

Stanford



Qi Gao

Instructor, Orthopaedic Surgery

Bio

ACADEMIC APPOINTMENTS

- Instructor, Orthopaedic Surgery

Publications

PUBLICATIONS

- **Targeting cellular senescence in progenitor cells as a strategy to enhance bone regeneration by cell therapies: a systematic review of pre-clinical investigations.** *Stem cell research & therapy*
Morita, M., Damle, E. B., Shinohara, I., Murayama, M., Susuki, Y., Gao, Q., Ma, C., Chow, S. K., Goodman, S. B.
2025; 16 (1): 669
- **Single-cell RNA sequencing reveals early cell dynamics of MSC-based therapy in long bone critical-size defects in mice** *JOURNAL OF ORTHOPAEDIC TRANSLATION*
Zhang, N., Yuan, J., Li, X., Su, N., Wang, Y., Chen, S., Huang, E., Gao, Q., Yang, F., Chow, S., Goodman, S. B.
2025; 55: 121-131
- **Can alternatives to animal testing yield useful information regarding biological mechanisms and drug discovery?** *Journal of orthopaedic translation*
Gao, Q., Chow, S. K., Shinohara, I., Murayama, M., Susuki, Y., Morita, M., Ma, C., Goodman, S. B.
2025; 55: 132-145
- **Single-cell RNA sequencing reveals early cell dynamics of MSC-based therapy in long bone critical-size defects in mice.** *Journal of orthopaedic translation*
Zhang, N., Yuan, J., Li, X., Su, N., Wang, Y., Chen, S., Huang, E., Gao, Q., Yang, F., Chow, S. K., Goodman, S. B.
2025; 55: 121-131
- **Can alternatives to animal testing yield useful information regarding biological mechanisms and drug discovery?** *JOURNAL OF ORTHOPAEDIC TRANSLATION*
Gao, Q., Chow, S., Shinohara, I., Murayama, M., Susuki, Y., Morita, M., Ma, C., Goodman, S. B.
2025; 55: 132-145
- **Metformin Modulates Oxidative Stress in Murine Mesenchymal Stem Cells In Vitro and Alleviates Corticosteroid-Induced Inflammation and Impairment of Bone Formation** *HSS JOURNAL*
Shinohara, I., Susuki, Y., Murayama, M., Gao, Q., Cekuc, M., Ergul, Y., Morita, M., Pius, A. K., Ma, C., Chow, S., Goodman, S. B.
2025
- **Metformin Modulates Oxidative Stress in Murine Mesenchymal Stem Cells In Vitro and Alleviates Corticosteroid-Induced Inflammation and Impairment of Bone Formation.** *HSS journal : the musculoskeletal journal of Hospital for Special Surgery*
Shinohara, I., Susuki, Y., Murayama, M., Gao, Q., Cekuc, M. S., Ergul, Y. S., Morita, M., Pius, A. K., Ma, C., Chow, S. K., Goodman, S. B.
2025: 15563316251351031
- **Optimization of Cytometry by Time-of-Flight Staining for Peripheral Blood and Bone Marrow Samples.** *Tissue engineering. Part C, Methods*

- Susuki, Y., Shinohara, I., Murayama, M., Morita, M., Ma, C., Pius, A. K., Gao, Q., Chow, S. K., Goodman, S. B.
2025; 31 (7): 261-270
- **AN INNERVATED SYNOVIUM-CARTILAGE CHIP FOR MODELING KNEE JOINT INFLAMMATION AND ASSOCIATED PAIN**
Makarczyk, M., Preisegger, M., Gao, Q., Bunnell, B., Goodman, S., Michael, G., Lin, H.
ELSEVIER SCI LTD.2025
 - **Pathophysiology of the Effects of Oxidative Stress on the Skeletal System.** *Journal of orthopaedic research : official publication of the Orthopaedic Research Society*
Shinohara, I., Morita, M., Chow, S. K., Murayama, M., Susuki, Y., Gao, Q., Goodman, S. B.
2025
 - **Macrophage phenotypes modulate neoangiogenesis and fibroblast profiles in synovial-like organoid cultures.** *Osteoarthritis and cartilage*
Gao, Q., Zhang, X., Makarczyk, M. J., Wong, L. E., Quig, M. S., Shinohara, I., Murayama, M., Chow, S. K., Bunnell, B. A., Lin, H., Goodman, S. B.
2025
 - **Personalized bone organoid using iPSC-derived cells for clinically relevant applications.** *Research square*
Gao, Q., Teissier, V., Zhu, W., Makarczyk, M. J., Shinohara, I., Murayama, M., Susuki, Y., Chow, S. K., Bunnell, B. A., Wu, J., Lin, H., Goodman, S. B.
2024
 - **Metformin Modulates Cell Oxidative Stress to Mitigate Corticosteroid-Induced Suppression of Osteogenesis in a 3D Model.** *Journal of inflammation research*
Cekuc, M. S., Ergul, Y. S., Pius, A. K., Meagan, M., Shinohara, I., Murayama, M., Susuki, Y., Ma, C., Morita, M., Chow, S. K., Bunnell, B. A., Lin, H., Gao, et al
2024; 17: 10383-10396
 - **3D Culture of MSCs for Clinical Application** *BIOENGINEERING-BASEL*
Gao, Q., Cekuc, M., Ergul, Y., Pius, A. K., Shinohara, I., Murayama, M., Susuki, Y., Ma, C., Morita, M., Chow, S., Goodman, S. B.
2024; 11 (12)
 - **Quantification of Empty Lacunae in Tissue Sections of Osteonecrosis of the Femoral Head Using YOLOv8 Artificial Intelligence Model.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Shinohara, I., Inui, A., Murayama, M., Susuki, Y., Gao, Q., Chow, S. K., Mifune, Y., Matsumoto, T., Kuroda, R., Goodman, S. B.
2024; 112 (12): e35512
 - **3D Culture of MSCs for Clinical Application.** *Bioengineering (Basel, Switzerland)*
Gao, Q., Cekuc, M. S., Ergul, Y. S., Pius, A. K., Shinohara, I., Murayama, M., Susuki, Y., Ma, C., Morita, M., Chow, S. K., Goodman, S. B.
2024; 11 (12)
 - **Leveraging AI models for lesion detection in osteonecrosis of the femoral head and T1-weighted MRI generation from radiographs.** *Journal of orthopaedic research : official publication of the Orthopaedic Research Society*
Shinohara, I., Inui, A., Hwang, K., Murayama, M., Susuki, Y., Uno, T., Gao, Q., Morita, M., Chow, S. K., Tsubosaka, M., Mifune, Y., Matsumoto, T., Kuroda, et al
2024
 - **The advantages and shortcomings of stem cell therapy for enhanced bone healing.** *Tissue engineering. Part C, Methods*
Chow, S. K., Gao, Q., Pius, A., Morita, M., Ergul, Y. S., Murayama, M., Shinohara, I., Cekuc, M. S., Ma, C., Susuki, Y., Goodman, S. B.
2024
 - **The interactions of macrophages, lymphocytes, and mesenchymal stem cells during bone regeneration.** *Bone & joint research*
Murayama, M., Chow, S. K., Lee, M. L., Young, B., Ergul, Y. S., Shinohara, I., Susuki, Y., Toya, M., Gao, Q., Goodman, S. B.
2024; 13 (9): 462-473
 - **T cells and macrophages jointly modulate osteogenesis of mesenchymal stromal cells.** *Journal of biomedical materials research. Part A*
Murayama, M., Shinohara, I., Toya, M., Susuki, Y., Lee, M. L., Young, B., Gao, Q., Chow, S. K., Goodman, S. B.
2024
 - **Correction: Pius et al. Effects of Aging on Osteosynthesis at Bone-Implant Interfaces.** *Biomolecules* 2024, 14, 52. *Biomolecules*
Pius, A. K., Toya, M., Gao, Q., Lee, M. L., Ergul, Y. S., Chow, S. K., Goodman, S. B.
2024; 14 (3)

- **Sex differences of NF-κB-targeted therapy for mitigating osteoporosis associated with chronic inflammation of bone.** *Bone & joint research*
Toya, M., Kushioka, J., Shen, H., Utsunomiya, T., Hirata, H., Tsubosaka, M., Gao, Q., Chow, S. K., Zhang, N., Goodman, S. B.
2024; 13 (1): 28-39
- **Preclinical models for studying corticosteroid-induced osteonecrosis of the femoral head.** *Journal of biomedical materials research. Part B, Applied biomaterials*
Tsubosaka, M., Maruyama, M., Lui, E., Kushioka, J., Toya, M., Gao, Q., Shen, H., Li, X., Chow, S. K., Zhang, N., Yang, Y. P., Goodman, S. B.
2024; 112 (1): e35360
- **Preclinical models for studying corticosteroid-induced osteonecrosis of the femoral head** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART B-APPLIED BIOMATERIALS*
Tsubosaka, M., Maruyama, M., Lui, E., Kushioka, J., Toya, M., Gao, Q., Shen, H., Li, X., Chow, S., Zhang, N., Yang, Y., Goodman, S. B.
2024; 112 (1)
- **Effects of Aging on Osteosynthesis at Bone-Implant Interfaces.** *Biomolecules*
Pius, A. K., Toya, M., Gao, Q., Ergul, Y. S., Chow, S. K., Goodman, S. B.
2023; 14 (1)
- **C-C Motif Chemokine Ligand 2 Enhances Macrophage Chemotaxis, Osteogenesis, and Angiogenesis during the Inflammatory Phase of Bone Regeneration.** *Biomolecules*
Shinohara, I., Tsubosaka, M., Toya, M., Lee, M. L., Kushioka, J., Murayama, M., Gao, Q., Li, X., Zhang, N., Chow, S. K., Matsumoto, T., Kuroda, R., Goodman, et al
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- **Glycolytic reprogramming in macrophages and MSCs during inflammation.** *Frontiers in immunology*
Li, X., Shen, H., Zhang, M., Teissier, V., Huang, E. E., Gao, Q., Tsubosaka, M., Toya, M., Kushioka, J., Maduka, C. V., Contag, C. H., Chow, S. K., Zhang, et al
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- **CCL2 promotes osteogenesis by facilitating macrophage migration during acute inflammation.** *Frontiers in cell and developmental biology*
Toya, M., Zhang, N., Tsubosaka, M., Kushioka, J., Gao, Q., Li, X., Chow, S. K., Goodman, S. B.
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- **Bone regeneration in inflammation with aging and cell-based immunomodulatory therapy.** *Inflammation and regeneration*
Kushioka, J., Chow, S. K., Toya, M., Tsubosaka, M., Shen, H., Gao, Q., Li, X., Zhang, N., Goodman, S. B.
2023; 43 (1): 29
- **Metabolic profile of mesenchymal stromal cells and macrophages in the presence of polyethylene particles in a 3D model.** *Stem cell research & therapy*
Teissier, V., Gao, Q., Shen, H., Li, J., Li, X., Huang, E. E., Kushioka, J., Toya, M., Tsubosaka, M., Hirata, H., Alizadeh, H. V., Maduka, C. V., Contag, et al
2023; 14 (1): 99
- **Using Microphysiological System for the Development of Treatments for Joint Inflammation and Associated Cartilage Loss-A Pilot Study.** *Biomolecules*
Makarczyk, M. J., Hines, S., Yagi, H., Li, Z. A., Aguglia, A. M., Zbikowski, J., Padget, A. M., Gao, Q., Bunnell, B. A., Goodman, S. B., Lin, H.
2023; 13 (2)
- **Creation of a Knee Joint-on-a-Chip for Modeling Joint Diseases and Testing Drugs.** *Journal of visualized experiments : JoVE*
Makarczyk, M. J., Li, Z. A., Yu, I., Yagi, H., Zhang, X., Yocum, L., Li, E., Fritch, M. R., Gao, Q., Bunnell, B. A., Goodman, S. B., Tuan, R. S., Alexander, et al
2023
- **The efficiency of genetically modified mesenchymal stromal cells combined with a functionally graded scaffold for bone regeneration in corticosteroid-induced osteonecrosis of the femoral head in rabbits.** *Journal of biomedical materials research. Part A*
Tsubosaka, M., Maruyama, M., Lui, E., Moeinzadeh, S., Huang, E. E., Kushioka, J., Hirata, H., Jain, C., Storaci, H. W., Chan, C., Toya, M., Gao, Q., Teissier, et al
2023
- **Experimental models to study osteoarthritis pain and develop therapeutics.** *Osteoarthritis and cartilage open*
Riewruja, K., Makarczyk, M., Alexander, P. G., Gao, Q., Goodman, S. B., Bunnell, B. A., Gold, M. S., Lin, H.

2022; 4 (4): 100306

- **Differential dynamics of bone graft transplantation and mesenchymal stem cell therapy during bone defect healing in a murine critical size defect.** *Journal of orthopaedic translation*
Huang, E. E., Zhang, N., Ganio, E. A., Shen, H., Li, X., Ueno, M., Utsunomiya, T., Maruyama, M., Gao, Q., Su, N., Yao, Z., Yang, F., Gaudilliere, et al
2022; 36: 64-74
- **Therapeutic effects of MSCs, genetically modified MSCs, and NFkB-inhibitor on chronic inflammatory osteolysis in aged mice.** *Journal of orthopaedic research : official publication of the Orthopaedic Research Society*
Kushioka, J., Toya, M., Shen, H., Hirata, H., Zhang, N., Huang, E., Tsubosaka, M., Gao, Q., Teissier, V., Li, X., Utsunomiya, T., Goodman, S. B.
2022
- **Human Mesenchymal Stem Cell-Derived Miniature Joint System for Disease Modeling and Drug Testing.** *Advanced science (Weinheim, Baden-Wuerttemberg, Germany)*
Li, Z., Lin, Z., Liu, S., Yagi, H., Zhang, X., Yocum, L., Romero-Lopez, M., Rhee, C., Makarczyk, M. J., Yu, I., Li, E. N., Fritch, M. R., Gao, et al
2022: e2105909
- **Novel Techniques and Future Perspective for Investigating Critical-Size Bone Defects.** *Bioengineering (Basel, Switzerland)*
Huang, E. E., Zhang, N., Shen, H., Li, X., Maruyama, M., Utsunomiya, T., Gao, Q., Guzman, R. A., Goodman, S. B.
2022; 9 (4)
- **AN INNERVATED SYNOVIUM-CARTILAGE CHIP FOR MODELING JOINT INFLAMMATION AND ASSOCIATED PAIN**
Li, Z., Makarczyk, M. J., Moy, J. K., Yu, I., Liu, F., Gao, Q., Cho, S., Weber, D. J., Bunnell, B. A., Goodman, S. B., Gold, M. S., Lin, H.
MARY ANN LIEBERT, INC.2022: S505
- **Sex differences in the therapeutic effect of unaltered versus NFkappaB sensing IL-4 over-expressing mesenchymal stromal cells in a murine model of chronic inflammatory bone loss.** *Frontiers in bioengineering and biotechnology*
Shen, H., Kushioka, J., Toya, M., Utsunomiya, T., Hirata, H., Huang, E. E., Tsubosaka, M., Gao, Q., Li, X., Teissier, V., Zhang, N., Goodman, S. B.
2022; 10: 962114
- **Macrophages Modulate the Function of MSC- and iPSC-Derived Fibroblasts in the Presence of Polyethylene Particles.** *International journal of molecular sciences*
Gao, Q., Li, Z., Rhee, C., Xiang, S., Maruyama, M., Huang, E. E., Yao, Z., Bunnell, B. A., Tuan, R. S., Lin, H., Gold, M. S., Goodman, S. B.
2021; 22 (23)
- **Effect on Osteogenic Differentiation of Genetically Modified IL4 or PDGF-BB Over-Expressing and IL4-PDGF-BB Co-Over-Expressing Bone Marrow-Derived Mesenchymal Stromal Cells In Vitro.** *Bioengineering (Basel, Switzerland)*
Tsubosaka, M., Maruyama, M., Huang, E. E., Zhang, N., Utsunomiya, T., Gao, Q., Shen, H., Li, X., Kushioka, J., Hirata, H., Yao, Z., Yang, Y. P., Goodman, et al
2021; 8 (11)
- **The effect of genetically modified platelet-derived growth factor-BB over-expressing mesenchymal stromal cells during core decompression for steroid-associated osteonecrosis of the femoral head in rabbits.** *Stem cell research & therapy*
Guzman, R. A., Maruyama, M., Moeinzadeh, S., Lui, E., Zhang, N., Storaci, H. W., Tam, K., Huang, E. E., Utsunomiya, T., Rhee, C., Gao, Q., Yao, Z., Yang, et al
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- **The efficacy of lapine preconditioned or genetically modified IL4 over-expressing bone marrow-derived mesenchymal stromal cells in corticosteroid-associated osteonecrosis of the femoral head in rabbits.** *Biomaterials*
Maruyama, M., Moeinzadeh, S., Guzman, R. A., Zhang, N., Storaci, H. W., Utsunomiya, T., Lui, E., Huang, E. E., Rhee, C., Gao, Q., Yao, Z., Takagi, M., Yang, et al
2021; 275: 120972
- **The Effects of Macrophage Phenotype on Osteogenic Differentiation of MSCs in the Presence of Polyethylene Particles** *BIOMEDICINES*
Gao, Q., Rhee, C., Maruyama, M., Li, Z., Shen, H., Zhang, N., Utsunomiya, T., Huang, E., Yao, Z., Bunnell, B. A., Lin, H., Tuan, R. S., Goodman, et al
2021; 9 (5)
- **Current Models for Development of Disease-Modifying Osteoarthritis Drugs.** *Tissue engineering. Part C, Methods*
Makarczyk, M. J., Gao, Q., He, Y., Li, Z., Gold, M. S., Hochberg, M., Bunnell, B., Tuan, R. S., Goodman, S. B., Lin, H.
2021

- **PDGF-BB and IL-4 co-overexpression is a potential strategy to enhance mesenchymal stem cell-based bone regeneration.** *Stem cell research & therapy*

Zhang, N. n., Lo, C. W., Utsunomiya, T. n., Maruyama, M. n., Huang, E. n., Rhee, C. n., Gao, Q. n., Yao, Z. n., Goodman, S. B.
2021; 12 (1): 40