

Yeja Zhang, M.D., Ph.D.

CURRICULUM VITAE

Citizenship: U. S. A.
Office Address: 1653 W. Congress Parkway
720 Cohn Building
Chicago, Illinois 60612

Discipline Specialization: Physical Medicine and Rehabilitation

Education:

University of Pennsylvania, Philadelphia. Ph. D., Cell & Molecular Biology. 1991-97
Second Military Medical University, Shanghai, P. R. China. M.D. 1983-89

Postgraduate Training:

Department of Physical Medicine & Rehabilitation, University of Rochester. Chief Resident and Resident. 07/2000-6/2002

Department of Physical Medicine & Rehabilitation, Rush University. PGY2 Resident. 1999-2000

Department of Pathology and Department of Dermatology, Northwestern University. Post-doctoral fellow. 1998-1999

Intern, Transitional Residency, St. Francis Hospital of Evanston, IL. 1997-98

Board Certification:

Physical Medicine & Rehabilitation Board Certified: 05/03

Current Academic Position:

Assistant Professor, Department of Rehabilitation Medicine, Thomas Jefferson University

Awards and Honors:

- ◆ North American Spine Society (NASS) Research Grant, 2008
- ◆ The President's Citation Award for outstanding research, American Academy of PM&R, 2007
- ◆ K08 Mentored Clinical Scientist Development Award, NIH/NICHHD, 2006-10
- ◆ 21st Century Development Grant Award, Cervical Spine Research Society (CSRS), 2007-08
- ◆ Education and Research Foundation New Investigator Award by the Academy of Physical Medicine and Rehabilitation, 2006
- ◆ Scott F. Nadler, D.O. Research Grant Award by PASSOR, P.I., 2006
- ◆ Research Grant, DePuy Spine, P.I., 2006
- ◆ Best paper award by PASSOR at the AAPM&R 66th Annual Assembly, 2005
- ◆ Research Grant Award, Cervical Spine Research Society (CSRS). 2006
- ◆ Best Paper Award at the Association for Academic Physiatrists 2005 Annual Meeting, Tucson, Arizona, 2005

- ◆ Stipend for AAMC Early Career Women Faculty Professional Development Seminar, 2004
- ◆ Research Grant, Rush University Committee on Research. Co-P.I., 2003-2005
- ◆ K-12 Research Fellowship, Rehabilitation Medicine Scientist Training Program (RMSTP), National Institute of Health, 2002-2005
- ◆ National Institute of Health National Research Service Award (NRSA), 1998-1999
- ◆ Graduate Fellowship, University of Pennsylvania, 1991-1997

Society Membership and Other Experience (Active):

- ◆ American Academy of Academic Physiatrists (AAP)
- ◆ American Academy of Physical Medicine and Rehabilitation (AAPM&R)
- ◆ North American Spine Society (NASS)
- ◆ Physiatric Association of Spine, Sports and Occupational Rehabilitation (PASSOR)
- ◆ Ad Hoc Reviewer, American Journal of Physical Medicine and Rehabilitation
- ◆ Ad Hoc Reviewer, Archives of Physical Medicine and Rehabilitation
- ◆ Reviewer, The American Journal of Sports Medicine

Committee and Administrative Service:

- ◆ AAPM&R Musculoskeletal research task force for NIH Institute for Child Health and Human Development (NICHD), 2004-2005
- ◆ AAP committee on academic affairs, 2006
- ◆ PASSOR Research Committee, 2007-2010

Invited Lectures:

- ◆ Danish Rheumatological Society Annual Meeting, Denmark, 9/2006
- ◆ Section of Orthopedic Surgery and Rehabilitation Medicine, Department of Orthopedic Surgery, the University of Chicago, 10/06
- ◆ Section of Orthopedic Surgery and Rehabilitation Medicine, Department of Orthopedic Surgery, the University of Chicago, 6/07
- ◆ North American Spine Society (NASS) 24th annual Meeting, Section on Spine Biologics and Research, San Francisco, 11/09
- ◆ International Spine Intervention Society (ISIS) 17th Annual Scientific Meeting, Toronto, Canada, 7/09

Research and Clinical Experience:

- 9/2008-present: **Assistant Professor, Department of Physical Medicine and Rehabilitation; Department of Orthopedics, Rush University.** Conducted research on intervertebral disc degeneration/regeneration under the guidance of Dr. Howard S. An, and Dr. Eugene Thonar. Specialize in non-operative care of spine, perform procedures including epidural nerve root blocks and EMGs.
- 1/2006-8/2008: **Assistant Professor, Department of Rehabilitation Medicine, Thomas Jefferson University.** Conducted research on intervertebral disc degeneration/regeneration under the guidance of Irving Shapiro, PhD, DDS, and Jouni Uitto, MD, PhD.
- 01/2004-12/2005: **Assistant Professor, Department of Physical Medicine and Rehabilitation; Department of Orthopedics, Rush University.**

- Conducted research on intervertebral disc degeneration/regeneration under the guidance of Dr. Howard S. An, and Dr. Eugene Thonar.
- 07/2002-12/2003: **Instructor, Department of Physical Medicine and Rehabilitation; Department of Orthopedics, Rush University.**
- 07/2000-06/2002: **Resident, Department of Physical Medicine & Rehabilitation, University of Rochester.**
- 1999-2000: **Resident, Department of Physical Medicine & Rehabilitation, Rush University.**
- 1998-1999: **Post-doctoral fellow, Department of Pathology and Department of Dermatology, Northwestern University.**
Conduct research on Desmosome assembly and its impact on skin cancer in Dr. Kathy J. Green's laboratory.
- 1997-98: **Intern, Transitional Residency, St. Francis Hospital of Evanston, IL.**
- 1993-97: **Research Assistant, Graduate Group of Cell and Developmental Biology, University of Pennsylvania.**
Conducted research in the fields of chondrocyte development, serotonin receptors, and breast cancer with Drs. Sherrill L. Adams, and David R. Manning; Dissertation Advisor: Dr. Sherrill L. Adams.
- 1991-93: **Research Assistant, Graduate Group of Parasitology, University of Pennsylvania.**
Conducted research in the treatment of parasitic infections with Dr. James B. Lok.

Teaching Experience:

- 1989-91: Teaching Assistant, Department of Parasitology, Second Military Medical University, Shanghai, P. R. China.

Publications:

- Anderson, DG, Markova, D., Adams, SL., Pacifici, M., An, HS., **Zhang, Y.** Fibronectin Alternative Splice Variants in the Human Intervertebral Disc. Spine. In review.
- Kondo N., Yuasa, T., Shimono, K., Tung, W., Okabe, T., Yasuhara R., **Zhang Y.**, Pacifici M., Iwamoto M., Enomoto-Iwamoto M. Imbalance of Wnt/beta-catenin signaling activity causes deformity of intervertebral disc organization. Spine. In review.
- Zhang, Y.**, Markova, D., IM, HJ., Hu W., Thonar, EJ., He, T-C., An, HS, Phillips, FM, Anderson, DG. Primary bovine intervertebral disc cells transduced with adenovirus overexpressing 12 BMPs and Sox9 maintain appropriate phenotype. Am J Phys Med Rehabil. 88:455-63, 2009. PMID: 19454853
- Zhang, Y.**, An, HS., Tannoury, C., Thonar, E. J-M.A., Freedman, MK., Anderson, DG. Biological Treatment for Degenerative Disc Disease: Implications for the Field of Physical Medicine and Rehabilitation. Lead article. Am J Phys Med Rehabil. 87:694-702, 2008. PMID: 18716481
- Zhang, Y.**, Phillips, FM., Thonar, E. J-M.A., Oegema, T., An, HS., Roman-Blas, JA., He, T-C., Anderson, DG. Cell Therapy using Articular Chondrocytes Over-expressing BMP-7 or BMP-10 in a Rabbit Disc Organ Culture Model. Spine. 33 (8):831-838, 2008. PMID: 18404100

Zhang, Y., Anderson, DG., Phillips, FM., Thonar, E. J-M.A, He, T-C., Pietryla, D., An, HS. Comparative Effects of Bone Morphogenetic Proteins and Sox9 Overexpression on Matrix Accumulation by Bovine Anulus Fibrosus Cells - Implications for Anular Repair. *Spine*. 32(23):2515-20, 2007. PMID: 17978648

Zhang, Y., Kerns, J., Anderson, DG., Lee, YS., Chen, Tannoury, C., An, HS. Sensory Neurons and Fibers from Multiple Spinal Cord Levels Innervate the Rabbit Lumbar Disc. *Am J Phys Med Rehabil*. 85:865-71, 2006. PMID: 17079958

Zhang, Y., An, HS., Thonar, E. J-M.A, Chubinskaya S., He, T-C., Phillips, FM. Comparative Effects of Adenovirus Expressing Different Bone Morphogenetic Proteins and Sox 9 on Extracellular Matrix Metabolism of Bovine Nucleus Pulposus Cells. *Spine*. (invited submission). 31(19):2173-9, 2006. PMID: 16946650

Zhang, Y., Li, Z., He, T-C., Thonar, E. J-M.A, An, HS., Pietryla, D., Phillips, FM. Transduced bovine articular chondrocytes affect the synthetic activity of neighboring nucleus pulposus cells: Implications for chondrocyte transplantation in the intervertebral disc. *Spine* (invited submission). 30(23):2601-7, 2005. PMID: 16319745 **Zhang, Y.**, An, H.S, Toofanfard, M., Li, Z., Andersson, G.B.J., Thonar, E. J-M.A. Low dose interleukin-1 counteracts osteogenic protein-1 induced proteoglycan synthesis in adult bovine intervertebral disc cells. *Am J Phys Med Rehabil*. 84:322-9, 2005.

Zhang, Y., An, H.S, Song, S.W., Toofanfard, M., Masuda, K., Andersson, G.B.J., Thonar, E. J-M.A. Growth factor osteogenic protein-1: differing effects on cells from three distinct zones in the bovine intervertebral disc. *Am J Phys Med Rehabil*. 83:515-521, 2004.

Zhang, X., **Zhang, Y.**, Schwarz, E.M., O'Keefe, R.J. Cyclooxygenase and bone repair. *Current Opinions in Orthopedics*. 12:387-402, 2001.

Zhang, Y., Nui, Z., Cohen, A. J., Adams, S. L. The internal chondrocyte-specific promoter of the chick type III collagen gene is activated by AP1 and is repressed in fibroblasts by a complex containing an LBP1-related protein. *Nucleic Acids Research*. 27: 4090-4099, 1999.

Zhang, Y., Nui, Z., Cohen, A. J., Nah, H-D., Adams, S. L. The chick type III collagen gene contains two promoters that are preferentially expressed in different cell types and are separated by over 20 kb of DNA containing 23 exons. *Nucleic Acids Research*. 25: 2470-2477, 1997.

Butketait, P., **Zhang, Y.**, Hallak, H., Graham, T. E., Miller, H. A., Burriss, K. D., Molinoff, P. B., Manning, D. R. Expression of the human 5-Hydroxytryptamine_{1A} receptor in Sf9 cells. *J Biol Chem*. 270: 18691-9, 1995.

Lok, J. B., Knight, D. H., Selavka, C. M., Eynard, J., **Zhang, Y.**, Bergman, R. N. Studies of reproductive competence in male *Dirofilaria immitis* treated with milbemycin oxime. *Trop Med and Parasitol*. 46: 235-240, 1995.

Published Abstracts and Presentations:

Anderson, DG, Markova, D., An, HS., Chee, A., **Zhang, Y.** Cytokine Profile in Intervertebral Disc Tissues from Patients with Discogenic Axial Back Pain Confirmed by Discography. Poster Presentation. *6th Congress of the European Federation of IASP Chapters (EFIC), 2009*, Lisbon, Portugal.

Anderson, DG, Markova, D., An, HS., Chee, A., **Zhang, Y.** Cytokine Profile in Intervertebral Disc Tissues from Patients with Discogenic Axial Back Pain Confirmed by

Discography. Poster Presentation. *The NIH pain Consortium 4th Annual Symposium on Advances in Pain Research, 2009*, Bethesda MD.

Zhang, Y., Drapeau S., An, HS., Thonar, EJ., Anderson, DG. Transplantation of Goat Bone Marrow-derived Stromal Cells to the Degenerative Intervertebral Disc in a Goat Disc-injury Model. Podium Presentation. *2009 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, Miami, FL.

Anderson, DG, Markova, D., Chu, M-L., An, HS., **Zhang, Y.** Characterization of Fibronectin Fragments in Human Surgical Intervertebral Disc Specimens. Poster Presentation. *2009 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, Miami, FL.

Anderson, DG, Markova, D., Adams, SL., Pacifici, M., An, HS., **Zhang, Y.** Fibronectin Alternative Splice Variants in the Human Intervertebral Disc. Poster Presentation. *2009 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, Miami, FL.

Zhang, Y., Markova, D., IM, HJ., Hu W., Thonar, EJ., He, T-C., An, HS, Phillips, FM, Anderson, DG. Primary bovine intervertebral disc cells transduced with adenovirus overexpressing 12 BMPs and Sox9 maintain appropriate phenotype. Poster Presentation. *2009 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, Miami, FL.

Di Paola, M; **Zhang, Y**; Shen, Y; Freeman, T; Chu, M-L; Anderson, DG. Histologic Characterization of the Knee Joint in a Collagen VI Deficient Murine Model. Podium presentation. *Orthopedic Research Society (ORS) 54th Annual Meeting'2008*, San Francisco, CA.

Zhang, Y., Chu, M-L., Vaccaro, AR., Albert, T., Hilibrand, A., Anderson, DG. Characterization of Fibronectin Fragments in Human Surgical Intervertebral Disc Specimens. Poster presentation. *68th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation (AAPM&R)*, 2007, Boston, MA.

Zhang, Y., Ponnappan RK, Anderson, DG., Phillips, FM. Transplantation of chondrocytes over-expressing bone morphogenetic proteins to reverse intervertebral disk degeneration in the rabbit. . Poster presentation. *2007 Annual Meeting of the American Academy of Physical Medicine and Rehabilitation (AAPM&R)*, Boston, MA.

Zhang, Y., Anderson, DG. Cell Therapy for the Degenerating Intervertebral Disc in the Rabbit Disc Organ Culture System. Poster presentation. *68th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation (AAPM&R)*, 2007, Boston, MA.

Zhang, Y., Anderson, DG. Comparative Effects of Adenovirus Expressing Bone Morphogenetic Proteins and Sox9 on Matrix Accumulation by Bovine Anulus Fibrosus Cells - Implications for Anular Repair. Poster Grand Round. *68th Annual Assembly of the American Academy of Physical Medicine and Rehabilitation (AAPM&R)*, 2007, Boston, MA.

Zhang, Y., Phillips, FM., Thonar, E.J-M.A., An, HS., Anderson, DG. Genetically-Engineered Chondrocytes to Repair the Degenerating Intervertebral Disk in the Rabbit. Plenary Session, *43rd Annual Meeting of the American Association of Academic Physiatrists' 2007*, San Juan, Puerto Rico. *Am J Phys Med Rehabil.* 86:S82, 2007.

Zhang, Y., Phillips, FM., An, HS., Thonar, E.J-M.A., Oegema, T., Shen, Y., Roman-Blas, J., He, TC., Anderson, DG. Cell therapy for the degenerating intervertebral disk in

the rabbit disk organ culture system. Platform presentation. *2007 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, Hong Kong.

Zhang, Y., Anderson, DG, Phillips, FM., Thonar, E.J-M.A., He, TC., Pietryla, D., An, HS. Comparative effects of bone morphogenetic proteins and SOX9 overexpression on matrix accumulation by bovine annulus fibrosus cells – implications for annular repair. Platform presentation. *2007 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, Hong Kong.

Zhang, Y., Phillips, FM., Thonar, E.J-M.A., An, HS, and Anderson, DG. Chondrocyte-based Gene Therapy for the Degenerating Intervertebral Disc in the Rabbit Disc Organ Culture System. Poster Presentation. Cervical Spine Research Society (CSRS) 2006 Annual Meeting, Palm Beach, FL.

Zhang Y., Phillips FM., Anderson, DG., Thonar E.J-M.A., Pietryla, D., He, T-C., An, HS. Comparative Effects of Adenovirus Expressing Bone Morphogenetic Proteins and Sox9 on Matrix Accumulation by Bovine Anulus Fibrosus Cells: Implications for Anular Repair. Podium Presentation. Cervical Spine Research Society (CSRS) 2006 Annual Meeting, Palm Beach, FL.

Ponnappan RK, **Zhang, Y.**, Phillips, FM. Transplantation of BMP-transduced Chondrocytes to Reverse Intervertebral Disc Degeneration in the Rabbit. Podium Presentation. Cervical Spine Research Society (CSRS) 2006 Annual Meeting, Palm Beach, FL.

Chen E-R., **Zhang Y.**, Langenbach, R., J.S. Kroin, JS., Kordower, JH. COX-2 Deficient Mice have Enhanced Mechanical Hyperalgesia Following Carrageenan Injection. 36th *Society for Neuroscience (SfN) Annual Meeting*, 2006, Atlanta, GA.

Kroin, JS., Chen, E-R., **Zhang, Y.**, Buvanendran, A., Tuman, KJ. No Compensatory Expression of COX-1 and -2 Detected in Transgenic Mice with Differences in Pain. *Annual meeting of American Society of Anesthesiologists (ASA)*, 2006, Chicago, IL.

Phillips, FM., **Zhang, Y.**, Oegema T, Andersson G, An. HS. Chondrocyte Based Gene Therapy for the Degenerating Intervertebral Disc in the Rabbit Disc Organ Culture System. *IMAST, The 13th International Meeting on Advanced Spine Techniques*, 2006, Athens, Greece.

Zhang, Y., An, HS., Thonar, E.J-M.A., Oegema, T., Andersson, G.B.J., Phillips, FM. Chondrocyte Based Gene Therapy for the Degenerating Intervertebral Disc in the Rabbit Disc Organ Culture System. Special Interest Poster Presentation. *21st Annual Meeting of the North American Spine Society (NASS)*, 2006, Seattle, Washington.

Zhang, Y., Uitto, J., E.J-M.A. Cell Based Gene Therapy for the Degenerating Intervertebral Disc. *Annual Meeting of the American Association of Academic Physiatrists' 2006*, Daytona Beach, Florida. *Am.J.Phys.Med.Rehabil.* **85**:248-249.

Zhang, Y., An, HS., Phillips, FM., Thonar, E.J-M.A. Biological Treatment of Degenerative Disc Diseases: Gene Therapy Approaches. Poster presentation. *2005 Annual Meeting of the American Academy of Physical Medicine and Rehabilitation (AAPM&R)*, Philadelphia.

Zhang, Y., An, HS., He, T-C., Thonar, E.J-MA., Phillips, FM. Effects of Adenovirus Expressing Twelve Different Bone Morphogenetic Proteins on Proteoglycan Metabolism of the Intervertebral Disc. Poster presentation. *Annual Meeting of the American Academy of Physical Medicine and Rehabilitation (AAPM&R)*, Philadelphia.

Zhang, Y., Lee YS., Chen, EY., An, HS. Study of Neurotransmission Pathway for Discogenic Low Back Pain: Fluro-Gold Particles are Transferred From the Rabbit L5/6 Intervertebral Disc to Primary Sensory Neurons and Primary Sensory Fibers at Multiple Levels. Poster presentation. *2005 Annual Meeting of the American Academy of Physical Medicine and Rehabilitation (AAPM&R)*, Philadelphia.

Zhang, Y., He, T-C., An, H.S., Thonar, E.J-MA; and Phillips, F.M.. The effects of transplanted articular chondrocytes transduced with adenovirus expression BMPs on metabolic activities of nucleus pulposus cells. Paper presentation. *2005 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, New York.

Zhang, Y., He, T-C., An, H.S., Thonar, E.J-MA; and Phillips, F.M.. Effects of adenovirus expressing twelve different bone morphogenetic proteins on proteoglycan metabolism of the intervertebral disc. Paper presentation. *2005 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, New York.

Zhang, Y., Phillips, F.M., Li, Z., He, T-C., Thonar, E.J-MA, Thonar, E. J-M.A, and An, H.S. Bone Morphogenetic Proteins-7 and -13 have Different Effects on Proteoglycan Accumulation by Nucleus Pulposus and Annulus Fibrosus Cells. Poster presentation. *2005 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, New York.

Zhang, Y., Feng, H., Holden, J., Li, Z., Cs-Szabo, G., An,, HS. Study of Neurotransmission Pathway for Discogenic Low Back Pain: Fluro-Gold Particles are Transferred From the Rabbit L5/6 Intervertebral Disc to Primary Sensory Neurons and Primary Sensory Fibers at Multiple Levels. Paper presentation. *2005 Annual Meeting for the International Society for the Study of Lumbar Spine (ISLSS)*, New York.

Zhang, Y., An, HS., Phillips, FM., Thonar, E.J-M.A. Biological Treatment of Degenerative Disc Diseases: Gene Therapy Approaches. Best paper award. Platform presentation. *41st Annual Meeting of the American Association of Academic Physiatrists' 2005*, Tucson, Arizona. *Am.J.Phys.Med.Rehabil.* **84**:200-201.

Zhang, Y., Phillips, FM., Im, H-J., Song; S., Li, Z., He, T-C., Thonar, EJ-MA., Andersson GBJ., and An, HS. Bone Morphogenetic Proteins-7 and -13 have Different Effects on Proteoglycan Accumulation by Nucleus Pulposus and Annulus Fibrosus Cells. Poster presentation. *Orthopedic Research Society 51st Annual Meeting'2005*, Washington D.C.

Zhang, Y., Feng, H., Holden, J., Li, Z, Cs-Szabo, G., Howard S. An, HS. Study of Neurotransmission Pathway for Discogenic Low Back Pain: Fluro-Gold Particles are Transferred From the Rabbit L5/6 Intervertebral Disc to Primary Sensory Neurons and Primary Sensory Fibers at Multiple Levels. Poster presentation. *Orthopedic Research Society 51st Annual Meeting'2005*, Washington D.C.

Zhang, Y., Li, Z., He, TC., An, HS, Song S., Thonar, E.J-MA., Phillips, FM. Effects of Adenovirus Expressing Twelve Different Bone Morphogenetic Proteins on Proteoglycan Metabolism of the Intervertebral Disc. Special Poster Presentation. *Annual Meeting of the North American Spine Society (NASS)*, 2004, Chicago, IL.

Zhang, Y., Phillips, FM., Song S., Li, Z., He, TC., Thonar, E.J-MA., An, HS, Bone Morphogenetic Proteins 7 and 13 have Different Effects on Proteoglycan Accumulation by Nucleus Pulposus and Annulus Fibrosus Cells. Poster Presentation. *Annual Meeting of the North American Spine Society (NASS)*, 2004, Chicago, IL.

Zhang, Y., Li, Z., An, HS, He, TC, Thonar, E.J-MA., Phillips, FM. Stimulation of Proteoglycan Synthesis by Nucleus Pulposus Cells Co-cultured with Articular

Chondrocytes Transduced with Adenoviruses Expressing Bone Morphogenetic Proteins. Poster presentation. *5th Canadian and US combined Orthopedic Research Society Meeting'2004* Canada.

Zhang, Y., Li, Z., An, HS., He, T-C., Song, S., Thonar, E.J-MA., Andersson, GBJ., Phillips, FM. Effects of Adenovirus Expressing Twelve Different Bone Morphogenetic Proteins on Proteoglycan Metabolism of the Intervertebral Disc. Platform presentation. *5th Canadian and US combined Orthopedic Research Society Meeting'2004* Canada.

Zhang, Y., Phillips, F.M., Im, H-J., Song, S., Li, Z., He, T-C., Thonar, E.J-MA; B.J. Andersson, G.B.J., and An, H.S. Bone Morphogenetic Proteins-7 and -13 have Different Effects on Proteoglycan Accumulation by Nucleus Pulposus and Annulus Fibrosus Cells. Poster presentation. *5th Canadian and US combined Orthopedic Research Society Meeting'2004* Canada.

Zhang, Y., Song, S.W., Andersson, G.B.J., An, H.S. The Effects of Growth Factor Treatment on Degenerative Disc Diseases and Discogenic Low Back Pain. Platform presentation. *40th Annual Meeting of the American Association of Academic Physiatrists' 2004*, Albuquerque, New Mexico.

Zhang, Y., Nui, Z., Cohen, A. J., Nah, H-D and Adams, S. L. The Chick Type III Collagen Gene Contains Two Cell Type-Specific Promoters Separated by at Least 20 kb of DNA Containing 23 Exons. *Matrix '97*. Platform Presentation. *East Coast Connective Tissue Society Seventeenth Annual Meeting*, Boston, MA.

Zhang, Y., Cohen, A. J., Nah, H-D, Nui, Z., Kelly, C and Adams, S. L. A Chondrocyte-Specific Promoter in Intron 23 of the Chick a1(III) Collagen Gene. *Supplement to Molecular Biology of the Cell*. 578a, 1996. Poster Presentation. *6th International Congress on Cell Biology & 36th American Society for Cell Biology Annual Meeting*, San Francisco, CA.

Zhang, Y., Nah, H-D, Nui, Z., Kelly, C and Adams, S. L. An Internal Chondrocyte-Specific Promoter in Intron 23 of the Chick a1(III) Collagen Gene. *Matrix'96*. Poster Presentation. *East Coast Connective Tissue Society Sixteenth Annual Meeting*.

Bowman, D. D., Johnson, R. C., Ulrich, M. E., Newmann, N., Lok, J. B., **Zhang, Y.** Effects of long-term administration of Ivermectin and Milbemycin Oxime on circulating microfilaria and parasite antigenemia in dogs with patent heartworm infections. *Heart Worm Symposium' 92*. 151-158, 1992.

Lok, J. D., Knight, D. H., LaPaugh, D. A., **Zhang, Y.** Kinetics of Microfilaremia suppression in *Dirofilaria immitis*-infected dogs during and after a prophylactic regimen of Milbemycin Oxime. *Heart Worm Symposium' 92*. 143-149, 1992.

Research Support:

Grant application submitted 09/2008-06/2009:

YeJia Zhang (PI) Submitted 2/16/09 (pending)
Discogenic back pain: cytokine profiles in human and rat.
R21, NIAMS, NIH

YeJia Zhang (PI) Submitted 6/16/09 (pending)
NIAMS, NIH
R03, Role of fibronectin in human intervertebral disc pathophysiology

YeJia Zhang (PI) Submitted 3/09 (not funded)

Rush University New Investigator Award in Orthopedics and Pediatrics
Role of fibronectin in human intervertebral disc pathophysiology

Howard S. An (PI) Submitted 4/09
Smith and Nephew
The Effects of Low Intensity Pulsed Ultrasound on Disc Healing in an Annulus Fibrosus
Needle Puncture Model
Role: Co-I

Howard S. An (PI) Submitted 3/09
Synthesis Spine
Molecular Therapy for Intervertebral disc degeneration: Repair, Regeneration and Anti-
inflammatory effects
Role: Co-I

Howard S. An (PI) Submitted 4/09
Medtronic
Molecular Therapy for Intervertebral disc degeneration: Repair, Regeneration and Anti-
inflammatory effects
Role: Co-I

Yeji Zhang (PI) 7/1/09-1/19/2011
Administrative supplement for Mentored Clinical Scientist Development Award,
NIH/NICHHD (K08)

Gunnar Andersson (PI) 09/01/09 to 08/31/11
Administrative supplement for Program Project Grant, Project 4: Biological Treatment
Strategies by Growth Factors and Cytokine Inhibitors
Role: Co-I

Grant application current and completed:

John Whyte (PI), 07/2002-06/2005.
2K12 HD0197-7, NIH/NICHHD
Rehabilitation Scientist Training Program
Role: Trainee

Howard An (PI) 2003-2004
Rush University Committee on Research \$100,000
The Role of the Spinal Cord in Modulating Discogenic Low-Back-Pain
Role: co-PI

Yeji Zhang (PI) 1/2006-12/2006
DePuy Spine \$90,496
Gene Expression Profile of Human Intervertebral Discs and the Effects of Recombinant
Human Growth Differentiation Factor-5 (rhGDF-5)
Role: PI

Yeji Zhang (PI) 1/2006-12/2006
Cervical Spine Research Society (CSRS) \$29,746
Cell-based Gene Therapy for the Degenerating Intervertebral Disc
Role: PI

Yeji Zhang (PI) 7/2006-6/2007
Scott F. Nadler, D.O. Research Grant Award by PASSOR \$10,000

The Role of Extracellular Matrix and Their Fragments in the Degenerating Human Intervertebral Disc

Role: PI

YeJia Zhang (PI)

10/2006-9/2007

ERF New Investigator Award by Foundation for Physical Medicine and Rehabilitation
\$10,000

The role of Human Umbilical Cord Blood-derived Mesenchymal Cells (hUCB-MS) in Intervertebral Disc Regeneration.

Role: PI

YeJia Zhang (PI)

12/2006-11/2008

21st Century Research Grant by the Cervical Spine Research Society (CSRS);
\$32,500/year (Total \$65,000)

The role of Human Umbilical Cord Blood-derived Mesenchymal Stem Cell (hUCB-MS) in Intervertebral Disc Regeneration.

Role: PI

YeJia Zhang (PI)

1/20/07-1/19/2011

Mentored Clinical Scientist Development Award, NIH/NICHHD (K08)

\$129,546/year, total \$518,184

Cell therapy for the degenerating intervertebral discs

Role: PI

YeJia Zhang (PI)

1/1/08-12/31/08

North American Spine Society (NASS) Research Grant

\$50,000

Cytokine Profile in Intervertebral Disc Tissues from Patients with Discogenic Axial Back Pain Confirmed by Discography

Role: PI