

Stanford



Robert Lane Smith

Professor (Research) of Orthopedic Surgery, Emeritus
Orthopaedic Surgery

Bio

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Orthopaedic Surgery
- Member, Bio-X

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our group is interested in the molecular and cell biology underlying bone and cartilage metabolism in health and disease. Normal daily activities are linked to the ability of the articular cartilage to withstand normal joint forces that may reach 5-7 times body weight and bone homeostasis depends on daily mechanical loading histories. The phenotypic stability of cartilage and bone depends on a complex interplay between stimuli influencing cell metabolism, physical forces, cytokines, hormones and growth factors, and the genetic expression determining the material properties of the tissue. Our lab applies modern biochemical techniques to analyze:

1. Mechanisms of cartilage degradation in inflammation and sepsis;
2. Stimulation of cartilage growth and repair by growth factors and hormones in serum-free culture;
3. Effects of adherence and deposition of glycoalyx on bacterial resistance to antibiotic treatment;
4. Effects of mechanical stresses and strains on cartilage and bone cell gene expression and matrix syntheses;
5. Analysis of metal particles on bone resorption and prosthetic loosening in total joint arthroplasty.

The experimental techniques include development of primary cultures of human chondrocytes, quantification of proteoglycan and collagen synthesis and degradation, zymogen and kinetic analysis of neutral metalloproteinases, western analysis of protein expression, northern and slot blot analysis of mRNA levels and cloning of connective tissue and bacterial genes.

Publications

PUBLICATIONS

- **Local versus distal transplantation of human neural stem cells following chronic spinal cord injury** *SPINE JOURNAL*
Cheng, I., Githens, M., Smith, R. L., Johnston, T. R., Park, D. Y., Stauff, M. P., Salari, N., Tileston, K. R., Kharazi, A. I.
2016; 16 (6): 764-769
- **Identification of Human Juvenile Chondrocyte-Specific Factors that Stimulate Stem Cell Growth** *TISSUE ENGINEERING PART A*
Taylor, S. E., Lee, J., Smeriglio, P., Razzaque, A., Smith, R. L., Dragoo, J. L., Maloney, W. J., Bhutani, N.

2016; 22 (7-8): 645-653

- **Biochemical and Cellular Assessment of Acetabular Chondral Flaps Identified During Hip Arthroscopy** *ARTHROSCOPY-THE JOURNAL OF ARTHROSCOPIC AND RELATED SURGERY*
Hariri, S., Truntzer, J., Smith, R. L., Safran, M. R.
2015; 31 (6): 1077-1083
- **T1 rho Dispersion in Articular Cartilage: Relationship to Material Properties and Macromolecular Content** *CARTILAGE*
Keenan, K. E., Besier, T. F., Pauly, J. M., Smith, R. L., Delp, S. L., Beaupre, G. S., Gold, G. E.
2015; 6 (2): 113-122
- **Interaction Between Osteoarthritic Chondrocytes and Adipose-Derived Stem Cells Is Dependent on Cell Distribution in Three-Dimension and Transforming Growth Factor- β 3 Induction.** *Tissue engineering. Part A*
Lai, J. H., Rogan, H., Kajiyama, G., Goodman, S. B., Smith, R. L., Maloney, W., Yang, F.
2015; 21 (5-6): 992-1002
- **Collagen VI Enhances Cartilage Tissue Generation by Stimulating Chondrocyte Proliferation.** *Tissue engineering. Part A*
Smeriglio, P., Dhulipala, L., Lai, J. H., Goodman, S. B., Dragoo, J. L., Smith, R. L., Maloney, W. J., Yang, F., Bhutani, N.
2015; 21 (3-4): 840-849
- **Comparative potential of juvenile and adult human articular chondrocytes for cartilage tissue formation in three-dimensional biomimetic hydrogels.** *Tissue engineering. Part A*
Smeriglio, P., Lai, J. H., Dhulipala, L., Behn, A. W., Goodman, S. B., Smith, R. L., Maloney, W. J., Yang, F., Bhutani, N.
2015; 21 (1-2): 147-155
- **Inhibition of Chondrocyte and Synovial Cell Death After Exposure to Commonly Used Anesthetics** *Chondrocyte Apoptosis After Anesthetics AMERICAN JOURNAL OF SPORTS MEDICINE*
Rao, A. J., Johnston, T. R., Harris, A. H., Smith, R. L., Costouros, J. G.
2014; 42 (1): 50-58
- **Stem cells catalyze cartilage formation by neonatal articular chondrocytes in 3D biomimetic hydrogels** *SCIENTIFIC REPORTS*
Lai, J. H., Kajiyama, G., Smith, R. L., Maloney, W., Yang, F.
2013; 3
- **Effects of Heme Oxygenase-1 on Bacterial Antigen-Induced Articular Chondrocyte Catabolism In Vitro** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Mawatari, T., Nakamichi, I., Suenaga, E., Maloney, W. J., Smith, R. L.
2013; 31 (12): 1943-1949
- **Local effect of IL-4 delivery on polyethylene particle induced osteolysis in the murine calvarium.** *Journal of biomedical materials research. Part A*
Rao, A. J., Nich, C., Dhulipala, L. S., Gibon, E., Valladares, R., Zwingenberger, S., Smith, R. L., Goodman, S. B.
2013; 101 (7): 1926-1934
- **Direct subcutaneous injection of polyethylene particles over the murine calvaria results in dramatic osteolysis.** *International orthopaedics*
Rao, A. J., Zwingenberger, S., Valladares, R., Li, C., Lane Smith, R., Goodman, S. B., Nich, C.
2013; 37 (7): 1393-1398
- **Local effect of IL-4 delivery on polyethylene particle induced osteolysis in the murine calvarium** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Rao, A. J., Nich, C., Dhulipala, L. S., Gibon, E., Valladares, R., Zwingenberger, S., Smith, R. L., Goodman, S. B.
2013; 101A (7): 1925-1934
- **Combined Transplantation of Human Neuronal and Mesenchymal Stem Cells following Spinal Cord Injury.** *Global spine journal*
Park, D. Y., Mayle, R. E., Smith, R. L., Corcoran-Schwartz, I., Kharazi, A. I., Cheng, I.
2013; 3 (1): 1-6
- **Functional assessment of the acute local and distal transplantation of human neural stem cells after spinal cord injury** *SPINE JOURNAL*
Cheng, I., Mayle, R. E., Cox, C. A., Park, D. Y., Smith, R. L., Corcoran-Schwartz, I., Ponnusamy, K. E., Oshtory, R., Smuck, M. W., Mitra, R., Kharazi, A. I., Carragee, E. J.
2012; 12 (11): 1040-1044
- **A relationship between mechanically-induced changes in serum cartilage oligomeric matrix protein (COMP) and changes in cartilage thickness after 5 years** *OSTEOARTHRITIS AND CARTILAGE*

- Erhart-Hledik, J. C., Favre, J., Asay, J. L., Smith, R. L., Giori, N. J., Muendermann, A., Andriacchi, T. P.
2012; 20 (11): 1309-1315
- **The effect of suture coated with mesenchymal stem cells and bioactive substrate on tendon repair strength in a rat model.** *journal of hand surgery*
Yao, J., Woon, C. Y., Behn, A., Korotkova, T., Park, D., Gajendran, V., Smith, R. L.
2012; 37 (8): 1639-1645
 - **The Effect of Suture Coated With Mesenchymal Stem Cells and Bioactive Substrate on Tendon Repair Strength in a Rat Model** *JOURNAL OF HAND SURGERY-AMERICAN VOLUME*
Yao, J., Woon, C. Y., Behn, A., Korotkova, T., Park, D., Gajendran, V., Smith, R. L.
2012; 37A (8): 1639-1645
 - **Revision joint replacement, wear particles, and macrophage polarization** *ACTA BIOMATERIALIA*
Rao, A. J., Gibon, E., Ma, T., Yao, Z., Smith, R. L., Goodman, S. B.
2012; 8 (7): 2815-2823
 - **Effect of a CCR1 receptor antagonist on systemic trafficking of MSCs and polyethylene particle-associated bone loss** *BIOMATERIALS*
Gibon, E., Yao, Z., Rao, A. J., Zwingenberger, S., Batke, B., Valladares, R., Smith, R. L., Biswal, S., Gambhir, S. S., Goodman, S. B.
2012; 33 (14): 3632-3638
 - **Molecular profile of osteoprogenitor cells seeded on allograft bone** *JOURNAL OF TISSUE ENGINEERING AND REGENERATIVE MEDICINE*
Smith, K. E., Huang, Z., Ma, T., Irani, A., Smith, R. L., Goodman, S. B.
2011; 5 (9): 704-711
 - **Cross-relaxation Imaging of Human Articular Cartilage** *MAGNETIC RESONANCE IN MEDICINE*
Stikov, N., Keenan, K. E., Pauly, J. M., Smith, R. L., Dougherty, R. F., Gold, G. E.
2011; 66 (3): 725-734
 - **Role of the Toll-like receptor pathway in the recognition of orthopedic implant wear-debris particles** *BIOMATERIALS*
Pearl, J. I., Ma, T., Irani, A. R., Huang, Z., Robinson, W. H., Smith, R. L., Goodman, S. B.
2011; 32 (24): 5535-5542
 - **Effects of Intermittent Hydrostatic Pressure and BMP-2 on Osteoarthritic Human Chondrocyte Metabolism In Vitro** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Smith, R. L., Lindsey, D. P., Dhulipala, L., Harris, A. H., Goodman, S. B., Maloney, W. J.
2011; 29 (3): 361-368
 - **Prediction of glycosaminoglycan content in human cartilage by age, T1 rho and T2 MRI** *OSTEOARTHRITIS AND CARTILAGE*
Keenan, K. E., Besier, T. F., Pauly, J. M., Han, E., Rosenberg, J., Smith, R. L., Delp, S. L., Beaupre, G. S., Gold, G. E.
2011; 19 (2): 171-179
 - **Viability and Proliferation of Pluripotential Cells Delivered to Tendon Repair Sites Using Bioactive Sutures-An In Vitro Study** *JOURNAL OF HAND SURGERY-AMERICAN VOLUME*
Yao, J., Korotkova, T., Smith, R. L.
2011; 36A (2): 252-258
 - **Viability and proliferation of pluripotential cells delivered to tendon repair sites using bioactive sutures--an in vitro study.** *journal of hand surgery*
Yao, J., Korotkova, T., Smith, R. L.
2011; 36 (2): 252-258
 - **Effects of orthopedic polymer particles on chemotaxis of macrophages and mesenchymal stem cells.** *Journal of biomedical materials research. Part A*
Huang, Z., Ma, T., Ren, P., Smith, R. L., Goodman, S. B.
2010; 94 (4): 1264-1269
 - **Effects of orthopedic polymer particles on chemotaxis of macrophages and mesenchymal stem cells** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Huang, Z., Ma, T., Ren, P., Smith, R. L., Goodman, S. B.
2010; 94A (4): 1264-1269
 - **Modulating osteogenesis of mesenchymal stem cells by modifying growth factor availability** *CYTOKINE*
Huang, Z., Ren, P., Ma, T., Smith, R. L., Goodman, S. B.

2010; 51 (3): 305-310

- **Surveillance of systemic trafficking of macrophages induced by UHMWPE particles in nude mice by noninvasive imaging** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Ren, P., Huang, Z., Ma, T., Biswal, S., Smith, R. L., Goodman, S. B.
2010; 94A (3): 706-711
- **Surveillance of systemic trafficking of macrophages induced by UHMWPE particles in nude mice by noninvasive imaging.** *Journal of biomedical materials research. Part A*
Ren, P., Huang, Z., Ma, T., Biswal, S., Smith, R. L., Goodman, S. B.
2010; 94 (3): 706-711
- **Effects of Tensile Strain and Fluid Flow on Osteoarthritic Human Chondrocyte Metabolism In Vitro** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Mawatari, T., Lindsey, D. P., Harris, A. H., Goodman, S. B., Maloney, W. J., Smith, R. L.
2010; 28 (7): 907-913
- **Polymethylmethacrylate particle exposure causes changes in p38 MAPK and TGF-beta signaling in differentiating MC3T3-E1 cells** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Ma, G. K., Chiu, R., Huang, Z., Pearl, J., Ma, T., Smith, R. L., Goodman, S. B.
2010; 94A (1): 234-240
- **Polymethylmethacrylate particle exposure causes changes in p38 MAPK and TGF-beta signaling in differentiating MC3T3-E1 cells.** *Journal of biomedical materials research. Part A*
Ma, G. K., Chiu, R., Huang, Z., Pearl, J., Ma, T., Smith, R. L., Goodman, S. B.
2010; 94 (1): 234-240
- **Flexor Tendon Tissue Engineering: Bioreactor Cyclic Strain Increases Construct Strength** *TISSUE ENGINEERING PART A*
Saber, S., Zhang, A. Y., Ki, S. H., Lindsey, D. P., Smith, R. L., Riboh, J., Pham, H., Chang, J.
2010; 16 (6): 2085-2090
- **Polymethylmethacrylate Particles Impair Osteoprogenitor Viability and Expression of Osteogenic Transcription Factors Runx2, Osterix, and Dlx5** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Chiu, R., Smith, K. E., Ma, G. K., Ma, T., Smith, R. L., Goodman, S. B.
2010; 28 (5): 571-577
- **POLYMETHYLMETHACRYLATE PARTICLES INHIBIT HUMAN MESENCHYMAL STEM CELL DIFFERENTIATION INTO OSTEOBLASTS** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Chiu, R., Smith, R. L., Goodman, S.
LIPPINCOTT WILLIAMS & WILKINS.2010: 109–
- **POLYMETHYLMETHACRYLATE PARTICLES INHIBIT HUMAN MESENCHYMAL STEM CELL DIFFERENTIATION INTO OSTEOBLASTS** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Chiu, R., Smith, R. L., Goodman, S.
LIPPINCOTT WILLIAMS & WILKINS.2010: 150–50
- **Biocompatibility of poly(ethylene glycol)/poly(acrylic acid) interpenetrating polymer network hydrogel particles in RAW 264.7 macrophage and MG-63 osteoblast cell lines.** *Journal of biomedical materials research. Part A*
Yim, E. S., Zhao, B., Myung, D., Kourtis, L. C., Frank, C. W., Carter, D., Smith, R. L., Goodman, S. B.
2009; 91 (3): 894-902
- **Biocompatibility of poly(ethylene glycol)/poly(acrylic acid) interpenetrating polymer network hydrogel particles in RAW 264.7 macrophage and MG-63 osteoblast cell lines** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Yim, E. S., Zhao, B., Myung, D., Kourtis, L. C., Frank, C. W., Carter, D., Smith, R. L., Goodman, S. B.
2009; 91A (3): 894-902
- **Change in Serum COMP Concentration Due to Ambulatory Load Is Not Related to Knee OA Status** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Muendermann, A., King, K. B., Smith, L., Andriacchi, T. P.
2009; 27 (11): 1408-1413
- **Analysis of Bone Mineral Density and Bone Turnover in the Presence of Polymethylmethacrylate Particles** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Zilber, S., Lee, S. W., Smith, R. L., Biswal, S., Goodman, S. B.

2009; 90B (1): 362-367

- **Flexor Tendon Tissue Engineering: Acellularized and Reseeded Tendon Constructs** *PLASTIC AND RECONSTRUCTIVE SURGERY*
Chong, A. K., Riboh, J., Smith, R. L., Lindsey, D. P., Pham, H. M., Chang, J.
2009; 123 (6): 1759-1766
- **Ultrahigh molecular weight polyethylene wear debris inhibits osteoprogenitor proliferation and differentiation in vitro.** *Journal of biomedical materials research. Part A*
Chiu, R., Ma, T., Smith, R. L., Goodman, S. B.
2009; 89 (1): 242-247
- **Efficacy of a p38 mitogen activated protein kinase inhibitor in mitigating an established inflammatory reaction to polyethylene particles in vivo** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Ma, T., Ren, P., Larsen, D. M., Suenaga, E., Zilber, S., Genovese, M., Smith, R. L., Goodman, S. B.
2009; 89A (1): 117-123
- **Ultrahigh molecular weight polyethylene wear debris inhibits osteoprogenitor proliferation and differentiation in vitro** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Chiu, R., Ma, T., Smith, R. L., Goodman, S. B.
2009; 89A (1): 242-247
- **Efficacy of a p38 mitogen activated protein kinase inhibitor in mitigating an established inflammatory reaction to polyethylene particles in vivo.** *Journal of biomedical materials research. Part A*
Ma, T., Ren, P., Larsen, D. M., Suenaga, E., Zilber, S., Genovese, M., Smith, R. L., Goodman, S. B.
2009; 89 (1): 117-123
- **In vivo murine model of continuous intramedullary infusion of particles--a preliminary study.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Ma, T., Ortiz, S. G., Huang, Z., Ren, P., Smith, R. L., Goodman, S. B.
2009; 88 (1): 250-253
- **In Vivo Murine Model of Continuous Intramedullary Infusion of Particles-A Preliminary Study** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Ma, T., Ortiz, S. G., Huang, Z., Ren, P., Smith, R. L., Goodman, S. B.
2009; 88B (1): 250-253
- **POLYMETHYLMETHACRYLATE PARTICLE-INDUCED SUPPRESSION OF OSTEOPROGENITOR DIFFERENTIATION INVOLVES IMPAIRMENT OF OSTEOPROGENITOR VIABILITY BY NECROSIS** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Chiu, R., Smith, R. L., Goodman, S.
LIPPINCOTT WILLIAMS & WILKINS.2009: 140-40
- **POLYMETHYLMETHACRYLATE PARTICLE-INDUCED SUPPRESSION OF OSTEOPROGENITOR DIFFERENTIATION INVOLVES INHIBITION OF RUNX2, OSTERIX, DLX5, AND beta-CATENIN EXPRESSION** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Chiu, R., Smith, R. L., Goodman, S.
LIPPINCOTT WILLIAMS & WILKINS.2009: 228-28
- **New Bone Formation by Murine Osteoprogenitor Cells Cultured on Corticocancellous Allograft Bone** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Nelson, E. R., Huang, Z., Ma, T., Lindsey, D., Jacobs, C., Smith, R. L., Goodman, S. B.
2008; 26 (12): 1660-1664
- **Continuous intramedullary polymer particle infusion using a murine femoral explant model.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Ortiz, S. G., Ma, T., Regula, D., Smith, R. L., Goodman, S. B.
2008; 87 (2): 440-446
- **Bioactive Sutures for Tendon Repair: Assessment of a Method of Delivering Pluripotential Embryonic Cells** *JOURNAL OF HAND SURGERY-AMERICAN VOLUME*
Yao, J., Korotkova, T., Riboh, J., Chong, A., Chang, J., Smith, R. L.
2008; 33A (9): 1558-1564

- **Continuous Intramedullary Polymer Particle Infusion Using a Murine Femoral Explant Model** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Ortiz, S. G., Ma, T., Regula, D., Smith, R. L., Goodman, S. B.
2008; 87B (2): 440-446
- **Bioactive sutures for tendon repair: assessment of a method of delivering pluripotential embryonic cells.** *journal of hand surgery*
Yao, J., Korotkova, T., Riboh, J., Chong, A., Chang, J., Smith, R. L.
2008; 33 (9): 1558-1564
- **An in vivo murine model of continuous intramedullary infusion of polyethylene particles** *BIOMATERIALS*
Ma, T., Huang, Z., Ren, P., McCally, R., Lindsey, D., Smith, R. L., Goodman, S. B.
2008; 29 (27): 3738-3742
- **Fluid shear stress magnitude, duration, and total applied load regulate gene expression and nitric oxide production in primary calvarial osteoblast cultures** *PLASTIC AND RECONSTRUCTIVE SURGERY*
Gonzalez, O., Fong, K. D., Trindade, M. C., Warren, S. M., Longaker, M. T., Smith, R. L.
2008; 122 (2): 419-428
- **Polymethylmethacrylate particles inhibit osteoblastic differentiation of MC3T3-E1 osteoprogenitor cells** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Chiu, R., Ma, T., Smith, R. L., Goodman, S. B.
2008; 26 (7): 932-936
- **Hydrostatic pressure enhances chondrogenic differentiation of human bone marrow stromal cells in osteochondrogenic medium** *ANNALS OF BIOMEDICAL ENGINEERING*
Wagner, D. R., Lindsey, D. P., Li, K. W., Tummala, P., Chandran, S. E., Smith, R. L., Longaker, M. T., Carter, D. R., Beaupre, G. S.
2008; 36 (5): 813-820
- **Quantitation of bone area in undecalcified frozen sections with fluorescent microscopy** *JOURNAL OF HISTOTECHNOLOGY*
Ren, P., Ma, T., Huang, Z., Smith, R. L., Goodman, S. B.
2008; 31 (1): 15-17
- **Validation and quantification of an in vitro model of continuous infusion of submicron-sized particles.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Ortiz, S. G., Ma, T., Epstein, N. J., Smith, R. L., Goodman, S. B.
2008; 84 (2): 328-333
- **Histomorphometric Analysis of the intramedullary bone response to titanium particles in wild-type and IL-1R1 knock-out mice: A preliminary study** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Bragg, B., Epstein, N., Ma, T., Goodman, S., Smith, R. L.
2008; 84B (2): 559-570
- **Validation and quantification of an in vitro model of continuous infusion of submicron-sized particles** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Ortiz, S. G., Ma, T., Epstein, N. J., Smith, R. L., Goodman, S. B.
2008; 84B (2): 328-333
- **Histomorphometric analysis of the intramedullary bone response to titanium particles in wild-type and IL-1R1 knock-out mice: a preliminary study.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Bragg, B., Epstein, N. J., Ma, T., Goodman, S., Smith, R. L.
2008; 84 (2): 559-570
- **Polymethylmethacrylate bone cement particles inhibit MC3T3-E1 osteoprogenitor differentiation in vitro** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Chiu, R., Smith, R. L., Goodman, S. B.
LIPPINCOTT WILLIAMS & WILKINS.2008: 242-43
- **Mouse femoral intramedullary injection model: Technique and microCT scan validation** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Zilber, S., Epstein, N., Lee, S., Larsen, M., Ma, T., Smith, R. L., Biswal, S., Goodman, S. B.
2008; 84B (1): 286-290

- **Mouse femoral intramedullary injection model: technique and microCT scan validation.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Zilber, S., Epstein, N. J., Lee, S., Larsen, M., Ma, T., Smith, R. L., Biswal, S., Goodman, S. B.
2008; 84 (1): 286-290
- **Ultrahigh molecular weight polyethylene wear debris suppresses osteoblast differentiation of bone marrow osteoprogenitors and MC3T3-E1 preosteoblasts in vitro** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Chiu, R., Smith, R. L., Goodman, S. B.
LIPPINCOTT WILLIAMS & WILKINS.2008: 243-43
- **The sequential expression profiles of growth factors from osteoprogenitors to osteoblasts In vitro** *TISSUE ENGINEERING*
Huang, Z., Nelson, E. R., Smith, R. L., Goodman, S. B.
2007; 13 (9): 2311-2320
- **Modulation of allograft incorporation by growth factors over a prolonged continuous infusion of duration in vivo** *BONE*
Ma, T., Gutnick, J., Salazar, B., Larsen, M. D., Suenaga, E., Zilber, S., Huang, Z., Huddleston, J., Smith, R. L., Goodman, S.
2007; 41 (3): 386-392
- **Effects of a p38 MAP kinase inhibitor on bone ingrowth and tissue differentiation in rabbit chambers.** *Journal of biomedical materials research. Part A*
Goodman, S. B., Ma, T., Spanogle, J., Chiu, R., Miyanishi, K., Oh, K., Plouhar, P., Wadsworth, S., Smith, R. L.
2007; 81 (2): 310-316
- **Effects of a p38 MAP kinase inhibitor on bone ingrowth and tissue differentiation in rabbit chambers** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Goodman, S. B., Ma, T., Spanogle, J., Chiu, R., Miyanishi, K., Oh, K., Plouhar, P., Wadsworth, S., Smith, R. L.
2007; 81A (2): 310-316
- **Kinetics of polymethylmethacrylate particle-induced inhibition of osteoprogenitor differentiation and proliferation** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Chiu, R., Ma, T., Smith, R. L., Goodman, S. B.
2007; 25 (4): 450-457
- **Inhibition of marrow stromal cell osteogenesis by polymethylmethacrylate wear particles and soluble factors released from polymethylmethacrylate particle-activated macrophages.** *8th Conference of the Western Student Medical Research Forum/Western Section of the American-Federation-for-Medical-Research/Western Association-of-Physicians/Western-Society-for-Pediatric-Research/Western-Society-for-Clinical-Investigation*
Chiu, R., Smith, R. L., Goodman, S. B.
LIPPINCOTT WILLIAMS & WILKINS.2007: S155-S155
- **Effects of orthopaedic wear particles on osteoprogenitor cells** *BIOMATERIALS*
Goodman, S. B., Ma, T., Chiu, R., Ramachandran, R., Smith, R. L.
2006; 27 (36): 6096-6101
- **Effects of local infusion of OP-1 on particle-induced and NSAID-induced inhibition of bone ingrowth in vivo** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Ma, T., Nelson, E. R., Mawatari, T., Oh, K. J., Larsen, D. M., Smith, R. L., Goodman, S. B.
2006; 79A (3): 740-746
- **Effects of local infusion of OP-1 on particle-induced and NSAID-induced inhibition of bone ingrowth in vivo.** *Journal of biomedical materials research. Part A*
Ma, T., Nelson, E. R., Mawatari, T., Oh, K. J., Larsen, D. M., Smith, R. L., Goodman, S. B.
2006; 79 (3): 740-746
- **Gene regulation ex vivo within a wrap-around tendon** *TISSUE ENGINEERING*
Li, K. W., Lindsey, D. P., Wagner, D. R., Giori, N. J., Schurman, D. J., Goodman, S. B., Smith, R. L., Carter, D. R., Beaupre, G. S.
2006; 12 (9): 2611-2618
- **Dose- and time-dependent effects of cyclic hydrostatic pressure on transforming growth factor-beta 3-induced chondrogenesis by adult human mesenchymal stem cells in vitro** *TISSUE ENGINEERING*
Miyanishi, K., Trindade, M. C., Lindsey, D. P., Beaupre, G. S., Carter, D. R., Goodman, S. B., Schurman, D. J., Smith, R. L.
2006; 12 (8): 2253-2262

- **Comparison of VEGF-producing cells in periprosthetic osteolysis** *BIOMATERIALS*
Spanogle, J. P., Miyanishi, K., Ma, T., Epstein, N. J., Smith, R. L., Goodman, S. B.
2006; 27 (21): 3882-3887
- **Polymethylmethacrylate particles inhibit osteoblastic differentiation of bone marrow osteoprogenitor cells.** *Journal of biomedical materials research. Part A*
Chiu, R., Ma, T., Smith, R. L., Goodman, S. B.
2006; 77 (4): 850-856
- **Polymethylmethacrylate particles inhibit osteoblastic differentiation of bone marrow osteoprogenitor cells** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Chiu, R., Ma, T., Smith, R. L., Goodman, S. B.
2006; 77A (4): 850-856
- **The effects of titanium and polymethylmethacrylate particles on osteoblast phenotypic stability.** *Journal of biomedical materials research. Part A*
Ramachandran, R., Goodman, S. B., Smith, R. L.
2006; 77 (3): 512-517
- **The effects of titanium and polymethylmethacrylate particles on osteoblast phenotypic stability** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Ramachandran, R., Goodman, S. B., Smith, R. L.
2006; 77A (3): 512-517
- **Effects of hydrostatic pressure and transforming growth factor-beta 3 on adult human mesenchymal stem cell chondrogenesis in vitro** *TISSUE ENGINEERING*
Miyanishi, K., Trindade, M. C., Lindsey, D. P., Beaupre, G. S., Carter, D. R., Goodman, S. B., Schurman, D. J., Smith, R. L.
2006; 12 (6): 1419-1428
- **Polymethylmethacrylate particles inhibit osteoblastic differentiation of bone marrow osteoprogenitor cells in vitro.** *Western Regional Meeting of the American-Federation-for-Medical-Research*
Chiu, R., Ma, T., Smith, R. L., Goodman, S. B.
LIPPINCOTT WILLIAMS & WILKINS.2006: S169-S169
- **Microarray analysis of mechanical shear effects on flexor tendon cells** *PLASTIC AND RECONSTRUCTIVE SURGERY*
Fong, K. D., Trindade, M. C., Wang, Z., Nacamuli, R. P., Pham, H., Fang, T. D., Song, H. J., Smith, L., Longaker, M. T., Chang, J.
2005; 116 (5): 1393-1404
- **UHMWPE wear debris upregulates mononuclear cell proinflammatory gene expression in a novel murine model of intramedullary particle disease** *ACTA ORTHOPAEDICA*
Epstein, N. J., Bragg, W. E., Ma, T., Spanogle, J., Smith, R. L., Goodman, S. B.
2005; 76 (3): 412-420
- **Interleukin-1 modulates periprosthetic tissue formation in an intramedullary model of particle-induced inflammation** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Epstein, N. J., Warme, B. A., Spanogle, J., Ma, T., Bragg, B., Smith, R. L., Goodman, S. B.
2005; 23 (3): 501-510
- **Temporal effects of a COX-2-selective NSAID on bone ingrowth.** *Journal of biomedical materials research. Part A*
Goodman, S. B., Ma, T., Mitsunaga, L., Miyanishi, K., Genovese, M. C., Smith, R. L.
2005; 72 (3): 279-287
- **Temporal effects of a COX-2-selective NSAID on bone ingrowth** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Goodman, S. B., Ma, T., Mitsunaga, L., Miyanishi, K., Genovese, M. C., Smith, R. L.
2005; 72A (3): 279-287
- **Pharmacologic modulation of periprosthetic osteolysis** *CLINICAL ORTHOPAEDICS AND RELATED RESEARCH*
Goodman, S. B., Trindade, M., Ma, T., Genovese, M., Smith, R. L.
2005: 39-45
- **Proinflammatory mediator expression in a novel murine model of titanium-particle-induced intramedullary inflammation.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Warme, B. A., Epstein, N. J., Trindade, M. C., Miyanishi, K., Ma, T., Saket, R. R., Regula, D., Goodman, S. B., Smith, R. L.

2004; 71 (2): 360-366

- **Proinflammatory mediator expression in a novel murine model of titanium-particle-induced intramedullary inflammation** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Warne, B. A., Epstein, N. J., Trindade, M. C., Miyanishi, K., Ma, T., Saket, R. R., Regula, D., Goodman, S. B., Smith, R. L.
2004; 71B (2): 360-366
- **Osteoarthritis - Current treatment and future prospects for surgical, medical, and biologic intervention** *Carl T Brighton Annual Workshop*
Schurman, D. J., Smith, R. L.
SPRINGER.2004: S183-S189
- **The mechanobiology of articular cartilage development and degeneration** *Carl T Brighton Annual Workshop*
Carter, D. R., Beaupre, G. S., Wong, M., Smith, R. L., Andriacchi, T. P., Schurman, D. J.
SPRINGER.2004: S69-S77
- **Pressure and shear differentially alter human articular chondrocyte metabolism - A review** *Carl T Brighton Annual Workshop*
Smith, R. L., Carter, D. R., Schurman, D. J.
SPRINGER.2004: S89-S95
- **Intermittent hydrostatic pressure inhibits matrix metalloproteinase and pro-inflammatory mediator release from human osteoarthritic chondrocytes in vitro** *OSTEOARTHRITIS AND CARTILAGE*
Trindade, M. C., Shida, J., Ikenoue, T., Lee, M. S., Lin, E. Y., Yaszay, B., Yerby, S., Goodman, S. B., Schurman, D. J., Smith, R. L.
2004; 12 (9): 729-735
- **Human interleukin-1-induced murine osteoclastogenesis is dependent on RANKL, but independent of TNF-alpha** *CYTOKINE*
Ma, T., Miyanishi, K., Suen, A., Epstein, N. J., Tomita, T., Smith, R. L., Goodman, S. B.
2004; 26 (3): 138-144
- **Effects of interleukin-10 on titanium particle-induced macrophage transcription factor activation and cytokine expression in vitro.** *Journal of biomedical materials research. Part A*
Wong, N., Trindade, M. C., Patel, R., Yaszay, B., Goodman, S. B., Smith, R. L.
2004; 69 (1): 40-46
- **Effects of interleukin-10 on titanium particle-induced macrophage transcription factor activation and cytokine expression in vitro** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Wong, N., Trindade, M. C., Patel, R., Yaszay, B., Goodman, S. B., Smith, R. L.
2004; 69A (1): 40-46
- **A framework for the in vivo pathomechanics of osteoarthritis at the knee** *ANNALS OF BIOMEDICAL ENGINEERING*
Andriacchi, T. P., Mundermann, A., Smith, R. L., Alexander, E. J., Dyrby, C. O., Koo, S.
2004; 32 (3): 447-457
- **Interleukin 1 receptor antagonist inhibits localized bone formation in vivo** *JOURNAL OF RHEUMATOLOGY*
Ma, T., Miyanishi, K., Trindade, M. C., Genovese, M., Regula, D., Smith, R. L., Goodman, S. B.
2003; 30 (12): 2547-2552
- **Expression of nitric oxide, peroxynitrite, and apoptosis in loose total hip replacements.** *Journal of biomedical materials research. Part A*
Puskas, B. L., Menke, N. E., Huie, P., Song, Y., Ecklund, K., Trindade, M. C., Smith, R. L., Goodman, S. B.
2003; 66 (3): 541-549
- **Expression of nitric oxide, peroxynitrite, and apoptosis in loose total hip replacements** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Puskas, B. L., Menke, N. E., Huie, P., Song, Y., Ecklund, K., Trindade, M. C., Smith, R. L., Goodman, S. B.
2003; 66A (3): 541-549
- **COX-2 selective inhibitors and bone** *INTERNATIONAL JOURNAL OF IMMUNOPATHOLOGY AND PHARMACOLOGY*
Goodman, S. B., Ma, T., Genovese, M., Smith, R. L.
2003; 16 (3): 201-205
- **Periprosthetic osteolysis: Induction of vascular endothelial growth factor from human monocyte/macrophages by orthopedic biomaterial particles** *49th Annual Meeting of the Orthopaedic-Research-Society*
Miyamishi, K., Trindade, M. C., Ma, T., Goodman, S. B., Schurman, D. J., Smith, R. L.

AMER SOC BONE & MINERAL RES.2003: 1573-83

- **Regulation of nitric oxide and bcl-2 expression by shear stress in human osteoarthritic Chondrocytes in vitro** *JOURNAL OF CELLULAR BIOCHEMISTRY*
Lee, M. S., Trindade, M. C., Ikenoue, T., Goodman, S. B., Schurman, D. J., Smith, R. L.
2003; 90 (1): 80-86
- **Local infusion of FGF-2 enhances bone ingrowth in rabbit chambers in the presence of polyethylene particles.** *Journal of biomedical materials research. Part A*
Goodman, S. B., Song, Y., Yoo, J. Y., Fox, N., Trindade, M. C., Kajiyama, G., Ma, T., Regula, D., Brown, J., Smith, R. L.
2003; 65 (4): 454-461
- **Local infusion of FGF-2 enhances bone ingrowth in rabbit chambers in the presence of polyethylene particles** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Goodman, S. B., Song, Y., Yoo, J. Y., Fox, N., Trindade, M. C., KAJIYAMA, G., Ma, T., Regula, D., Brown, J., Smith, R. L.
2003; 65A (4): 454-461
- **Human serum opsonization of orthopedic biomaterial particles: protein-binding and monocyte/macrophage activation in vitro.** *Journal of biomedical materials research. Part A*
Sun, D., Trindade, M. C., Nakashima, Y., Maloney, W. J., Goodman, S. B., Schurman, D. J., Smith, R. L.
2003; 65 (2): 290-298
- **Human serum opsonization of orthopedic biomaterial particles: Protein-binding and monocyte/macrophage activation in vitro** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Sun, D. H., Trindade, M. C., Nakashima, Y., Maloney, W. J., Goodman, S. B., Schurman, D. J., Smith, R. L.
2003; 65A (2): 290-298
- **Modulation of bone ingrowth and tissue differentiation by local infusion of interleukin-10 in the presence of ultra-high molecular weight polyethylene (UHMWPE) wear particles.** *Journal of biomedical materials research. Part A*
Goodman, S., Trindade, M., Ma, T., Lee, M., Wang, N., Ikenoue, T., Matsuura, I., Miyanishi, K., Fox, N., Regula, D., Genovese, M., Klein, J., Bloch, et al
2003; 65 (1): 43-50
- **Modulation of bone ingrowth and tissue differentiation by local infusion of interleukin-10 in the presence of ultra-high molecular weight polyethylene (UHMWPE) wear particles** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Goodman, S., Trindade, M., Ma, T., Lee, M., Wang, N., Ikenoue, T., Matsuura, I., Miyanishi, K., Fox, N., Regula, D., Genovese, M., Klein, J., Bloch, et al
2003; 65A (1): 43-50
- **The role of the TH1 and TH2 immune responses in loosening and osteolysis of cemented total hip replacements.** *Journal of biomedical materials research. Part A*
Arora, A., Song, Y., Chun, L., Huie, P., Trindade, M., Smith, R. L., Goodman, S.
2003; 64 (4): 693-697
- **The role of the TH1 and TH2 immune responses in loosening and osteolysis of cemented total hip replacements** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
Arora, A., Song, Y., Chun, L., Huie, P., Trindade, M., Smith, R. L., Goodman, S.
2003; 64A (4): 693-697
- **Intermittent hydrostatic pressure inhibits shear stress-induced nitric oxide release in human osteoarthritic chondrocytes in vitro** *JOURNAL OF RHEUMATOLOGY*
Lee, M. S., Trindade, M. C., Ikenoue, T., Schurman, D. J., Goodman, S. B., Smith, R. L.
2003; 30 (2): 326-328
- **Meehanoregulation of human articular chondrocyte aggrecan and type II collagen expression by intermittent hydrostatic pressure in vitro** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Ikenoue, T., Trindade, M. C., Lee, M. S., Lin, E. Y., Schurman, D. J., Goodman, S. B., Smith, R. L.
2003; 21 (1): 110-116
- **Protective effects of intermittent hydrostatic pressure on osteoarthritic chondrocytes activated by bacterial endotoxin in vitro** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Lee, M. S., Ikenoue, T., Trindade, M. C., Wong, N., Goodman, S. B., Schurman, D. J., Smith, R. L.
2003; 21 (1): 117-122

- **COX-2 selective NSAID decreases bone ingrowth in vivo** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Goodman, S., Ma, T., Trindade, M., Ikenoue, T., Matsuura, I., Wong, N., Fox, N., Genovese, M., Regula, D., Smith, R. L.
2002; 20 (6): 1164-1169
- **Factors influencing changes in articular cartilage following hemiarthroplasty in sheep** *JOURNAL OF ORTHOPAEDIC RESEARCH*
van der Meulen, M. C., Beaupre, G. S., Smith, R. L., Giddings, V. L., Allen, W. A., Athanasiou, K. A., Zhu, C. F., Mandell, J. A., Song, Y., Poser, R. D., Goodman, S. B.
2002; 20 (4): 669-675
- **Effects of shear stress on nitric oxide and matrix protein gene expression in human osteoarthritic chondrocytes in vitro** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Lee, M. S., Trindade, M. C., Ikenoue, T., Schurman, D. J., Goodman, S. B., Smith, R. L.
2002; 20 (3): 556-561
- **Fibroblast expression of C-C chemokines in response to orthopaedic biomaterial particle challenge in vitro** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Yaszay, B., Trindade, M. C., Lind, M., Goodman, S. B., Smith, R. L.
2001; 19 (5): 970-976
- **Interleukin-10 inhibits polymethylmethacrylate particle induced interleukin-6 and tumor necrosis factor-alpha release by human monocyte/macrophages in vitro** *BIOMATERIALS*
Trindade, M. C., Lind, M., Nakashima, Y., Sun, D. H., Goodman, S. B., Schurman, D. J., Smith, R. L.
2001; 22 (15): 2067-2073
- **In vitro reaction to orthopaedic biomaterials by macrophages and lymphocytes isolated from patients undergoing revision surgery** *BIOMATERIALS*
Trindade, M. C., Lind, M., Sun, D., Schurman, D. J., Goodman, S. B., Smith, R. L.
2001; 22 (3): 253-259
- **Effects of local infusion of TGF beta on bone ingrowth in rabbit chambers** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Goodman, S., Song, Y., Chun, L., Aspenberg, P., Plouhar, P., Glancy, T., Regula, D., Smith, R. L.
2000; 53 (5): 475-479
- **G-protein activity requirement for polymethylmethacrylate and titanium particle-induced fibroblast interleukin-6 and monocyte chemoattractant protein-1 release in vitro** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Trindade, M. C., Schurman, D. J., Maloney, W. J., Goodman, S. B., Smith, R. L.
2000; 51 (3): 360-368
- **Induction of interleukin-6 release in human osteoblast-like cells exposed to titanium particles in vitro** *CALCIFIED TISSUE INTERNATIONAL*
Shida, J., Trindade, M. C., Goodman, S. B., Schurman, D. J., Smith, R. L.
2000; 67 (2): 151-155
- **Monocyte migration inhibitory factor synthesis and gene expression in particle-activated macrophages** *CYTOKINE*
Lind, M., Trindade, M. C., Schurman, D. J., Goodman, S. B., Smith, R. L.
2000; 12 (7): 909-913
- **Time-dependent effects of intermittent hydrostatic pressure on articular chondrocyte type II collagen and aggrecan mRNA expression** *JOURNAL OF REHABILITATION RESEARCH AND DEVELOPMENT*
Smith, R. L., Lin, J., Trindade, M. C., Shida, J., KAJIYAMA, G., Vu, T., Hoffman, A. R., van der Meulen, M. C., Goodman, S. B., Schurman, D. J., Carter, D. R.
2000; 37 (2): 153-161
- **Effects of shear stress on articular chondrocyte metabolism** *1st International Symposium on Mechanobiology - Cartilage and Chondrocyte*
Smith, R. L., Trindade, M. C., Ikenoue, T., Mohtai, M., Das, P., Carter, D. R., Goodman, S. B., Schurman, D. J.
IOS PRESS.2000: 95-107
- **Interleukin-4 inhibits granulocyte-macrophage colony-stimulating factor, interleukin-6, and tumor necrosis factor-alpha expression by human monocytes in response to polymethylmethacrylate particle challenge in vitro** *44th Annual Meeting of the Orthopaedic-Research-Society*
Trindade, M. C., Nakashima, Y., Lind, M., Sun, D. H., Goodman, S. B., Maloney, W. J., Schurman, D. J., Smith, R. L.
JOHN WILEY & SONS INC.1999: 797-802
- **Degradative enzymes in osteoarthritis.** *Frontiers in bioscience : a journal and virtual library*
Smith, R. L.

1999; 4: D704-12

- **Interferon-gamma exacerbates polymethylmethacrylate particle-induced interleukin-6 release by human monocyte/macrophages in vitro** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Trindade, M. C., Lind, M., Goodman, S. B., Maloney, W. J., Schurman, D. J., Smith, R. L.
1999; 47 (1): 1-7
- **Proinflammatory mediator release in response to particle challenge: Studies using the bone harvest chamber** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Trindade, M. C., Song, Y., Aspenberg, P., Smith, R. L., Goodman, S. B.
1999; 48 (4): 434-439
- **Chemotaxis and activation of particle-challenged human monocytes in response to monocyte migration inhibitory factor and C-C chemokines** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Lind, M., Trindade, M. C., Nakashima, Y., Schurman, D. J., Goodman, S. B., Smith, R. L.
1999; 48 (3): 246-250
- **Signaling pathways for tumor necrosis factor-alpha and interleukin-6 expression in human macrophages exposed to titanium-alloy particulate debris in vitro.** *journal of bone and joint surgery. American volume*
Nakashima, Y., Sun, D. H., Trindade, M. C., Maloney, W. J., Goodman, S. B., Schurman, D. J., Smith, R. L.
1999; 81 (5): 603-615
- **Signaling pathways for tumor necrosis factor-alpha and interleukin-6 expression in human macrophages exposed to titanium-alloy particulate debris in vitro** *JOURNAL OF BONE AND JOINT SURGERY-AMERICAN VOLUME*
Nakashima, Y., Sun, D. H., Trindade, M. C., Maloney, W. J., Goodman, S. B., Schurman, D. J., Smith, R. L.
1999; 81A (5): 603-615
- **Induction of macrophage C-C chemokine expression by titanium alloy and bone cement particles.** *journal of bone and joint surgery. British volume*
Nakashima, Y., Sun, D. H., Trindade, M. C., Chun, L. E., Song, Y., Goodman, S. B., Schurman, D. J., Maloney, W. J., Smith, R. L.
1999; 81 (1): 155-162
- **Induction of macrophage C-C chemokine expression by titanium alloy and bone cement particles** *JOURNAL OF BONE AND JOINT SURGERY-BRITISH VOLUME*
Nakashima, Y., Sun, D. H., Trindade, M. C., Chun, L. E., Song, Y., Goodman, S. B., Schurman, D. J., Maloney, W. J., Smith, R. L.
1999; 81B (1): 155-162
- **Expression of inflammatory mediators by human macrophages in response to particulate debris in vitro** *28th Annual Meeting of the Japanese-Society-for-Replacement-Arthroplasty*
Nakashima, Y., Sun, D. H., Trindade, M., Maloney, W. J., Goodman, S. B., Schurman, D. J., Smith, R. L., Ushijima, M., Iwamoto, Y.
SPRINGER-VERLAG TOKYO.1999: 65-75
- **Effects of serum protein opsonization on cytokine release by titanium-alloy particles** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Maloney, W. J., Sun, D. H., Nakashima, Y., James, R., Smith, R. L.
1998; 41 (3): 371-376
- **Effects of particulate debris on macrophage-dependent fibroblast stimulation in coculture.** *journal of bone and joint surgery. British volume*
Lind, M., Trindade, M. C., Yaszay, B., Goodman, S. B., Smith, R. L.
1998; 80 (5): 924-930
- **Effects of particulate debris on macrophage-dependent fibroblast stimulation in coculture** *JOURNAL OF BONE AND JOINT SURGERY-BRITISH VOLUME*
Lind, M., Trindade, M. C., Yaszay, B., Goodman, S. B., Smith, R. L.
1998; 80B (5): 924-930
- **In vitro, in vivo, and tissue retrieval studies on particulate debris** *CLINICAL ORTHOPAEDICS AND RELATED RESEARCH*
Goodman, S. B., Lind, M., Song, Y., Smith, R. L.
1998: 25-34
- **Induction of matrix metalloproteinase expression in human macrophages by orthopaedic particulate debris in vitro** *JOURNAL OF BONE AND JOINT SURGERY-BRITISH VOLUME*
Nakashima, Y., Sun, D. H., Maloney, W. J., Goodman, S. B., Schurman, D. J., Smith, R. L.
1998; 80B (4): 694-700

- **Induction of matrix metalloproteinase expression in human macrophages by orthopaedic particulate debris in vitro.** *journal of bone and joint surgery. British volume*
Nakashima, Y., Sun, D. H., Maloney, W. J., Goodman, S. B., Schurman, D. J., Smith, R. L.
1998; 80 (4): 694-700
- **Effects of polyethylene particles on tissue surrounding knee arthroplasties in rabbits** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Sacomen, D., Smith, R. L., Song, Y., Fornasier, V., Goodman, S. B.
1998; 43 (2): 123-130
- **Joint infection.** *Acta orthopaedica Scandinavica. Supplementum*
Schurman, D. J., Smith, R. L.
1998; 281: 14-16
- **Joint infection** *Meeting on the Bone and Joint Decade 2000-2010 for Prevention and Treatment of Musculo-Skeletal Disorders*
Schurman, D. J., Smith, R. L.
TAYLOR & FRANCIS AS.1998: 14-16
- **Staphylococcal septic arthritis: Antibiotic and nonsteroidal anti-inflammatory drug treatment in a rabbit model** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Smith, R. L., KAJIYAMA, G., Schurman, D. J.
1997; 15 (6): 919-926
- **Stabilized analogs of thymopentin .3. Evaluation of ketomethylene pseudopeptides for antiarthritic properties** *JOURNAL OF MEDICINAL CHEMISTRY*
Smith, R. L., Dousman, L., Waud, W. R., DeGraw, J. I.
1997; 40 (15): 2407-2411
- **Stabilized analogs of thymopentin .1. 4,5-ketomethylene pseudopeptides** *JOURNAL OF MEDICINAL CHEMISTRY*
DeGraw, J. I., ALMQUIST, R. G., HIEBERT, C. K., Colwell, W. T., Crase, J., Hayano, T., Judd, A. K., Dousman, L., Smith, R. L., Waud, W. R., Uchida, I.
1997; 40 (15): 2386-2397
- **Stabilized analogs of thymopentin .2. 1,2- and 3,4-ketomethylene pseudopeptides** *JOURNAL OF MEDICINAL CHEMISTRY*
DeGraw, J. I., ALMQUIST, R. G., HIEBERT, C. K., Judd, A. K., Dousman, L., Smith, R. L., Waud, W. R., Uchida, I.
1997; 40 (15): 2398-2406
- **Analogues of methotrexate in rheumatoid arthritis .2. Effects of 5-deazaaminopterin, 5,10-dideazaaminopterin, and analogues on type II collagen-induced arthritis in mice** *JOURNAL OF MEDICINAL CHEMISTRY*
Piper, J. R., DeGraw, J. I., Colwell, W. T., Johnson, C. A., Smith, R. L., Waud, W. R., Sirotnak, F. M.
1997; 40 (3): 377-384
- **Analogues of methotrexate in rheumatoid arthritis .1. Effects of 10-deazaaminopterin analogues on type II collagen-induced arthritis in mice** *JOURNAL OF MEDICINAL CHEMISTRY*
DeGraw, J. I., Colwell, W. T., Crase, J., Smith, R. L., Piper, J. R., Waud, W. R., Sirotnak, F. M.
1997; 40 (3): 370-376
- **Nitric oxide and G proteins mediate the response of bovine articular chondrocytes to fluid-induced shear** *41st Annual Meeting of the Orthopaedic-Research-Society*
Das, P., Schurman, D. J., Smith, R. L.
WILEY-BLACKWELL.1997: 87-93
- **Analogs of methotrexate in rheumatoid arthritis** *11th International Symposium on Pteridines and Folates*
DeGraw, J. I., Colwell, W. T., Piper, J. R., Waud, W. R., Sirotnak, F. M., Smith, R. L.
BLACKWELL WISSENSCHAFTS-VERLAGGMBH.1997: 127-132
- **Osteoarthritis: Differential expression of matrix metalloproteinase-9 mRNA in nonfibrillated and fibrillated cartilage** *40th Annual Meeting of the Orthopaedic-Research-Society*
Tsuchiya, K., Maloney, W. J., Vu, T., Hoffman, A. R., Huie, P., Sibley, R., Schurman, D. J., Smith, R. L.
WILEY-BLACKWELL.1997: 94-100
- **Anti-lipid A antibodies in childhood arthritis: Methods of immobilization affect quantitation and crossreactivity measured by ELISA** *JOURNAL OF RHEUMATOLOGY*
Miller, J. J., Zhu, S. L., Smith, R. L.

1996; 23 (12): 2125-2131

- **Osteoblast adhesion to orthopaedic implant alloys: Effects of cell adhesion molecules and diamond-like carbon coating** *21st Annual Meeting of the Society-for-Biomaterials*
Kornu, R., Maloney, W. J., Kelly, M. A., Smith, R. L.
JOHN WILEY & SONS INC.1996: 871-77
- **RT-PCR analysis of MMP-9 expression in human articular cartilage chondrocytes and synovial fluid cells** *BIOTECHNIC & HISTOCHEMISTRY*
Tsuchiya, K., Maloney, W. J., Vu, T., Hoffman, A. R., Schurman, D. J., Smith, R. L.
1996; 71 (4): 208-213
- **In vitro activation of human fibroblasts by retrieved titanium alloy wear debris** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Manlapaz, M., Maloney, W. J., Smith, R. L.
1996; 14 (3): 465-472
- **Effect of size, concentration, surface area, and volume of polymethylmethacrylate particles on human macrophages in vitro** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Gonzalez, O., Smith, R. L., Goodman, S. B.
1996; 30 (4): 463-473
- **Chondrocytes from osteoarthritic cartilage have increased expression of insulin-like growth factor I (IGF-I) and IGF-binding protein-3 (IGFBP-3) and -5, but not IGF-II or IGFBP-4** *JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM*
Olney, R. C., Tsuchiya, K., Wilson, D. M., Mohtai, M., Maloney, W. J., Schurman, D. J., Smith, R. L.
1996; 81 (3): 1096-1103
- **Human macrophage response to retrieved titanium alloy particles in vitro** *CLINICAL ORTHOPAEDICS AND RELATED RESEARCH*
Maloney, W. J., James, R. E., Smith, R. L.
1996: 268-278
- **Periprosthetic osteolysis in total hip arthroplasty: The role of particulate wear debris** *1995 Instructional Course Lectures, at the Annual Meeting of the American-Academy-of-Orthopaedic-Surgeons*
Maloney, W. J., Smith, R. L.
AMER ACAD ORTHOPAEDIC SURGEONS.1996: 171-182
- **In vitro stimulation of articular chondrocyte mRNA and extracellular matrix synthesis by hydrostatic pressure** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Smith, R. L., RUSK, S. F., Ellison, B. E., Wessells, P., Tsuchiya, K., Carter, D. R., CALER, W. E., Sandell, L. J., Schurman, D. J.
1996; 14 (1): 53-60
- **ISOLATION AND CHARACTERIZATION OF WEAR PARTICLES GENERATED IN PATIENTS WHO HAVE HAD FAILURE OF A HIP-ARTHROPLASTY WITHOUT CEMENT** *JOURNAL OF BONE AND JOINT SURGERY-AMERICAN VOLUME*
Maloney, W. J., Smith, R. L., Schmalzried, T. P., Chiba, J., HUENE, D., Rubash, H.
1995; 77 (9): 1301-1310
- **INTERLEUKIN-1 AND TUMOR-NECROSIS-FACTOR-ALPHA INCREASE INSULIN-LIKE GROWTH FACTOR-BINDING PROTEIN-3 (IGFBP-3) PRODUCTION AND IGFBP-3 PROTEASE ACTIVITY IN HUMAN ARTICULAR CHONDROCYTES** *JOURNAL OF ENDOCRINOLOGY*
Olney, R. C., Wilson, D. M., Mohtai, M., Fielder, P. J., Smith, R. L.
1995; 146 (2): 279-286
- **NEW ANALOGS OF METHOTREXATE IN CANCER AND ARTHRITIS** *CURRENT MEDICINAL CHEMISTRY*
DeGraw, J. I., Colwell, W. T., Piper, J. R., Sirotnak, F. M., Smith, R. L.
1995; 2 (2): 630-653
- **NONSTEROIDAL ANTIINFLAMMATORY DRUGS - EFFECTS ON NORMAL AND INTERLEUKIN-1 TREATED HUMAN ARTICULAR CHONDROCYTE METABOLISM IN-VITRO** *JOURNAL OF RHEUMATOLOGY*
Smith, R. L., KAJIYAMA, G., Lane, N. E.
1995; 22 (6): 1130-1137
- **HOLMIUM - YAG LASER EFFECTS ON ARTICULAR-CARTILAGE METABOLISM IN-VITRO** *Conference on Laser Surgery: Advanced Characterization, Therapeutics, and Systems IV*
Smith, R. L., Montgomery, L., Fanton, G., Dillingham, M., Schurman, D. J.
SPIE - INT SOC OPTICAL ENGINEERING.1994: 149-153

- **Lysosomal enzyme production at the interface surrounding loose and well-fixed cemented tibial hemiarthroplasties in the rabbit knee.** *Journal of investigative surgery*
Goodman, S. B., Kang, T., Smith, R. L.
1993; 6 (5): 413-418
- **THE EFFECTS OF BONE-CEMENT POWDER ON HUMAN ADHERENT MONOCYTES MACROPHAGES IN-VITRO** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH*
Davis, R. G., Goodman, S. B., Smith, R. L., Lerman, J. A., Williams, R. J.
1993; 27 (8): 1039-1046
- **PRODUCTION AND HORMONAL-REGULATION OF INSULIN-LIKE GROWTH-FACTOR BINDING-PROTEINS IN BOVINE CHONDROCYTES** *ENDOCRINOLOGY*
Olney, R. C., Smith, R. L., Kee, Y., Wilson, D. M.
1993; 133 (2): 563-570
- **EXPRESSION OF 92-KD TYPE-IV COLLAGENASE GELATINASE (GELATINASE-B) IN OSTEOARTHRITIC CARTILAGE AND ITS INDUCTION IN NORMAL HUMAN ARTICULAR-CARTILAGE BY INTERLEUKIN-1** *JOURNAL OF CLINICAL INVESTIGATION*
Mohtai, M., Smith, R. L., Schurman, D. J., Tsuji, Y., Torti, F. M., Hutchinson, N. I., STETLERSTEVENSON, W. G., Goldberg, G. I.
1993; 92 (1): 179-185
- **Fibroblast response to metallic debris in vitro. Enzyme induction cell proliferation, and toxicity.** *journal of bone and joint surgery. American volume*
Maloney, W. J., Smith, R. L., CASTRO, F., Schurman, D. J.
1993; 75 (6): 835-844
- **FIBROBLAST RESPONSE TO METALLIC DEBRIS IN-VITRO - ENZYME-INDUCTION, CELL-PROLIFERATION, AND TOXICITY** *JOURNAL OF BONE AND JOINT SURGERY-AMERICAN VOLUME*
Maloney, W. J., Smith, R. L., CASTRO, F., Schurman, D. J.
1993; 75A (6): 835-844
- **PRODUCTION AND HORMONAL-REGULATION OF INSULIN-LIKE GROWTH-FACTOR BINDING-PROTEINS IN BOVINE CHONDROCYTES**
Olney, R. C., Smith, R. L., Kee, Y., KAJIYAMA, G., Wilson, D. M.
SLACK INC.1992: A81-A81
- **RABBIT KNEE IMMOBILIZATION - BONE REMODELING PRECEDES CARTILAGE DEGRADATION** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Smith, R. L., Thomas, K. D., Schurman, D. J., Carter, D. R., Wong, M., VANDERMEULEN, M. C.
1992; 10 (1): 88-95
- **INHIBITION OF INTERLEUKIN-1 INDUCED CHONDROCYTE PROTEASE ACTIVITY BY A CORTICOSTEROID AND A NONSTEROIDAL ANTIINFLAMMATORY DRUG** *JOURNAL OF RHEUMATOLOGY*
Lane, N. E., Williams, R. J., Schurman, D. J., Smith, R. L.
1992; 19 (1): 135-139
- **PURIFIED STAPHYLOCOCCAL CULTURE-MEDIUM STIMULATES NEUTRAL METALLOPROTEASE SECRETION FROM HUMAN ARTICULAR-CARTILAGE** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Williams, R. J., Smith, R. L., Schurman, D. J.
1991; 9 (2): 258-265
- **Mechanical overload of a single compartment induces early degenerative changes in the rabbit knee: a preliminary study.** *Journal of investigative surgery*
Goodman, S. B., Lee, J., Smith, R. L., Csongradi, J. C., Fornasier, V. L.
1991; 4 (2): 161-170
- **SOLUBLE MEDIATORS OF ARTICULAR-CARTILAGE DEGRADATION IN JUVENILE RHEUMATOID-ARTHRITIS** *CLINICAL ORTHOPAEDICS AND RELATED RESEARCH*
Smith, R. L.
1990: 31-37
- **GLUCOSAMINIDASE, GALACTOSAMINIDASE, AND GLUCURONIDASE IN THE GROWTH PLATE** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Gamble, J. G., HAIMSON, R., Smith, R. L.
1990; 8 (5): 764-768

- **QUANTITATION AND RELATIVE DISTRIBUTION OF EXTRACELLULAR-MATRIX IN STAPHYLOCOCCUS-EPIDERMIDIS BIOFILM** *JOURNAL OF ORTHOPAEDIC RESEARCH*
VANPETT, K., Schurman, D. J., Smith, R. L.
1990; 8 (3): 321-327
- **SEPTIC ARTHRITIS - STAPHYLOCOCCAL INDUCTION OF CHONDROCYTE PROTEOLYTIC ACTIVITY** *ARTHRITIS AND RHEUMATISM*
Williams, R. J., Smith, R. L., Schurman, D. J.
1990; 33 (4): 533-541
- **STIMULATION OF ADULT CHONDROCYTE METABOLISM BY A THYROID-DERIVED FACTOR** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Jones, D. G., Smith, R. L.
1990; 8 (2): 227-233
- **INFLAMMATION AND TISSUE-REPAIR** *WORKSHOP ON SPORTS-INDUCED INFLAMMATION : CLINICAL AND BASIC SCIENCE CONCEPTS*
Schurman, D. J., Goodman, S. B., Smith, R. L.
AMER ACAD ORTHOPAEDIC SURGEONS.1990: 277-284
- **BIOCHEMICAL-MECHANISMS UNDERLYING CARTILAGE DESTRUCTION IN INFECTIOUS ARTHRITIS** *4TH BRISTOL-MYERS/ZIMMER ORTHOPAEDIC SYMP ON ARTICULAR CARTILAGE AND KNEE JOINT FUNCTION : BASIC SCIENCE AND ARTHROSCOPY*
Smith, R. L., Schurman, D. J.
RAVEN PRESS.1990: 197-211
- **GROWTH-HORMONE STIMULATES INSULIN-LIKE GROWTH FACTOR-I ACTIONS ON ADULT ARTICULAR CHONDROCYTES** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Smith, R. L., PALATHUMPAT, M. V., Ku, C. W., Hintz, R. L.
1989; 7 (2): 198-207
- **INDUCTION OF ARTICULAR-CARTILAGE DEGRADATION BY RECOMBINANT INTERLEUKIN 1-ALPHA AND 1-BETA** *CONNECTIVE TISSUE RESEARCH*
Smith, R. L., Allison, A. C., Schurman, D. J.
1989; 18 (4): 307-316
- **QUANTITATION OF GLYCOCALYX PRODUCTION IN COAGULASE-NEGATIVE STAPHYLOCOCCUS** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Tsai, C. L., Schurman, D. J., Smith, R. L.
1988; 6 (5): 666-670
- **TIME-VARYING MAGNETIC-FIELDS - EFFECTS OF ORIENTATION ON CHONDROCYTE PROLIFERATION** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Elliott, J. P., Smith, R. L., Block, C. A.
1988; 6 (2): 259-264
- **BIOCHEMISTRY OF FUSION MASS CONSOLIDATION IN THE SHEEP SPINE** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Slater, R., Nagel, D., Smith, R. L.
1988; 6 (1): 138-144
- **The effect of antibiotics on the destruction of cartilage in experimental infectious arthritis.** *journal of bone and joint surgery. American volume*
Smith, R. L., Schurman, D. J., KAJIYAMA, G., Mell, M., Gilkerson, E.
1987; 69 (7): 1063-1068
- **THE EFFECT OF ANTIBIOTICS ON THE DESTRUCTION OF CARTILAGE IN EXPERIMENTAL INFECTIOUS ARTHRITIS** *JOURNAL OF BONE AND JOINT SURGERY-AMERICAN VOLUME*
Smith, R. L., Schurman, D. J., KAJIYAMA, G., Mell, M., Gilkerson, E.
1987; 69A (7): 1063-1068
- **Surgical approach to the management of septic arthritis.** *Orthopaedic review*
Schurman, D. J., Smith, R. L.
1987; 16 (4): 241-245
- **BIOCHEMISTRY AND ANTIGENICITY OF OSTEOARTHRITIC AND RHEUMATOID CARTILAGE** *JOURNAL OF ORTHOPAEDIC RESEARCH*
Schurman, D. J., PALATHUMPAT, M. V., DeSilva, A., KAJIYAMA, G., Smith, R. L.

1986; 4 (3): 255-262

- **CHARACTERIZATION OF SPECIFIC INSULIN-LIKE GROWTH FACTOR-L SOMATOMEDIN-C RECEPTORS ON HIGH-DENSITY, PRIMARY MONOLAYER-CULTURES OF BOVINE ARTICULAR CHONDROCYTES**

Watanabe, N., DOLLAR, L. A., Hintz, R. L., Smith, R. L., Rosenfeld, R. G.

SLACK INC.1984: A54-A54