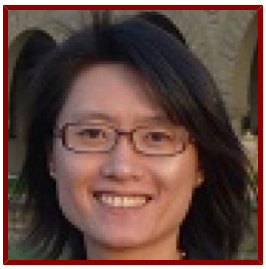
Stanford



Fan Yang

Associate Professor of Orthopaedic Surgery and of Bioengineering

Bio

BIO

Stem cells are attractive cell sources for regenerative medicine due to their unique capacity of self-renewal and differentiation into multiple lineages. Specifically, our research focuses on the following areas:

I. Fundamental: Understand how microenvironmental cues regulate stem cell fate. We are interested in understanding the effects of interactive signaling on stem cell in 3D and results from such studies would help predict stem cell phenotype in vivo and direct rational design of stem cell niche for tissue engineering applications.

II. Technological: Develop controlled delivery system to direct stem cell differentiation in situ. Our goal is to develop a controlled release system for sustained delivery of synergistic genetic signals to direct stem cells differentiation in situ.

III. Translational: Stem cells for targeting and delivery of therapeutic factors. Many disease processes are associated with abnormal blood supply, cell death and eventual loss of tissue structure and function. We are interested in engineering stem cells for targeting and delivery of therapeutic factors to restore normal vascularization and promote tissue regeneration. Findings from such study would have great translational potential that may benefit patients in the future.

ACADEMIC APPOINTMENTS

- Associate Professor, Orthopaedic Surgery
- Associate Professor, Bioengineering
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Child Health Research Institute
- Faculty Fellow, Stanford ChEM-H
- Member, Stanford Neurosciences Institute

HONORS AND AWARDS

- Ellen Weaver Award for outstanding mentoring and support of other women in science, the Northern California Chapters of the Association for Women in Science (2017)
- Biomaterials Science Lectureship Award, Biomaterials Science (2016)
- Young Investigator Award from the Society for Biomaterials (one winner per year), Society for Bioamterials (2016)
- NSF Faculty Early Career Development (CAREER) award, National Science Foundation (2014-2019)
- Rising Star Award, Biomedical Engineering Society-Cellular and Molecular Engineering, Biomedical Engineering Society (2014)

- Mission for Learning Faculty Scholar Award in Pediatric Translational Medicine, Child Health Research Institute (2013-2015)
- Stanford Asian American Faculty Award, Stanford University (2013)
- Young Investigator Award, Alliance for Cancer and Gene Therapy, Alliance for Cancer and Gene Therapy (2013)
- 3M Nontenured Faculty Grant Award, 3M (2012-2015)
- Basil O'Connor Starter Scholar Research Award, March of Dimes Foundation (2012)
- 2011 TR35 Global Honoree, Recognized as one of the world's top innovators under age 35, Technology Review (2011)
- Donald E. and Delia B. BaxterFoundation Scholars Award, Baxter Foundation (2010)
- McCormick Faculty Award, Stanford University (2010)
- National Scientist Development Grant Award, American Heart Association (2009-2013)
- Ruth L. Kirschstein National Research Service Award Postdoctoral Fellowship, MIT (2008-2009)

PROFESSIONAL EDUCATION

- Ph.D., Johns Hopkins University , Biomedical Engineering (2006)
- B.S., Shanghai Jiaotong University , Biomedical Engineering (2001)

PATENTS

- Keeney M, Yang F, Goodman S. "United States Patent US9682035B2 Injectable hydrogel system to modulate host response at the bone implant interface", Leland Stanford Junior University, Jun 20, 2017

LINKS

- Stem Cell and Biomaterials Engineering Laboratory: www.fanyanggroup.com

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Specifically, our research focuses on the following areas:

I. Fundamental: Understand how microenvironmental cues regulate stem cell fate. We are interested in understanding the effects of interactive signaling on stem cell in 3D and results from such studies would help predict stem cell phenotype in vivo and direct rational design of stem cell niche for tissue engineering applications.

II. Technological: Develop controlled delivery system to direct stem cell differentiation in situ. Our goal is to develop a controlled release system for sustained delivery of synergistic genetic signals to direct stem cells differentiation in situ.

III. Translational: Stem cells for targeting and delivery of therapeutic factors. We are interested in engineering stem cells for targeting and delivery of therapeutic factors to restore normal vascularization and promote tissue regeneration. Findings from such study would have great translational potential that may benefit patients in the future.

Teaching

COURSES

2017-18

- Orthopaedic Tissue Engineering: ORTHO 270 (Win)
- Tissue Engineering: BIOE 260, ORTHO 260 (Spr)

2016-17

- Orthopaedic Tissue Engineering: ORTHO 270 (Win)
- Senior Capstone Design II: BIOE 141B (Win)
- Tissue Engineering: BIOE 260, ORTHO 260 (Spr)

2015-16

- Orthopaedic Tissue Engineering: ORTHO 270 (Win)
- Senior Capstone Design II: BIOE 141B (Win)
- Tissue Engineering: BIOE 260, ORTHO 260 (Spr)

2014-15

- Tissue Engineering: BIOE 260, ORTHO 260 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Alberto Arvayo

Postdoctoral Faculty Sponsor

Danial Barati, Jianfeng Li

Doctoral Dissertation Advisor (AC)

Alice Stanton

Doctoral (Program)

Suhaas Anbazhakan, Tim Schnabel

Postdoctoral Research Mentor

Danial Barati, Jianfeng Li

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)

Publications

PUBLICATIONS

- **Bioacoustic-enabled patterning of human iPSC-derived cardiomyocytes into 3D cardiac tissue** *BIOMATERIALS*
  Serpooshan, V., Chen, P., Wu, H., Lee, S., Sharma, A., Hu, D. A., Venkatraman, S., Ganesan, A. V., Usta, O. B., Yarmush, M., Yang, F., Wu, J. C., Demirci, et al
  2017; 131: 47-57
- **Contractile force generation by 3D hiPSC-derived cardiac tissues is enhanced by rapid establishment of cellular interconnection in matrix with muscle-mimicking stiffness** *BIOMATERIALS*
  Lee, S., Serpooshan, V., Tong, X., Venkatraman, S., Lee, M., Lee, J., Chirikian, O., Wu, J. C., Wu, S. M., Yang, F.
  2017; 131: 111-120
- **Mimicking Cartilage Tissue Zonal Organization by Engineering Tissue-scale Gradient Hydrogels as 3D Cell Niche.** *Tissue engineering. Part A*
  Zhu, D., Tong, X., Trinh, P., Yang, F.
  2017
- **Elastin-like protein-hyaluronic acid (ELP-HA) hydrogels with decoupled mechanical and biochemical cues for cartilage regeneration.** *Biomaterials*
  Zhu, D., Wang, H., Trinh, P., Heilshorn, S. C., Yang, F.
  2017
- **Effect of matrix metalloproteinase-mediated matrix degradation on glioblastoma cell behavior in 3D PEG-based hydrogels** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*

Wang, C., Tong, X., Jiang, X., Yang, F.
2017; 105 (3): 770-778

- **Mutant CCL2 protein coating mitigates wear particle-induced bone loss in a murine continuous polyethylene infusion model** *BIOMATERIALS*
  Nabeshima, A., Pajarinen, J., Lin, T., Jiang, X., Gibon, E., Cordova, L. A., Loi, F., Lu, L., Jamsen, E., Egashira, K., Yang, F., Yao, Z., Goodman, et al
  2017; 117: 1-9

- **Pharmacological rescue of diabetic skeletal stem cell niches.** *Science translational medicine*
  Tevlin, R., Seo, E. Y., Marecic, O., McArdle, A., Tong, X., Zimdahl, B., Malkovskiy, A., Sinha, R., Gulati, G., Li, X., Wearda, T., Morganti, R., Lopez, et al
  2017; 9 (372)

- **Modulating stem cell-chondrocyte interactions for cartilage repair using combinatorial extracellular matrix-containing hydrogels** *JOURNAL OF MATERIALS CHEMISTRY B*
  Wang, T., Lai, J. H., Han, L., Tong, X., Yang, F.
  2016; 4 (47): 7641-7650

- **Nanoparticle engineered TRAIL-overexpressing adipose-derived stem cells target and eradicate glioblastoma via intracranial delivery** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Jiang, X., Fitch, S., Wang, C., Wilson, C., Li, J., Grant, G. A., Yang, F.
  2016; 113 (48): 13857-13862

- **Effect of Matrix Metalloproteinase-Mediated Matrix Degradation on Glioblastoma Cell Behavior in 3D PEG-based Hydrogels.** *Journal of biomedical materials research. Part A*
  Wang, C., Tong, X., Jiang, X., Yang, F.
  2016

- **Effects of Hydrogel Stiffness and Extracellular Compositions on Modulating Cartilage Regeneration by Mixed Populations of Stem Cells and Chondrocytes In Vivo.** *Tissue engineering. Part A*
  Wang, T., Lai, J. H., Yang, F.
  2016: -?

- **The effect of local IL-4 delivery or CCL2 blockade on implant fixation and bone structural properties in a mouse model of wear particle induced osteolysis.** *Journal of biomedical materials research. Part A*
  Sato, T., Pajarinen, J., Behn, A., Jiang, X., Lin, T., Loi, F., Yao, Z., Egashira, K., Yang, F., Goodman, S. B.
  2016; 104 (9): 2255-2262

- **Sliding Hydrogels with Mobile Molecular Ligands and Crosslinks as 3D Stem Cell Niche.** *Advanced materials*
  Tong, X., Yang, F.
  2016; 28 (33): 7257-7263

- **Scaffold-mediated BMP-2 minicircle DNA delivery accelerated bone repair in a mouse critical-size calvarial defect model** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Keeney, M., Chung, M. T., Zielins, E. R., Paik, K. J., McArdle, A., Morrison, S. D., Ransom, R. C., Barbhaiya, N., Atashroo, D., Jacobson, G., Zare, R. N., Longaker, M. T., Wan, et al
  2016; 104 (8): 2099-2107

- **Winner of the Young Investigator Award of the Society for Biomaterials at the 10th World Biomaterials Congress, May 17-22, 2016, Montreal QC, Canada: Microribbon-based hydrogels accelerate stem cell-based bone regeneration in a mouse critical-size cranial defect model** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Han, L., Conrad, B., Chung, M. T., Deveza, L., Jiang, X., Wang, A., Butte, M. J., Longaker, M. T., Wan, D., Yang, F.
  2016; 104 (6): 1321-1331

- **Winner of the Young Investigator Award of the Society for Biomaterials (USA) for 2016, 10th World Biomaterials Congress, May 17-22, 2016, Montreal QC, Canada: Aligned microribbon-like hydrogels for guiding three-dimensional smooth muscle tissue regeneration** *JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A*
  Lee, S., Tong, X., Han, L., Behn, A., Yang, F.
  2016; 104 (5): 1064-1071

- **Hydrogels with Dual Gradients of Mechanical and Biochemical Cues for Deciphering Cell-Niche Interactions** *ACS BIOMATERIALS-SCIENCE & ENGINEERING*
  Tong, X., Jiang, J., Zhu, D., Yang, F.

2016; 2 (5): 845-852

- **Effects of the poly(ethylene glycol) hydrogel crosslinking mechanism on protein release.** *Biomaterials science*
  Lee, S., Tong, X., Yang, F.
  2016; 4 (3): 405-411
- **Local delivery of mutant CCL2 protein-reduced orthopaedic implant wear particle-induced osteolysis and inflammation in vivo.** *Journal of orthopaedic research*
  Jiang, X., Sato, T., Yao, Z., Keeney, M., Pajarinen, J., Lin, T., Loi, F., Egashira, K., Goodman, S., Yang, F.
  2016; 34 (1): 58-64
- **Polymer-DNA Nanoparticle-Induced CXCR4 Overexpression Improves Stem Cell Engraftment and Tissue Regeneration in a Mouse Hindlimb Ischemia Model** *THERANOSTICS*
  Deveza, L., Choi, J., Lee, J., Huang, N., Cooke, J., Yang, F.
  2016; 6 (8): 1176-1189
- **Long-Term Controlled Protein Release from Poly(Ethylene Glycol) Hydrogels by Modulating Mesh Size and Degradation** *MACROMOLECULAR BIOSCIENCE*
  Tong, X., Lee, S., Bararpour, L., Yang, F.
  2015; 15 (12): 1679-1686
- **Early induction of a prechondrogenic population allows efficient generation of stable chondrocytes from human induced pluripotent stem cells** *FASEB JOURNAL*
  Lee, J., Taylor, S. E., Smeriglio, P., Lai, J., Maloney, W. J., Yang, F., Bhutani, N.
  2015; 29 (8): 3399-3410
- **Gene delivery of osteoinductive signals to a human fetal osteoblast cell line induces cell death in a dose-dependent manner.** *Drug delivery and translational research*
  Ramasubramanian, A., Jeeawoody, S., Yang, F.
  2015; 5 (2): 160-167
- **Improved Approach for Chondrogenic Differentiation of Human Induced Pluripotent Stem Cells** *STEM CELL REVIEWS AND REPORTS*
  Nejadnik, H., Diecke, S., Lenkov, O. D., Chapelin, F., Donig, J., Tong, X., Derugin, N., Chan, R. C., Gaur, A., Yang, F., Wu, J. C., Daldrup-Link, H. E.
  2015; 11 (2): 242-253
- **Interaction Between Osteoarthritic Chondrocytes and Adipose-Derived Stem Cells Is Dependent on Cell Distribution in Three-Dimension and Transforming Growth Factor-ß3 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
- **Microfluidic Synthesis of Biodegradable Polyethylene-Glycol Microspheres for Controlled Delivery of Proteins and DNA Nanoparticles** *ACS BIOMATERIALS-SCIENCE & ENGINEERING*
  Deveza, L., Ashoken, J., Castaneda, G., Tong, X., Keeney, M., Han, L., Yang, F.
  2015; 1 (3): 157-165
- **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
- **3D Hydrogel Scaffolds for Articular Chondrocyte Culture and Cartilage Generation.** *Journal of visualized experiments : JoVE*
  Smeriglio, P., Lai, J. H., Yang, F., Bhutani, N.
  2015
- **The effects of varying poly(ethylene glycol) hydrogel crosslinking density and the crosslinking mechanism on protein accumulation in three-dimensional hydrogels** *ACTA BIOMATERIALIA*
  Lee, S., Tong, X., Yang, F.

2014; 10 (10): 4167-4174

- **Co-Release of Cells and Polymeric Nanoparticles from Sacrificial Microfibers Enhances Nonviral Gene Delivery Inside 3D Hydrogels** *TISSUE ENGINEERING PART C-METHODS*
  Madl, C. M., Keeney, M., Li, X., Han, L., Yang, F.
  2014; 20 (10): 798-805
- **Mutant monocyte chemoattractant protein 1 protein attenuates migration of and inflammatory cytokine release by macrophages exposed to orthopedic implant wear particles.** *Journal of biomedical materials research. Part A*
  Yao, Z., Keeney, M., Lin, T., Pajarinen, J., Barcay, K., Waters, H., Egashira, K., Yang, F., Goodman, S.
  2014; 102 (9): 3291-3297
- **Suppression of wear-particle-induced pro-inflammatory cytokine and chemokine production in macrophages via NF-?B decoy oligodeoxynucleotide: A preliminary report.** *Acta biomaterialia*
  Lin, T., Yao, Z., Sato, T., Keeney, M., Li, C., Pajarinen, J., Yang, F., Egashira, K., Goodman, S. B.
  2014; 10 (8): 3747-3755
- **Chondrogenic differentiation of adipose-derived stromal cells in combinatorial hydrogels containing cartilage matrix proteins with decoupled mechanical stiffness.** *Tissue engineering. Part A*
  Wang, T., Lai, J. H., Han, L., Tong, X., Yang, F.
  2014; 20 (15-16): 2131-2139
- **Bioengineered 3D Brain Tumor Model To Elucidate the Effects of Matrix Stiffness on Glioblastoma Cell Behavior Using PEG-Based Hydrogels** *MOLECULAR PHARMACEUTICS*
  Wang, C., Tong, X., Yang, F.
  2014; 11 (7): 2115-2125
- **Photo-crosslinkable PEG-Based Microribbons for Forming 3D Macroporous Scaffolds with Decoupled Niche Properties.** *Advanced materials*
  Han, L., Tong, X., Yang, F.
  2014; 26 (11): 1757-1762
- **Engineering interpenetrating network hydrogels as biomimetic cell niche with independently tunable biochemical and mechanical properties.** *Biomaterials*
  Tong, X., Yang, F.
  2014; 35 (6): 1807-1815
- **A Facile Method to Fabricate Hydrogels with Microchannel-Like Porosity for Tissue Engineering** *TISSUE ENGINEERING PART C-METHODS*
  Hammer, J., Han, L., Tong, X., Yang, F.
  2014; 20 (2): 169-176
- **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
- **Modulating polymer chemistry to enhance non-viral gene delivery inside hydrogels with tunable matrix stiffness.** *Biomaterials*
  Keeney, M., Onyiah, S., Zhang, Z., Tong, X., Han, L., Yang, F.
  2013; 34 (37): 9657-9665
- **Mutant MCP-1 protein delivery from layer-by-layer coatings on orthopedic implants to modulate inflammatory response.** *Biomaterials*
  Keeney, M., Waters, H., Barcay, K., Jiang, X., Yao, Z., Pajarinen, J., Egashira, K., Goodman, S. B., Yang, F.
  2013; 34 (38): 10287-10295
- **Programming Stem Cells for Therapeutic Angiogenesis Using Biodegradable Polymeric Nanoparticles** *JOVE-JOURNAL OF VISUALIZED EXPERIMENTS*
  Keeney, M., Deveza, L., Yang, F.
  2013
- **Development of Poly(ß-amino ester)-Based Biodegradable Nanoparticles for Nonviral Delivery of Minicircle DNA.** *ACS nano*
  Keeney, M., Ong, S., Padilla, A., Yao, Z., Goodman, S., Wu, J. C., Yang, F.
  2013; 7 (8): 7241-7250
- **Dynamic tissue engineering scaffolds with stimuli-responsive macroporosity formation** *BIOMATERIALS*
  Han, L., Lai, J. H., Yu, S., Yang, F.

2013; 34 (17): 4251-4258

- **The future of biologic coatings for orthopaedic implants** *BIOMATERIALS*
  Goodman, S. B., Yao, Z., Keeney, M., Yang, F.
  2013; 34 (13): 3174-3183

- **CD90 (Thy-1)-Positive Selection Enhances Osteogenic Capacity of Human Adipose-Derived Stromal Cells** *TISSUE ENGINEERING PART A*
  Chung, M. T., Liu, C., Hyun, J. S., Lo, D. D., Montoro, D. T., Hasegawa, M., Li, S., Sorkin, M., Rennert, R., Keeney, M., Yang, F., Quarto, N., Longaker, et al
  2013; 19 (7-8): 989-997

- **Effects of Polymer End-Group Chemistry and Order of Deposition on Controlled Protein Delivery from Layer-by-Layer Assembly** *BIOMACROMOLECULES*
  Keeney, M., Mathur, M., Cheng, E., Tong, X., Yang, F.
  2013; 14 (3): 794-800

- **The effects of interactive mechanical and biochemical niche signaling on osteogenic differentiation of adipose-derived stem cells using combinatorial hydrogels** *ACTA BIOMATERIALIA*
  Nii, M., Lai, J. H., Keeney, M., Han, L., Behn, A., Imanbayev, G., Yang, F.
  2013; 9 (3): 5475-5483

- **Paracrine Release from Nonviral Engineered Adipose-Derived Stem Cells Promotes Endothelial Cell Survival and Migration In Vitro** *STEM CELLS AND DEVELOPMENT*
  Deveza, L., Choi, J., Imanbayev, G., Yang, F.
  2013; 22 (3): 483-491

- **Adipose-derived Stromal Cells Overexpressing Vascular Endothelial Growth Factor Accelerate Mouse Excisional Wound Healing** *MOLECULAR THERAPY*
  Nauta, A., Seidel, C., Deveza, L., Montoro, D., Grova, M., Ko, S. H., Hyun, J., Gurtner, G. C., Longaker, M. T., Yang, F.
  2013; 21 (2): 445-455

- **Microribbon-Like Elastomers for Fabricating Macroporous and Highly Flexible Scaffolds that Support Cell Proliferation in 3D** *ADVANCED FUNCTIONAL MATERIALS*
  Han, L., Yu, S., Wang, T., Behn, A. W., Yang, F.
  2013; 23 (3): 346-358

- **The Effects of Polymer End-group Chemistry and Order of Deposition on Controlled Protein Delivery from Layer-by-layer Assembly** *Biomacromolecules*
  Keeney M, Mathur M, Cheng E, Yang F
  2013; 14 (3): 794-800

- **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: 3553-?

- **Therapeutic angiogenesis using genetically engineered human endothelial cells** *JOURNAL OF CONTROLLED RELEASE*
  Cho, S., Yang, F., Son, S. M., Park, H., Green, J. J., Bogatyrev, S., Mei, Y., Park, S., Langer, R., Anderson, D. G.
  2012; 160 (3): 515-524

- **Tissue Engineering: Focus on musculoskeletal system** *Biomaterials Science-an integrated clinical and engineering approach*
  Keeney M, Han LH, Onyiah S, Yang F
  2012

- **Nanomaterials for Engineering Cell Microenvironment and Gene delivery** *Tissue Engineering and Regenerative Medicine: A Nano Approach. CRC Press.*
  Lai JH, Ramasubranian A, Jeeawoody S, Yang F
  2012

- **Nonviral delivery of genetic medicine for therapeutic angiogenesis** *ADVANCED DRUG DELIVERY REVIEWS*
  Park, H., Yang, F., Cho, S.
  2012; 64 (1): 40-52

- **Therapeutic Angiogenesis for Treating Cardiovascular Diseases** *THERANOSTICS*
  Deveza, L., Choi, J., Yang, F.

2012; 2 (8): 801-814

- **Non-viral Delivery of Inductive and Suppressive Genes to Adipose-Derived Stem Cells for Osteogenic Differentiation** *PHARMACEUTICAL RESEARCH*
  Ramasubramanian, A., Shiigi, S., Lee, G. K., Yang, F.
  2011; 28 (6): 1328-1337

- **Preparation of Mineralized Nanofibers: Collagen Fibrils Containing Calcium Phosphate** *NANO LETTERS*
  Maas, M., Guo, P., Keeney, M., Yang, F., Hsu, T. M., Fuller, G. G., Martin, C. R., Zare, R. N.
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- **Recent Progress in Cartilage Tissue Engineering** *Curr Opin Biotechnol*
  Keeney M, Lai J, Yang F
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- **Combinatorial Extracellular Matrices for Human Embryonic Stem Cell Differentiation in 3D** *BIOMACROMOLECULES*
  Yang, F., Cho, S., Son, S. M., Hudson, S. P., Bogatyrev, S., Keung, L., Kohane, D. S., Langer, R., Anderson, D. G.
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- **Genetic Engineering of Human Stem Cells for Enhanced Angiogenesis Using Biodegradable Polymeric Nanoparticles.** *Proceedings of the National Academy of Sciences*
  Yang F, Cho SW, Son SM, Bogatyrev S, Singh D, Green JJ, Mei Y, Park S, Bhang SH, Kim BS, Langer R, Anderson DG
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- **High-throughput Optimization of Stem Cell Microenvrionments** *Combinatorial Chemistry & High Throughput Screening*
  Yang F, Mei Y, Langer R, Anderson DG
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- **Gene Delivery to Human Adult and Embryonic cell-derived Stem Cells Using Biodegradable Nanoparticulate Polymeric Vectors** *Gene Therapy*
  Yang F, Green JJ, Dinio T, Keung L, Cho SW, Park H, Langer R, Anderson DG
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- **Lipid-like Nanoparticles for Small Interfering RNA Delivery to Endothelial Cells.** *Advanced Functional Materials*
  Cho SW, Goldberg M, Son SM, Xu Q, Yang F, Mei Y, Bogatyrev S, Langer R, Anderson DG
  2009; 19 (19): 3112-3118

- **Small Molecule End Group of Linear Polymer Determines Cell-type Gene Delivery Efficacy** *Advanced Materials*
  Sunshine J, Green JJ, Mahon K, Yang F, Langer R, Anderson DG
  2009; 21: 1-5

- **The study of abnormal bone development in the Apert syndrome Fgfr2(+/S252W) mouse using a 3D hydrogel culture model** *BONE*
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- **Delivery of Small Interfering RNA for Inhibition of Endothelial Cell Apoptosis by Hypoxia and Serum Deprivation** *Biochemical and Biophysical Communications*
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  2008; 376 (1): 158-163

- **Tissue Engineering: The Therapeutic Strategy of the 21st Century** *Nanotechnology and Tissue Engineering*
  Yang F, Neeley WL, Moore MJ, Karp JM, Shukla A, Langer R
  2008

- **Abnormal Tissue Development of Osteoblasts from an Apert Syndrome FGFR2+/S252W Mouse Model in 3D Hydrogels** *Bone*
  Yang F, Wang YL, Zhang Z, Hsu B, Jabs EW, Elisseeff JH
  2008; 43 (1): 55-63

- **Metabolic changes in mesenchymal stem cells in osteogenic medium measured by autofluorescence spectroscopy** *STEM CELLS*
  Reyes, J. M., Fermanian, S., Yang, F., Zhou, S., Herretes, S., Murphy, D. B., Elisseeff, J. H., Chuck, R. S.
  2006; 24 (5): 1213-1217

- **Cartilage Tissue Engineering** *Biomedical Engineering Handbook, Tissue Engineering Section*

Yang F, Elisseeff JH

2006

- **The effect of incorporating RGD adhesive peptide in polyethylene glycol diacrylate hydrogel on osteogenesis of bone marrow stromal cells** *BIOMATERIALS*

  Yang, F., Williams, C. G., Wang, D. A., LEE, H., Manson, P. N., Elisseeff, J.

  2005; 26 (30): 5991-5998

- **Abnormalities in cartilage and bone development in the Apert syndrome FGFR2(+/S252W) mouse** *DEVELOPMENT*

  Wang, Y. L., Xiao, R., Yang, F., Karim, B. O., Iacovelli, A. J., Cai, J. L., Lerner, C. P., Richtsmeier, J. T., Leszl, J. M., Hill, C. A., Yu, K., Ornitz, D. M., Elisseeff, et al

  2005; 132 (15): 3537-3548

- **Advances in skeletal tissue engineering with hydrogels.** *Orthodontics & craniofacial research*

  Elisseeff, J., Puleo, C., Yang, F., SHARMA, B.

  2005; 8 (3): 150-161

- **Bioresponsive phosphoester hydrogels for bone tissue engineering** *TISSUE ENGINEERING*

  Wang, D. A., Williams, C. G., Yang, F., Cher, N., LEE, H., Elisseeff, J. H.

  2005; 11 (1-2): 201-213

- **Enhancing the tissue-biomaterial interface: Tissue-initiated integration of biomaterials** *ADVANCED FUNCTIONAL MATERIALS*

  Wang, D. A., Williams, C. G., Yang, F., Elisseeff, J. H.

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