stress and Strain In-Vivo, February, 2012.
84. Reza Karimi (MechE), A New Approach for Elastography and Modulus Estimation: Development and Application in Tissue and Cell Biomechanics, February, 2012.
85. Jason Sen (MechE), Nanofluidic system for single molecule manipulation and analysis, September, 2012.
86. Noah Davidsohn (BE), The Development of Synthetic Gene Networks for the Creation of Artificial Tissue Homeostasis, February, 2013.
87. Andrew Koo (MechE), The Role of Syndecan-4 in Mechanotransduction and Computational Modeling of Shear Stress-induced Syndecan-4 Activation, February, 2013
88. Leon Li (MEMP, HST), Microfluidic Analysis of Mucin Gels, February, 2013
89. Sungmin Son (MechE), The Study of Mammalian Cell Size Homeostasis using the Suspended Microchannel Resonator, a State of the Art Tool for Single Cell Growth Measurements, June, 2013
90. Miles Miller (BE), Systematically Mapping Extracellular Protease Networks, June 2013
91. Daniel Massimini (MechE), In-Vivo Kinematics of the Human Shoulder, February, 2014.
92. Heenam Kwon (Cellular, Molecular and Developmental Biology, Tufts University), Cartilage tissue engineering in the inflammatory milieu, February, 2014.
93. Brant Hubbard, Molecular Biology, Cell Biology and Biochemistry, Boston University School of Medicine, June, 2014.
94. Gulati, Amneet (BE), Characterizing Cell Growth and Size, June, 2014.
95. Caroline Chopko (ChemE), Design of a Quantitative, Multiplexed, Non-Invasive, Single Cell Secreted Extracellular Protease Sensor, December, 2014.
96. Shu-Wei Chang (CEE), Heterotrimers and Homotrimers of Type I Collagen: Atomistic Models of Molecular and Fibril Strength September, 2014.
97. Josephine Shaw Bagnall (BE), Use of suspended microchannel resonator to elucidate biophysical properties of tumor cells in relation to metastasis, February, 2015.
98. Jorge Valdez, (BE), Developing a Modular Syntheticyc 3D Matrix for Assay Control and Measurement of Cell Phenotype, June, 2016.
99. John Martin (ChemE): Tumor progression and biomechanics, February, 2015.

100. Jon Sellon (HST), Tectorial membrane poroelasticity and viscoelasticity, September, 2016.
101. Erica Shapiro (Harvard School of Dental Medicine), The Role of MUC5B Salivary Mucin in modulating oral bacterial surface colonization and interspecies competition, June, 2017.
102. Michelle Chen (MechE), Engineering the tumor cell extravasation microenvironment, February, 2017.
103. Wesley Chen (BE), Dissecting Design Parameters of Biological Hydrogel Mimetics Using Simple Repeat-based Proteins, June, 2017.
104. Chris Nehme, Department of Mechanical Engineering, Tufts University, The development of an in-vitro system for the study of osteoarthritis in a mouse model, June 2017.
105. Bhavana Mohanraj (UPenn, Orthopaedics Department), High Throughput and Mechano-Active Platforms to Promote Cartilage Regeneration and Repair, June, 2017.
106. Samiya Alkhairy (HST), An Analytic Model of the Cochlear and Functional Interpretations, September, 2017.
107. Alessio Brecca, Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark, Impact of Knee Joint Loading Exercise on Articular Cartilage, February, 2018.
108. Caroline Wagner (MechE), Micro- and macro-rheological studies of the structure and association dynamics of biopolymer gels, June, 2018.
109. Carrie Hui Mingalone, Tufts School of Biomedical Sciences, Understanding Osteoarthritis as a Biological and Biomechanical Disease, June, 2018.
110. Bo Qing (BE), Design and Optimization of Synthetic Polymer Gels to Mimic Mechanical Properties of Brain Tissue, June, 2018.
111. Anya Burkart (BE), The role of nuclear mechanics in cancer metastasis (in progress).
112. Kevin Shi (BE), Modeling Biological Systems (in progress).
113. Tahoura Samad (BE), Transport of peptides within and through mucin gels (in progress).
114. Jacob Witten (CISB), High throughput drug discovery for penetration into mucins (in progress).
115. Dan Wu (MechE) (in progress).
116. Uyanga Tsedev (BE), Bacteriophage Platforms for Cancer Therapy Applications (in progress).
117. Alex Wang (BE), Engineering a physiologically relevant vascularized liver model (in progress).
118. Alex Brown (BE), Regulation of proteases in engineered hydrogel environments (in progress).
119. Sheryl Wang (BE), Design of an adaptable gene delivery system for programmed stimulation of in situ osteogenic expression to enhance bone regeneration (in progress).
120. MayLin Funkenbusch (ChemE), Layer-by-Layer Delivery Systems for Craniomaxillofacial Bone Repair (in progress)

121. Hyeon Yu Kim (Mechanical Engineering), (in progress).
122. Gustavo Zanotto, Clinical Sciences, Colorado State University, (in progress).
123. Uyanga Tsedev (Biological Engineering), (in progress).
124. Alex Majailovic, (Mechanical Engineering), (in progress).
125. Caroline Werlang, (Biological Engineering), (in progress).
126. Eric Lehnhardt, (Biological Engineering), (in progress).
127. Samantha Strasser, (Elec Eng Comp Sci), (in progress).

FUNDING

- **(Please note: MIT did not request funding information for tenure or promotion, so a complete list has never been compiled)**
- **AJG has received continuous NIH R01 Funding from 1980 – present, including an NIH MERIT Award from 1995-2005**
- **Current Funding is listed below from the most recent NIH Biosketch:**

Ongoing Research Support

NIH/NIAMS Grant R01-AR060331 (PI: A Grodzinsky) 9/1/2012 - 8/31/2018

“Cartilage Repair Using Self Assembling Peptide Scaffolds”

The major goals are to develop second-generation peptide nanofiber scaffolds by functionalizing with pro-chondrogenic molecules and a pro-anabolic molecule (heparin binding IGF-1 (HB-IGF-1)). We will then test the ability of these optimized acellular peptide scaffolds to promote the chondrogenesis of infiltrating progenitor cells, cartilage neotissue biosynthesis, and integration with adjacent cartilage in rabbit and horse models in vivo in collaboration with the Equine Orthopaedics Laboratory of Colorado State University.

NIH/NCATS Grant UG3TR002186 (PI: A Grodzinsky, Co-PI: M Cirit) 6/15/2017 – 2/28/2019

“Cartilage-Bone-Synovium MPS: Musculoskeletal Disease Biology in Space”

The mission of this program is to bring highly quantitative and high-content experimental and computational approaches to study the effects of space flight on the musculoskeletal system, focusing on cartilage, bone and synovium. We will co-culture osteochondral explants with joint capsule synovium explants and the ability of a panel of selected drugs to prevent cartilage and bone degradation.

NIH/NCATS Grant U24TR001951 (PI: M Cirit, Co-PI: A Grodzinsky) 9/28/2016 – 8/31/2019

“Translational Center of Tissue Chip Technologies for quantitative characterization of Microphysiological Systems”

This Translational Center for Tissue Chip Technologies combines quantitative experimental biology, computational biology and biostatistics to characterize these complex systems and translate experimental insights into clinical outcomes. The translational systems pharmacology team at MIT is the core of the testing center and includes tissue engineers, experimentalists and computational biologists. The team designs

model-guided experiments, carries out the experiments, acquires and analyzes data, and reports on results.

NIH/NCATS Grant U24TR002634 (PI: M Cirit, Co-PI: A Grodzinsky) 9/18/2018 – 7/31/2020
“Translational Center of Tissue Chip Technologies for quantitative characterization of Microphysiological Systems 2.0”

This Translational Center for Tissue Chip Technologies grant is a new extension of the the above initial grant, Grant U24TR001951.

NSF CMMI 1536233 (PI: C Ortiz, Co-P: A Grodzinsky) 9/15/2015-8/31/2019
“Assessing Effects of Genetic Modifications, Age and Exercise on Osteoarthritis Progression in Mouse Models Using Multiscale Nanodynamics”

We will assess the role of genetic modifications, aging and overuse of murine knee joints on the degradation of cartilage tissue and its key structural molecules using genetically engineered mouse models. Knee joints from aggrecanase resistant and collagenase resistant knock-ins are obtained from animals allowed normal ambulation and those exercised on running wheels. AFM-based dynamic nanoindentation is used to assess tissue and molecular properties.

NIH/NIBIB Grant R01-EB017755 (PI: K Ribbeck; Co-I A Grodzinsky) 9/1/2013 - 8/31/2018
“Mechanistic analysis of transport through the mucus barrier”

We are designing in vitro transport experiments to quantify effects of electrostatic and hydrophobic interactions on peptide transport through mucin gels, direct the theoretical modeling, and co-advise the work of the postdoctoral associate conducting the in vitro transport studies throughout the project.

NSF (Mat Res Center, MIT): IRG II: Engineered Biological Motifs for Complex Hydrogel Function
IRG Leader: K Ribbeck; A Grodzinsky and P Hammond: leaders of *Thrust 3: “Glycosylation to control mechanical properties of hydrogels”* 12/01/2015 – 11/30/2020

This project explores the biological functions of polymer-associated glycan chains in regulating the material properties of hydrogels, using aggrecan, the primary glycan-containing molecule of cartilage, as a model system. The resulting systematic analysis will be used to understand the function of polymer-associated glycan chains broadly used in other biological hydrogel systems with very different properties.

NIH/NIBIB (PI: P Hammond; Co-I AJ Grodzinsky) 04/01/2018-03/31/2023
“Multivalent Nano-conjugates for Targeted Penetration of and Delivery to Dense Extracellular Matrices”

Project Goals: The goal is to help deliver biologic drugs and other important drugs to penetrate tissues such as cartilage, cornea, meniscus and tendon that do not have blood vessels to help drug molecules get into the tissue for effective treatment to treat and aid in repair of early stage osteoarthritis.

NIH/NCI R01-CA208205-01, subaward from MGH (PI: R Jain; Co-I: A Grodzinsky) 8/01/2017 – 7/31/2022

“Reengineering obesity-induced abnormal microenvironment to improve PDAC Treatment”

In this Bioengineering Research Grant, we will be responsible for the design, synthesis, and initial characterization of families of nanomedicines and be in charge of measuring the multiscale mechanical and physical properties of pancreas and PDAC tissues in this BRG.

Pending Research Support

Title: Biological Characterization of Electrostatic Material-Tissue Interactions of Polyelectrolyte Nanomaterials

Source agency: NSF

Award Period: 09/01/2018-08/31/2021

Person-months/year: 0.01 academic month

Project Goals: Development of a high throughput biological system to characterize the properties of nanoscale biomaterials in situ.

Recently Completed Research Support

DoD Grant W81XWH-14-1-0544 (PI: P Hammond; Co-I: A Grodzinsky) 9/30/2014 - 9/29/2018
“Cartilage-Penetrating Chondrogenic Nanoparticles for Early Post-Traumatic Osteoarthritis Therapy”

The objective is to develop drug functionalized nanoparticles intended for intra-articular injection after traumatic joint injury. Experiments and modeling in the Grodzinsky lab focus on measurement of transport of drug-functionalized nanoparticles into living cartilage, assessment of bioactivity of the delivered drugs, and design and development of appropriate animal models to test these materials.

W.L. Gore & Associates, Inc. (PI: A Grodzinsky) 9/1/2016 – 8/31/2017
“Gore Material Constructs for Cartilage Repair”

Evaluation of multiple Gore material constructs for ability to allow penetration and assembly of self-assembling peptide [KLDL]3 containing chondrocytes. Characterization and validation that chondrocytes can maintain viability and synthesize new cartilage-like extracellular matrix in situ. Biochemical and biomechanical assessment of newly synthesized cartilage-like tissue.

L’Oreal Research 9/01/2014-12/31/2016
Effects of externally applied hyaluronan (HA) on the biophysical profile of skin”

In this project we are performing a comparison of the biophysical profile in young vs. aged skin and of biophysical profiles in aged skin treated with hyaluronan.

Deshpande Foundation 9/01/2012-12/31/2015
“Drug Delivery System for Post Traumatic Osteoarthritis in Human and Equine Populations”

The goals are to encapsulate a drug combination into nanoparticles and introduce them locally into the joint using intra-articular injection. We have determined the ideal design parameters which will enable their deep penetration into cartilage and particle surface properties critical for their long term retention inside the joint tissue to ensure effective treatment.

NIH Grant R01-AR33236-22-26 (PI: A Grodzinsky) 3/1/06-2/29/12 [NIH MERIT Award (1/95-1/05)]
NIH/NIAMS

“Cartilage Metabolic Response to Loading”

The major goals of this project are to determine the effects of moderate static and dynamic shear and compressive loading on chondrocyte biosynthesis, gene expression, growth factor transport and signaling within bovine cartilage explants in vitro, as well as chondrocyte metabolism within 3-D chondrocyte-gel culture systems (e.g., alginate and agarose).