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Cytoskeletal and focal adhesion influences on mesenchymal stem cell shape, mechanical properties, and differentiation down osteogenic, adipogenic, and chondrogenic pathways

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#	Paper	IF	Citations
290	The role of slingshot-1L (SSH1L) in the differentiation of human bone marrow mesenchymal stem cells into cardiomyocyte-like cells. 2012 , 17, 14975-94		13
289	Screening of osteoprotegerin-related feature genes in osteoporosis and functional analysis with DNA microarray. 2013 , 18, 15		3
288	Universal method for protein bioconjugation with nanocellulose scaffolds for increased cell adhesion. <i>Materials Science and Engineering C</i> , 2013 , 33, 4599-607	8.3	42
287	In vivo ectopic implantation model to assess human mesenchymal progenitor cell potential. 2013 , 9, 833-46		10
286	Stem cells, cell therapies, and bioengineering in lung biology and diseases. Comprehensive review of the recent literature 2010-2012. 2013 , 10, S45-97		39
285	The effect of electrically charged polyion complex nanoparticle-coated surfaces on adipose-derived stromal progenitor cell behaviour. <i>Biomaterials</i> , 2013 , 34, 9096-102	15.6	11
284	Elongated cell morphology and uniaxial mechanical stretch contribute to physical attributes of niche environment for MSC tenogenic differentiation. 2013 , 37, 755-60		16
283	Mesenchymal stem cells and nano-structured surfaces. 2013 , 1058, 133-48		2
282	The Control of Mesenchymal Stromal Cell Osteogenic Differentiation through Modified Surfaces. 2013 , 2013, 361637		26
281	Ox-LDL promotes migration and adhesion of bone marrow-derived mesenchymal stem cells via regulation of MCP-1 expression. 2013 , 2013, 691023		20
280	Indentation quantification for in-liquid nanomechanical measurement of soft material using an atomic force microscope: rate-dependent elastic modulus of live cells. 2013 , 88, 052711		21
279	Ultrafast laser texturing of Ti-6Al-4V surfaces for biomedical applications. 2013 ,		3
278	Distinct effects of RGD-glycoproteins on Integrin-mediated adhesion and osteogenic differentiation of human mesenchymal stem cells. 2013 , 10, 1846-59		30
277	Synergy between Piezo1 and Piezo2 channels confers high-strain mechanosensitivity to articular cartilage. 2014 , 111, E5114-22		193
276	Mesenchymal stem cells: mechanisms and role in bone regeneration. 2014 , 90, 643-7		60
275	Micro- and nano-modified surfaces for better polymeric implants. 2014 , 30-42		1
274	Osteogenic differentiation on DLC-PDMS-h surface. 2014 , 102, 1462-72		4

273	Three-Dimensional Scaffolds of Carbonized Polyacrylonitrile for Bone Tissue Regeneration. 2014 , 126, 9367-9371		12
272	Cell morphology and focal adhesion location alters internal cell stress. 2014 , 11, 20140885		26
271	Topography design concept of a tissue engineering scaffold for controlling cell function and fate through actin cytoskeletal modulation. <i>Tissue Engineering - Part B: Reviews</i> , 2014 , 20, 609-27	7.9	43
270	Modulation of the stemness and osteogenic differentiation of human mesenchymal stem cells by controlling RGD concentrations of poly(carboxybetaine) hydrogel. 2014 , 9, 1613-23		20
269	Texture analyses show synergetic effects of biomechanical and biochemical stimulation on mesenchymal stem cell differentiation into early phase osteoblasts. 2014 , 20, 219-27		7
268	Activation of focal adhesion kinase induces extracellular signal-regulated kinase-mediated osteogenesis in tensile force-subjected periodontal ligament fibroblasts but not in osteoblasts. 2014 , 32, 671-82		19
267	Adipocyte stiffness increases with accumulation of lipid droplets. 2014 , 106, 1421-31		69
266	Temporal and spatial patterns of gene profiles during chondrogenic differentiation. 2014 , 18, 799-809		4
265	Cryopreservation effects on Wharton's Jelly Stem Cells proteome. 2014 , 10, 429-46		5
264	Towards ready-to-use 3-D scaffolds for regenerative medicine: adhesion-based cryopreservation of human mesenchymal stem cells attached and spread within alginate-gelatin cryogel scaffolds. 2014 , 25, 857-71		52
263	Adipose tissue: A valuable resource of biomaterials for soft tissue engineering. 2014 , 22, 932-947		16
262	Influence of cartilage extracellular matrix molecules on cell phenotype and neocartilage formation. <i>Tissue Engineering - Part A</i> , 2014 , 20, 264-74	3.9	32
261	From mechanical stimulation to biological pathways in the regulation of stem cell fate. 2014 , 32, 309-25		45
260	Poly(lactide-co-glycolide)/fibrin gel construct as a 3D model to evaluate gene therapy of cartilage in vivo. 2014 , 11, 2062-70		18
259	Three-dimensional osteogenic and chondrogenic systems to model osteochondral physiology and degenerative joint diseases. 2014 , 239, 1080-95		51
258	MiR-143 suppresses osteogenic differentiation by targeting Osterix. 2014 , 390, 69-74		61
257	Tuning the material-cytoskeleton crosstalk via nanoconfinement of focal adhesions. <i>Biomaterials</i> , 2014 , 35, 2743-51	15.6	35
256	Three-dimensional scaffolds of carbonized polyacrylonitrile for bone tissue regeneration. 2014 , 53, 9213-7		28

255	The effects of actin cytoskeleton perturbation on keratin intermediate filament formation in mesenchymal stem/stromal cells. <i>Biomaterials</i> , 2014 , 35, 3934-44	15.6	23
254	Characterization of partially lifted cell sheets. <i>Tissue Engineering - Part A</i> , 2014 , 20, 1703-14	3.9	1
253	2D and 3D Hybrid Systems for Enhancement of Chondrogenic Differentiation of Tonsil-Derived Mesenchymal Stem Cells. 2015 , 25, 2573-2582		62
252	Nitric oxide regulates cell behavior on an interactive cell-derived extracellular matrix scaffold. 2015 , 103, 3807-14		10
251	Barium titanate nanoparticles and hypergravity stimulation improve differentiation of mesenchymal stem cells into osteoblasts. 2015 , 10, 433-45		29
250	Cytoskeletal Reorganization Drives Mesenchymal Condensation and Regulates Downstream Molecular Signaling. <i>PLoS ONE</i> , 2015 , 10, e0134702	3.7	18
249	Physical Activity Increases the Total Number of Bone-Marrow-Derived Mesenchymal Stem Cells, Enhances Their Osteogenic Potential, and Inhibits Their Adipogenic Properties. 2015 , 2015, 379093		56
248	RhoGTPases as key players in mammalian cell adaptation to microgravity. 2015 , 2015, 747693		26
247	Low Molecular Weight Fraction of Commercial Human Serum Albumin Induces Morphologic and Transcriptional Changes of Bone Marrow-Derived Mesenchymal Stem Cells. 2015 , 4, 945-55		18
246	Dynamically tunable polymer microwells for directing mesenchymal stem cell differentiation into osteogenesis. 2015 , 3, 9011-9022		19
245	MicroRNA-153 suppresses the osteogenic differentiation of human mesenchymal stem cells by targeting bone morphogenetic protein receptor type II. 2015 , 36, 760-6		40
244	Presence and function of microRNA-92a in chondrogenic ATDC5 and adipose-derived mesenchymal stem cells. <i>Molecular Medicine Reports</i> , 2015 , 12, 4877-86	2.9	23
243	Mesenchymal stem cell printing and process regulated cell properties. 2015 , 7, 044106		23
242	Differential response of encapsulated nucleus pulposus and bone marrow stem cells in isolation and coculture in alginate and chitosan hydrogels. <i>Tissue Engineering - Part A</i> , 2015 , 21, 288-99	3.9	35
241	Periodontal-like gingival connective tissue attachment on titanium surface with nano-ordered spikes and pores created by alkali-heat treatment. 2015 , 31, e116-30		20
240	Oscillatory shear stress mediates directional reorganization of actin cytoskeleton and alters differentiation propensity of mesenchymal stem cells. 2015 , 33, 429-42		40
239	Opportunities and challenges in three-dimensional brown adipogenesis of stem cells. 2015 , 33, 962-79		13
238	Mechanism of regulation of stem cell differentiation by matrix stiffness. <i>Stem Cell Research and Therapy</i> , 2015 , 6, 103	8.3	217

237	Therapeutically relevant aspects in bone repair and regeneration. 2015 , 18, 573-589		78
236	Bone-Biomimetic Biomaterial and Cell Fate Determination. 2015 , 119-146		
235	Hydrophilic polyurethane matrix promotes chondrogenesis of mesenchymal stem cells. <i>Materials Science and Engineering C</i> , 2015 , 54, 182-95	8.3	19
234	Scaffold composition affects cytoskeleton organization, cell-matrix interaction and the cellular fate of human mesenchymal stem cells upon chondrogenic differentiation. <i>Biomaterials</i> , 2015 , 52, 208-20	15.6	39
233	Human mesenchymal stem cell behavior on femtosecond laser-textured Ti-6Al-4V surfaces. 2015 , 10, 725-39		68
232	Connectivity Map-based discovery of parabendazole reveals targetable human osteogenic pathway. 2015 , 112, 12711-6		47
231	Femtosecond laser nano/micro patterning of titanium influences mesenchymal stem cell adhesion and commitment. 2015 , 10, 055002		74
230	Regulation of human mesenchymal stem cell osteogenesis by specific surface density of fibronectin: a gradient study. 2015 , 7, 2367-75		29
229	Dissection of the cord blood stromal component reveals predictive parameters for culture outcome. 2015 , 24, 104-14		19
228	Immortalised human mesenchymal stem cells undergo chondrogenic differentiation in alginate and PGA/PLLA scaffolds. 2015 , 16, 159-70		16
227	TiO ₂ -coated CoCrMo: improving the osteogenic differentiation and adhesion of mesenchymal stem cells in vitro. 2015 , 103, 1208-17		19
226	Impact of tissue-specific stem cells on lineage-specific differentiation: a focus on the musculoskeletal system. 2015 , 11, 119-32		53
225	Cell-mediated remodeling of biomimetic encapsulating hydrogels triggered by adipogenic differentiation of adipose stem cells. 2016 , 7, 2041731416670482		10
224	Thermogel-Coated Poly(εCaprolactone) Composite Scaffold for Enhanced Cartilage Tissue Engineering. <i>Polymers</i> , 2016 , 8,	4.5	37
223	3D Culture of Chondrocytes in Gelatin Hydrogels with Different Stiffness. <i>Polymers</i> , 2016 , 8,	4.5	100
222	Early molecular events during in vitro chondrogenesis. 2016 , 167-190		0
221	The role of cyclic tensile strain on osteogenesis and angiogenesis in human mesenchymal stem/stromal cells. 2016 , 208-221		
220	In vitro evaluation of an yttria-stabilized zirconia reinforced nano-hydroxyapatite/polyamide 66 ternary biomaterial: biomechanics, biocompatibility and bioactivity. 2016 , 6, 114086-114095		5

219	Additive manufactured polymeric 3D scaffolds with tailored surface topography influence mesenchymal stromal cells activity. 2016 , 8, 025012		27
218	Mesenchymal stem cell-induced 3D displacement field of cell-adhesion matrices with differing elasticities. <i>Journal of the Mechanical Behavior of Biomedical Materials</i> , 2016 , 60, 394-400	4.1	4
217	Jellyfish collagen and alginate: Combined marine materials for superior chondrogenesis of hMSC. <i>Materials Science and Engineering C</i> , 2016 , 64, 190-198	8.3	41
216	Vitronectin-Based, Biomimetic Encapsulating Hydrogel Scaffolds Support Adipogenesis of Adipose Stem Cells. <i>Tissue Engineering - Part A</i> , 2016 , 22, 597-609	3.9	20
215	Prospects and progress in cell therapy for acute respiratory distress syndrome. 2016 , 16, 1353-1360		22
214	Proteomic analysis of integrin-associated complexes from mesenchymal stem cells. 2016 , 10, 51-7		24
213	New bone formation induced by surface strontium-modified ceramic bone graft substitute. 2016 , 22, 53-61		8
212	Transgelin is a TGF β -inducible gene that regulates osteoblastic and adipogenic differentiation of human skeletal stem cells through actin cytoskeleton organization. 2016 , 7, e2321		47
211	Plasma treatment in conjunction with EGM-2 medium increases endothelial and osteogenic marker expressions of bone marrow mesenchymal stem cells. 2016 , 51, 9145-9154		4
210	Concise Review: Primary Cilia: Control Centers for Stem Cell Lineage Specification and Potential Targets for Cell-Based Therapies. 2016 , 34, 1445-54		23
209	Mesenchymal stem cells generate distinct functional hybrids in vitro via cell fusion or entosis. <i>Scientific Reports</i> , 2016 , 6, 36863	4.9	39
208	Injectable Polypeptide Hydrogels with Tunable Microenvironment for 3D Spreading and Chondrogenic Differentiation of Bone-Marrow-Derived Mesenchymal Stem Cells. 2016 , 17, 3862-3871		46
207	Bio- chemical and physical characterizations of mesenchymal stromal cells along the time course of directed differentiation. <i>Scientific Reports</i> , 2016 , 6, 31547	4.9	19
206	Activation of FAK promotes ERK-mediated osteogenesis for tensile force-subjected periodontal ligament cell. 2016 ,		
205	Surface Chemistry of Nanoscale Mineralized Collagen Regulates Periodontal Ligament Stem Cell Fate. 2016 , 8, 15958-66		33
204	BM-MSCs and Bio-Oss complexes enhanced new bone formation during maxillary sinus floor augmentation by promoting differentiation of BM-MSCs. 2016 , 52, 757-71		4
203	Early Passage Dependence of Mesenchymal Stem Cell Mechanics Influences Cellular Invasion and Migration. 2016 , 44, 2123-31		5
202	Murine Mesenchymal Stem Cell Commitment to Differentiation Is Regulated by Mitochondrial Dynamics. 2016 , 34, 743-55		106

201	Differentiation of mesenchymal stem cells for cartilage tissue engineering: Individual and synergetic effects of three-dimensional environment and mechanical loading. 2016 , 33, 1-12		71
200	Separation of Mesenchymal Stem Cells Through a Strategic Centrifugation Protocol. 2016 , 22, 348-59		1
199	One size does not fit all: developing a cell-specific niche for in vitro study of cell behavior. 2016 , 52-54, 426-441		54
198	Global profiling of the gene expression and alternative splicing events during hypoxia-regulated chondrogenic differentiation in human cartilage endplate-derived stem cells. 2016 , 107, 170-7		13
197	Fabrication of novel high surface area mushroom gilled fibers and their effects on human adipose derived stem cells under pulsatile fluid flow for tissue engineering applications. 2016 , 36, 220-30		7
196	Surface Engineering of Nanostructured Titanium Implants with Bioactive Ions. <i>Journal of Dental Research</i> , 2016 , 95, 558-65	8.1	34
195	Injectable dual-gelling cell-laden composite hydrogels for bone tissue engineering. <i>Biomaterials</i> , 2016 , 83, 1-11	15.6	94
194	The effect of low static magnetic field on osteogenic and adipogenic differentiation potential of human adipose stromal/stem cells. 2016 , 398, 235-245		25
193	Deformability of Human Mesenchymal Stem Cells Is Dependent on Vimentin Intermediate Filaments. 2017 , 45, 1365-1374		18
192	Role of Microtubules in Osteogenic Differentiation of Mesenchymal Stem Cells on 3D Nanofibrous Scaffolds. <i>ACS Biomaterials Science and Engineering</i> , 2017 , 3, 551-559	5.5	15
191	Magnetically Tuning Tether Mobility of Integrin Ligand Regulates Adhesion, Spreading, and Differentiation of Stem Cells. 2017 , 17, 1685-1695		75
190	Effects of organophosphates on the regulation of mesenchymal stem cell proliferation and differentiation. 2017 , 266, 38-46		4
189	Atomic Force Microscopy in Characterizing Cell Mechanics for Biomedical Applications: A Review. 2017 , 16, 523-540		52
188	High-throughput physical phenotyping of cell differentiation. 2017 , 3, 17013		39
187	Mesenchymal stem cell fate following non-viral gene transfection strongly depends on the choice of delivery vector. 2017 , 55, 226-238		50
186	Transcriptional Regulation of Adipogenesis. 2017 , 7, 635-674		188
185	Photothermally triggered actuation of hybrid materials as a new platform for in vitro cell manipulation. 2017 , 8, 14700		69
184	CRMP4 Inhibits Bone Formation by Negatively Regulating BMP and RhoA Signaling. 2017 , 32, 913-926		9

183	Biopolymer-based functional composites for medical applications. 2017 , 68, 77-105	207
182	Built-In Electric Fields Dramatically Induce Enhancement of Osseointegration. 2017 , 27, 1703771	35
181	Screening Platform for Cell Contact Guidance Based on Inorganic Biomaterial Micro/nanotopographical Gradients. 2017 , 9, 31433-31445	55
180	Stromal fibroblasts from perimenopausal endometrium exhibit a different transcriptome than those from the premenopausal endometrium. 2017 , 97, 387-399	4
179	Curved microstructures promote osteogenesis of mesenchymal stem cells via the RhoA/ROCK pathway. 2017 , 50,	28
178	Nanomechanical Characterization of Osteogenic Differentiation of Mesenchymal Stem Cells on Bioactive Peptide Nanofiber Hydrogels. 2017 , 4, 1700090	8
177	Influencing Factors in Atomic Force Microscopy Based Mechanical Characterization of Biological Cells. 2017 , 41, 673-687	5
176	Downregulation of the protein synthesis machinery is a major regulatory event during early adipogenic differentiation of human adipose-derived stromal cells. 2017 , 25, 191-201	16
175	Cyclic Stretch Effects on Adipose-Derived Stem Cell Stiffness, Morphology and Smooth Muscle Cell Gene Expression. 2017 , 14, 279-286	8
174	Tailoring biomaterial scaffolds for osteochondral repair. 2017 , 523, 476-489	29
173	X-rays effects on cytoskeleton mechanics of healthy and tumor cells. 2017 , 74, 40-52	11
172	Regulation of Adipogenesis Through Differential Modulation of ROS and Kinase Signaling Pathways by 3,4'-Dihydroxyflavone Treatment. 2017 , 118, 1065-1077	10
171	Simultaneous engagement of mechanical stretching and surface pattern promotes cardiomyogenic differentiation of human mesenchymal stem cells. 2017 , 123, 252-258	10
170	Metabolic Reconfiguration Supports Reacquisition of Primitive Phenotype in Human Mesenchymal Stem Cell Aggregates. 2017 , 35, 398-410	30
169	Transcriptomic Analyses of Adipocyte Differentiation From Human Mesenchymal Stromal-Cells (MSC). 2017 , 232, 771-784	22
168	Establishing the Basis for Mechanobiology-Based Physical Therapy Protocols to Potentiate Cellular Healing and Tissue Regeneration. 2017 , 8, 303	13
167	Mechanical Stress Regulates Osteogenesis and Adipogenesis of Rat Mesenchymal Stem Cells through PI3K/Akt/GSK-3/-Catenin Signaling Pathway. 2017 , 2017, 6027402	45
166	Neuron-Specific Fluorescence Reporter-Based Live Cell Tracing for Transdifferentiation of Mesenchymal Stem Cells into Neurons by Chemical Compound. 2017 , 2017, 8452830	4

165	Human decellularized bone scaffolds from aged donors show improved osteoinductive capacity compared to young donor bone. <i>PLoS ONE</i> , 2017 , 12, e0177416	3.7	17
164	Investigation of the Mechanical Properties of the Human Osteosarcoma Cell at Different Cell Cycle Stages 2017 , 8, 89		8
163	General regulatory effects of hypoxia on human cartilage endplate-derived stem cells: A genome-wide analysis of differential gene expression and alternative splicing events. <i>Molecular Medicine Reports</i> , 2017 , 16, 3001-3009	2.9	2
162	The optimization and production of stable homogeneous amine enriched surfaces with characterized nanotopographical properties for enhanced osteoinduction of mesenchymal stem cells. 2018 , 106, 1862-1877		7
161	The Evolution of Polystyrene as a Cell Culture Material. <i>Tissue Engineering - Part B: Reviews</i> , 2018 , 24, 359-372	7.9	99
160	Ablation of the mammalian lectin galectin-8 induces bone defects in mice. 2018 , 32, 2366-2380		9
159	Attachment and spatial organisation of human mesenchymal stem cells on poly(ethylene glycol) hydrogels. <i>Journal of the Mechanical Behavior of Biomedical Materials</i> , 2018 , 84, 46-53	4.1	5
158	Two-dimensional material-based bionano platforms to control mesenchymal stem cell differentiation. 2018 , 22, 10		20
157	Cyclic uniaxial compression of human stem cells seeded on a bone biomimetic nanocomposite decreases anti-osteogenic commitment evoked by shear stress. <i>Journal of the Mechanical Behavior of Biomedical Materials</i> , 2018 , 83, 84-93	4.1	8
156	Actin depolymerization enhances adipogenic differentiation in human stromal stem cells. 2018 , 29, 76-83		25
155	Introduction of Laser Interference Lithography to Make Nanopatterned Surfaces for Fundamental Studies on Stem Cell Response. <i>ACS Biomaterials Science and Engineering</i> , 2018 , 4, 1820-1832	5.5	9
154	Cell-Sheet-Derived ECM Coatings and Their Effects on BMSCs Responses. 2018 , 10, 11508-11518		20
153	Elucidating molecular events underlying topography mediated cardiomyogenesis of stem cells on 3D nanofibrous scaffolds. <i>Materials Science and Engineering C</i> , 2018 , 88, 104-114	8.3	21
152	Genipin cross-linked type II collagen/chondroitin sulfate composite hydrogel-like cell delivery system induces differentiation of adipose-derived stem cells and regenerates degenerated nucleus pulposus. 2018 , 71, 496-509		53
151	LARG GEF and ARHGAP18 orchestrate RhoA activity to control mesenchymal stem cell lineage. <i>Bone</i> , 2018 , 107, 172-180	4.7	19
150	Recellularization of decellularized adipose tissue-derived stem cells: role of the cell-secreted extracellular matrix in cellular differentiation. <i>Biomaterials Science</i> , 2017 , 6, 168-178	7.4	24
149	The Mechanobiology of the Actin Cytoskeleton in Stem Cells during Differentiation and Interaction with Biomaterials. 2018 , 2018, 2891957		26
148	Focal Adhesion Kinase and ROCK Signaling Are Switch-Like Regulators of Human Adipose Stem Cell Differentiation towards Osteogenic and Adipogenic Lineages. 2018 , 2018, 2190657		19

147	Static Magnetic Field (SMF) as a Regulator of Stem Cell Fate - New Perspectives in Regenerative Medicine Arising from an Underestimated Tool. 2018 , 14, 785-792		36
146	The effect of low-magnitude, high-frequency vibration on poly(ethylene glycol)-microencapsulated mesenchymal stem cells. 2018 , 9, 2041731418800101		10
145	Nanoengineered, cell-derived extracellular matrix influences ECM-related gene expression of mesenchymal stem cells. 2018 , 22, 32		19
144	Multifunctional effects of a modification of SLA titanium implant surface with strontium-containing nanostructures on immunoinflammatory and osteogenic cell function. 2018 , 106, 3009-3020		17
143	Adipoinductive effect of extracellular matrix involves cytoskeleton changes and SIRT1 activity in adipose tissue stem/stromal cells. 2018 , 46, S370-S382		4
142	Diabetes can change the viscoelastic properties of lymphocytes. 2018 , 7, 219-224		
141	Response of hPDLSCs on 3D printed PCL/PLGA composite scaffolds in vitro. <i>Molecular Medicine Reports</i> , 2018 , 18, 1335-1344	2.9	13
140	Vitamin D Promotes MSC Osteogenic Differentiation Stimulating Cell Adhesion and V3 Expression. 2018 , 2018, 6958713		18
139	Romidepsin Promotes Osteogenic and Adipocytic Differentiation of Human Mesenchymal Stem Cells through Inhibition of Histone deacetylase Activity. 2018 , 2018, 2379546		3
138	High-Throughput Screening of Rat Mesenchymal Stem Cell Behavior on Gradient TiO Nanotubes. <i>ACS Biomaterials Science and Engineering</i> , 2018 , 4, 2804-2814	5.5	19
137	A review of biomaterials in bone defect healing, remaining shortcomings and future opportunities for bone tissue engineering: The unsolved challenge. 2018 , 7, 232-243		219
136	Influence of Kartogenin on Chondrogenic Differentiation of Human Bone Marrow-Derived MSCs in 2D Culture and in Co-Cultivation with OA Osteochondral Explant. 2018 , 23,		13
135	Surface Severe Plastic Deformation of an Orthopedic Ti-Nb-Sn Alloy Induces Unusual Precipitate Remodeling and Supports Stem Cell Osteogenesis through Akt Signaling. <i>ACS Biomaterials Science and Engineering</i> , 2018 , 4, 3132-3142	5.5	14
134	Migration critically mediates osteoblastic differentiation of bone mesenchymal stem cells through activating canonical Wnt signal pathway. 2018 , 171, 205-213		10
133	Engineering mesenchymal stem cell spheroids by incorporation of mechanoregulator microparticles. <i>Journal of the Mechanical Behavior of Biomedical Materials</i> , 2018 , 84, 74-87	4.1	14
132	RhBMP-2 and concomitant rapid material degradation synergistically promote bone repair and regeneration with collagen-hydroxyapatite nanocomposites. 2018 , 6, 4338-4350		13
131	MicroRNA-138 Inhibits Osteogenic Differentiation and Mineralization of Human Dedifferentiated Chondrocytes by Regulating RhoC and the Actin Cytoskeleton. 2019 , 3, e10071		12
130	The utrophin-beta 2 syntrophin complex regulates adipocyte lipid droplet size independent of adipogenesis. 2019 , 452, 29-39		3

129	Impact of Four Protein Additives in Cryogels on Osteogenic Differentiation of Adipose-Derived Mesenchymal Stem Cells. <i>Bioengineering</i> , 2019 , 6,	5.3	8
128	Fluorescence Imaging of Actin Turnover Parses Early Stem Cell Lineage Divergence and Senescence. <i>Scientific Reports</i> , 2019 , 9, 10377	4.9	11
127	Alginate-nanohydroxyapatite hydrogel system: Optimizing the formulation for enhanced bone regeneration. <i>Materials Science and Engineering C</i> , 2019 , 105, 109985	8.3	31
126	The relative effects of Ca and Mg ions on MSC osteogenesis in the surface modification of microrough Ti implants. 2019 , 14, 5697-5711		26
125	Loss of ASAP1 in mice impairs adipogenic and osteogenic differentiation of mesenchymal progenitor cells through dysregulation of FAK/Src and AKT signaling. 2019 , 15, e1008216		13
124	Sphingosine 1-Phosphate (S1P)/ S1P Receptor Signaling and Mechanotransduction: Implications for Intrinsic Tissue Repair/Regeneration. <i>International Journal of Molecular Sciences</i> , 2019 , 20,	6.3	19
123	Permissive Electroconductive Nanocomposites for Neuronal Progenitor Cells. 2019 ,		
122	Isolation, Characterization, and Safety Evaluation of Human Skin-Derived Precursors from an Adherent Monolayer Culture System. 2019 , 2019, 9194560		3
121	Influence of nanoporous titanium niobium alloy surfaces produced via hydrogen peroxide oxidative etching on the osteogenic differentiation of human mesenchymal stromal cells. <i>Materials Science and Engineering C</i> , 2019 , 98, 635-648	8.3	9
120	Determinants of stem cell lineage differentiation toward chondrogenesis versus adipogenesis. <i>Cellular and Molecular Life Sciences</i> , 2019 , 76, 1653-1680	10.3	17
119	Construction of a micro/nano structured surface on a β -TCP/CaSiO ₃ bioceramic promotes osteogenic differentiation of mBMSCs. 2019 , 21, 513-523		3
118	Tauroursodeoxycholic acid (TUDCA) counters osteoarthritis by regulating intracellular cholesterol levels and membrane fluidity of degenerated chondrocytes. <i>Biomaterials Science</i> , 2019 , 7, 3178-3189	7.4	15
117	Bioglass 45S5: Structural characterization of short range order and analysis of biocompatibility with adipose-derived mesenchymal stromal cells in vitro and in vivo. <i>Materials Science and Engineering C</i> , 2019 , 103, 109781	8.3	9
116	Directional Topography Influences Adipose Mesenchymal Stromal Cell Plasticity: Prospects for Tissue Engineering and Fibrosis. 2019 , 2019, 5387850		20
115	Differential adhesion and fibrinolytic activity of mesenchymal stem cells from human bone marrow, placenta, and Wharton's jelly cultured in a fibrin hydrogel. 2019 , 10, 2041731419840622		9
114	Influence of hydrogel network microstructures on mesenchymal stem cell chondrogenesis in vitro and in vivo. 2019 , 91, 159-172		32
113	Uniaxial Cyclic Tensile Stretching at 8% Strain Exclusively Promotes Tenogenic Differentiation of Human Bone Marrow-Derived Mesenchymal Stromal Cells. 2019 , 2019, 9723025		20
112	A comparison of human mesenchymal stem cell osteogenesis in poly(ethylene glycol) hydrogels as a function of MMP-sensitive crosslinker and crosslink density in chemically defined medium. 2019 , 116, 1523-1536		9

111	Gene Expression Profiling of Human Adipose Tissue Stem Cells during 2D versus 3D Adipogenesis. 2019 , 208, 113-133		4
110	Colony Formation, Migratory, and Differentiation Characteristics of Multipotential Stromal Cells (MSCs) from "Clinically Accessible" Human Periosteum Compared to Donor-Matched Bone Marrow MSCs. 2019 , 2019, 6074245		10
109	On the Mechanisms of Action of the Low Molecular Weight Fraction of Commercial Human Serum Albumin in Osteoarthritis. 2019 , 15, 189-200		6
108	Cartilage/bone interface fabricated under perfusion: Spatially organized commitment of adipose-derived stem cells without medium supplementation. 2019 , 107, 1833-1843		8
107	SEMA3B-AS1-inhibited osteogenic differentiation of human mesenchymal stem cells revealed by quantitative proteomics analysis. 2019 , 234, 2491-2499		6
106	Finite element modeling of living cells for AFM indentation-based biomechanical characterization. 2019 , 116, 108-115		20
105	Pressure-induced mesenchymal stem cell osteogenesis is dependent on intermediate filament remodeling. 2019 , 33, 4178-4187		10
104	Maintenance and Culture of MSCs. 2019 , 39-61		1
103	Positive regulation of lipopolysaccharide-stimulated osteoblast functions by strontium modification of an SLA titanium implant surface. 2020 , 34, 802-811		2
102	Bioinspired poly (L-glutamic acid) hydrogels for enhanced chondrogenesis of bone marrow-derived mesenchymal stem cells. 2020 , 142, 332-344		28
101	Current understanding of the therapeutic benefits of mesenchymal stem cells in acute respiratory distress syndrome. 2020 , 36, 83-102		39
100	Lineage Commitment, Signaling Pathways, and the Cytoskeleton Systems in Mesenchymal Stem Cells. <i>Tissue Engineering - Part B: Reviews</i> , 2020 , 26, 13-25	7.9	30
99	Glutaraldehyde-crosslinking chitosan scaffolds reinforced with calcium phosphate spray-dried granules for bone tissue applications. <i>Materials Science and Engineering C</i> , 2020 , 109, 110557	8.3	29
98	Chondrogenic differentiation of human ASCs by stiffness control in 3D fibrin hydrogel. 2020 , 522, 213-219		21
97	ITGB1 promotes the chondrogenic differentiation of human adipose-derived mesenchymal stem cells by activating the ERK signaling. 2020 , 51, 729-739		10
96	miR-124-3p promotes BMSC osteogenesis via suppressing the GSK-3 β /catenin signaling pathway in diabetic osteoporosis rats. 2020 , 56, 723-734		6
95	Dynamic azopolymeric interfaces for photoactive cell instruction. 2020 , 1, 011302		6
94	Gene Expression Regulation and Secretory Activity of Mesenchymal Stem Cells upon In Vitro Contact with Microarc Calcium Phosphate Coating. <i>International Journal of Molecular Sciences</i> , 2020 , 21,	6.3	3

93	Quantitative assessment of the impact of cryopreservation on human bone marrow-derived mesenchymal stem cells: up to 24h post-thaw and beyond. <i>Stem Cell Research and Therapy</i> , 2020 , 11, 540	8.3	6
92	The negatively charged microenvironment of collagen hydrogels regulates the chondrogenic differentiation of bone marrow mesenchymal stem cells in vitro and in vivo. 2020 , 8, 4680-4693		12
91	Proteomic analysis of knee cartilage reveals potential signaling pathways in pathological mechanism of Kashin-Beck disease compared with osteoarthritis. <i>Scientific Reports</i> , 2020 , 10, 6824	4.9	7
90	Material-Dependent Formation and Degradation of Bone Matrix-Comparison of Two Cryogels. <i>Bioengineering</i> , 2020 , 7,	5.3	5
89	Influence of Microenvironment on Mesenchymal Stem Cell Therapeutic Potency: From Planar Culture to Microcarriers. <i>Frontiers in Bioengineering and Biotechnology</i> , 2020 , 8, 640	5.8	31
88	Mechanical Strain Promotes Proliferation of Adipose-Derived Stem Cells Through the Integrin α -Mediated RhoA/Myosin Light Chain Pathway. <i>Tissue Engineering - Part A</i> , 2020 , 26, 939-952	3.9	4
87	Dimensionality changes actin network through lamin A/C and zyxin. <i>Biomaterials</i> , 2020 , 240, 119854	15.6	7
86	Three-Dimensional Spheroid Culture on Polymer-Coated Surface Potentiate Stem Cell Functions via Enhanced Cell-Extracellular Matrix Interactions. <i>ACS Biomaterials Science and Engineering</i> , 2020 , 6, 2240-2250	5.5	5
85	Effects of scaffold geometry on chondrogenic differentiation of adipose-derived stem cells. <i>Materials Science and Engineering C</i> , 2020 , 110, 110733	8.3	11
84	Resveratrol inhibits adipocyte differentiation and cellular senescence of human bone marrow stromal stem cells. <i>Bone</i> , 2020 , 133, 115252	4.7	15
83	Topography induced stiffness alteration of stem cells influences osteogenic differentiation. <i>Biomaterials Science</i> , 2020 , 8, 2638-2652	7.4	23
82	Comparative transcriptome analysis of transcultured human skin-derived precursors (tSKPs) from adherent monolayer culture system and tSKPs-derived fibroblasts (tFBs) by RNA-Seq. <i>BioScience Trends</i> , 2020 , 14, 104-114	9.9	
81	Sdccag3 Promotes Implant Osseointegration during Experimental Hyperlipidemia. <i>Journal of Dental Research</i> , 2020 , 99, 938-948	8.1	3
80	Chondroinduction of Mesenchymal Stem Cells on Cellulose-Silk Composite Nanofibrous Substrates: The Role of Substrate Elasticity. <i>Frontiers in Bioengineering and Biotechnology</i> , 2020 , 8, 197	5.8	6
79	Additive manufacturing of nanocellulose based scaffolds for tissue engineering: Beyond a reinforcement filler. <i>Carbohydrate Polymers</i> , 2021 , 252, 117159	10.3	13
78	The role of microRNAs in bone development. <i>Bone</i> , 2021 , 143, 115760	4.7	12
77	Steering cell behavior through mechanobiology in 3D: A regenerative medicine perspective. <i>Biomaterials</i> , 2021 , 268, 120572	15.6	17
76	MiR-181d-5p regulates implant surface roughness-induced osteogenic differentiation of bone marrow stem cells. <i>Materials Science and Engineering C</i> , 2021 , 121, 111801	8.3	3

75	Physical and biological characterizations of TiNbSn/(Mg) system produced by powder metallurgy for use as prostheses material. <i>Journal of the Mechanical Behavior of Biomedical Materials</i> , 2021 , 115, 104260	4.1	3
74	Biomimetic mineralized microenvironment stiffness regulated BMSCs osteogenic differentiation through cytoskeleton mediated mechanical signaling transduction. <i>Materials Science and Engineering C</i> , 2021 , 119, 111613	8.3	5
73	The mechanobiology of adipocytes in the context of diabetes. 2021 , 143-160		
72	Infrapatellar Fat Pads-Derived Stem Cell Is a Favorable Cell Source for Articular Cartilage Tissue Engineering: An and Study Based on 3D Organized Self-Assembled Biomimetic Scaffold. <i>Cartilage</i> , 2021 , 1947603520988153	3	1
71	Effects of Gene Delivery Approaches on Differentiation Potential and Gene Function of Mesenchymal Stem Cells. <i>IEEE Transactions on Biomedical Engineering</i> , 2021 , PP,	5	0
70	Nuclear envelope mechanobiology: linking the nuclear structure and function. <i>Nucleus</i> , 2021 , 12, 90-114	3.9	2
69	PDGFRb mesenchymal cells, but not NG2 mural cells, contribute to cardiac fat. <i>Cell Reports</i> , 2021 , 34, 108697	10.6	3
68	Biomaterial-directed cell behavior for tissue engineering. <i>Current Opinion in Biomedical Engineering</i> , 2021 , 17, 100260-100260	4.4	3
67	0.5-Gy X-ray irradiation induces reorganization of cytoskeleton and differentiation of osteoblasts. <i>Molecular Medicine Reports</i> , 2021 , 23,	2.9	0
66	Transcriptomics-based analysis of the mechanism by which Wang-Bi capsule alleviates joint destruction in rats with collagen-induced arthritis. <i>Chinese Medicine</i> , 2021 , 16, 31	4.7	1
65	Neonatal hyperoxia impairs adipogenesis of bone marrow-derived mesenchymal stem cells and fat accumulation in adult mice. <i>Free Radical Biology and Medicine</i> , 2021 , 167, 287-298	7.8	0
64	On the Use of Black Ti as a Bone Substituting Biomaterial: Behind the Scenes of Dual-Functionality. <i>Small</i> , 2021 , 17, e2100706	11	5
63	Development of Titanium Implants with a Rough Calcium Phosphate Surface to Control the Morphofunctional State of Stem Cells. <i>Key Engineering Materials</i> , 887, 40-45	0.4	
62	Mesenchymal stem cells: a brief review of classis concepts and new factors of osteogenic differentiation. <i>Medical Immunology (Russia)</i> , 2021 , 23, 207-222	0.5	
61	Conditioning the microenvironment for soft tissue regeneration in a cell free scaffold. <i>Scientific Reports</i> , 2021 , 11, 13310	4.9	0
60	Bioprintable Lung Extracellular Matrix Hydrogel Scaffolds for 3D Culture of Mesenchymal Stromal Cells. <i>Polymers</i> , 2021 , 13,	4.5	6
59	Calcein Binding to Assess Mineralization in Hydrogel Microspheres. <i>Polymers</i> , 2021 , 13,	4.5	4
58	Modeling of the Human Bone Environment: Mechanical Stimuli Guide Mesenchymal Stem Cell-Extracellular Matrix Interactions. <i>Materials</i> , 2021 , 14,	3.5	5

57	Tropoelastin improves adhesion and migration of intra-articular injected infrapatellar fat pad MSCs and reduces osteoarthritis progression.. <i>Bioactive Materials</i> , 2022 , 10, 443-459	16.7	1
56	Integrins in the Regulation of Mesenchymal Stem Cell Differentiation by Mechanical Signals. <i>Stem Cell Reviews and Reports</i> , 2021 , 1	7.3	5
55	Collagen Promotes Higher Adhesion, Survival and Proliferation of Mesenchymal Stem Cells. <i>PLoS ONE</i> , 2015 , 10, e0145068	3.7	128
54	Osteogenic Differentiation Of Human Adipose-Derived Stem Cells (hASC): Role Of FAK and Ras-MAPK Signaling. <i>Journal of Stem Cell and Regenerative Biology</i> , 2016 , 2, 1-19		1
53	Effect of platelet-rich plasma on chondrogenic differentiation in three-dimensional culture. <i>The Open Orthopaedics Journal</i> , 2014 , 8, 78-84	0.3	14
52	"Ins" and "Outs" of mesenchymal stem cell osteogenesis in regenerative medicine. <i>World Journal of Stem Cells</i> , 2014 , 6, 94-110	5.6	20
51	Design Concept of Topographical and Mechanical Properties of Synthetic Extracellular Matrix to Control Cell Functions and Fates Through Actin Cytoskeletal Modulation. <i>Frontiers of Biomechanics</i> , 2015 , 159-186	0.2	1
50	Implant Surface Modifications and Osseointegration. <i>Springer Series in Biomaterials Science and Engineering</i> , 2017 , 107-131	0.6	1
49	Measurement of 3D Deformation Field of ECM Generated by Mesenchymal Stem Cell Using DVC Method. <i>Conference Proceedings of the Society for Experimental Mechanics</i> , 2018 , 9-14	0.3	
48	4D imaging reveals stage dependent random and directed cell motion during somite morphogenesis.		
47	Cartilaginous and osteochondral tissue formation by human mesenchymal stem cells on three-dimensionally woven scaffolds.		
46	Dimensionality changes actin network through lamin A and C and zyxin.		0
45	Biomimetic Mechanically Strong One-Dimensional Hydroxyapatite/Poly(d,l-lactide) Composite Inducing Formation of Anisotropic Collagen Matrix. <i>ACS Nano</i> , 2021 ,	16.7	2
44	Consistent apparent Young's modulus of human embryonic stem cells and derived cell types stabilized by substrate stiffness regulation promotes lineage specificity maintenance. <i>Cell Regeneration</i> , 2020 , 9, 15	2.5	2
43	Enhanced wound healing in diabetic mice by hyaluronan/chitosan multilayer-coated PLLA nanofibrous mats with sustained release of insulin. <i>Applied Surface Science</i> , 2022 , 576, 151825	6.7	2
42	Determination of nuclear position by the arrangement of actin filaments using deep generative networks.		0
41	Flavonoid Phloretin Inhibits Adipogenesis and Increases OPG Expression in Adipocytes Derived from Human Bone-Marrow Mesenchymal Stromal-Cells. <i>Nutrients</i> , 2021 , 13,	6.7	5
40	Vitronectin acts as a key regulator of adhesion and migration in umbilical cord-derived MSCs under different stress conditions.		1

39	Histone deacetylase inhibitor overrides the effect of soft hydrogel on the mechanoresponse of human mesenchymal stem cells.		
38	Consistent apparent Young's modulus of human embryonic stem cells and derived cell types stabilized by substrate stiffness regulation promotes lineage specificity maintenance. <i>Cell Regeneration</i> , 2020 , 9, 15	2.5	2
37	The integrin beta1 modulator Tirofiban prevents adipogenesis and obesity by the overexpression of integrin-linked kinase: a pre-clinical approach in vitro and in vivo.. <i>Cell and Bioscience</i> , 2022 , 12, 10	9.8	0
36	Dendrimer-modified gelatin methacrylate hydrogels carrying adipose-derived stromal/stem cells promote cartilage regeneration.. <i>Stem Cell Research and Therapy</i> , 2022 , 13, 26	8.3	2
35	Hierarchical Intrafibrillarly Mineralized Collagen Membrane Promotes Guided Bone Regeneration and Regulates M2 Macrophage Polarization.. <i>Frontiers in Bioengineering and Biotechnology</i> , 2021 , 9, 781268	5.8	2
34	Regulatory mechanisms of the early phase of white adipocyte differentiation: an overview.. <i>Cellular and Molecular Life Sciences</i> , 2022 , 79, 139	10.3	2
33	Graphene-Oxide-Enriched Biomaterials: A Focus on Osteo and Chondroinductive Properties and Immunomodulation.. <i>Materials</i> , 2022 , 15,	3.5	1
32	Fracture repair by IOX2: Regulation of the hypoxia inducible factor-1 signaling pathway and BMSCs.. <i>European Journal of Pharmacology</i> , 2022 , 921, 174864	5.3	0
31	ROS-Influenced Regulatory Cross-Talk With Wnt Signaling Pathway During Perinatal Development.. <i>Frontiers in Molecular Biosciences</i> , 2022 , 9, 889719	5.6	0
30	Scaffold Pore Curvature Influences BC Fate through Differential Cellular Organization and YAP/TAZ Activity.. <i>International Journal of Molecular Sciences</i> , 2022 , 23,	6.3	2
29	Data_Sheet_1.docx. 2020 ,		
28	Cytochalasin B Modulates Nanomechanical Patterning and Fate in Human Adipose-Derived Stem Cells. <i>Cells</i> , 2022 , 11, 1629	7.9	3
27	Engineering cell-substrate interactions on porous membranes for microphysiological system.. <i>Lab on A Chip</i> , 2022 ,	7.2	3
26	Epigallocatechine-3-gallate Inhibits the Adipogenesis of Human Mesenchymal Stem Cells via the Regulation of Protein Phosphatase-2A and Myosin Phosphatase. <i>Cells</i> , 2022 , 11, 1704	7.9	0
25	Modulation of Osteogenic Differentiation of Adipose-Derived Stromal Cells by Co-Treatment with 3, 4'-Dihydroxyflavone, U0126, and N-Acetyl Cysteine. <i>International Journal of Stem Cells</i> , 2022 ,	3	0
24	Gellan Gum Is a Suitable Biomaterial for Manual and Bioprinted Setup of Long-Term Stable, Functional 3D-Adipose Tissue Models. <i>Gels</i> , 2022 , 8, 420	4.2	1
23	From qualitative data to correlation using deep generative networks: Demonstrating the relation of nuclear position with the arrangement of actin filaments. 2022 , 17, e0271056		
22	Ion elemental-optimized layered double hydroxide nanoparticles promote chondrogenic differentiation and intervertebral disc regeneration of mesenchymal stem cells through focal adhesion signaling pathway. 2023 , 22, 75-90		0

21	Chondrogenic differentiation of mesenchymal stem cells through cartilage matrix-inspired surface coatings. 10,	0
20	Inhibiting DNA methylation as a strategy to enhance adipose-derived stem cells differentiation: Focus on the role of Akt/mTOR and Wnt/ β -catenin pathways on adipogenesis. 10,	2
19	Mechanotransduction through adhesion molecules: Emerging roles in regulating the stem cell niche. 10,	0
18	Mesenchymal Stem Cell Sheet Centrifuge-Assisted Layering Augments Pro-Regenerative Cytokine Production. 2022, 11, 2840	0
17	Enhanced Cell Osteogenesis and Osteoimmunology Regulated by Piezoelectric Biomaterials with Controllable Surface Potential and Charges. 2022, 14, 44111-44124	0
16	Articular fibrocartilage-targeted therapy by microtubule stabilization. 2022, 8,	0
15	Engineering the dynamics of biophysical cues in supramolecular hydrogels to facilitate control stem cell chondrogenesis for cartilage regeneration. 2022, 110429	0
14	Enhanced osteogenic differentiation of human mesenchymal stem cells using size-controlled graphene oxide flakes. 2023, 144, 213221	0
13	Chapter 14. Tissue Engineered Models of Metastasis: Focus on Bone Metastasis. 2022, 384-414	0
12	Regulation of Mesenchymal Stem Cell Morphology Using Hydrogel Substrates with Tunable Topography and Photoswitchable Stiffness. 2022, 14, 5338	0
11	EVL Promotes Osteo-/Odontogenic Differentiation of Dental Pulp Stem Cells via Activating JNK Signaling Pathway. 2023, 2023, 1-14	0
10	Mechano-responsive hydrogel for direct stem cell manufacturing to therapy. 2023, 24, 387-400	0
9	Key circRNAs from goat: discovery, integrated regulatory network and their putative roles in the differentiation of intramuscular adipocytes. 2023, 24,	0
8	Biomechanical, biophysical and biochemical modulators of cytoskeletal remodelling and emergent stem cell lineage commitment. 2023, 6,	1
7	Contact guidance of mesenchymal stem cells by flagellin-modified substrates: Aspects of cell-surface interaction from the point of view of liquid crystal theory. 2023, 663, 131113	0
6	How Mechanical and Physicochemical Material Characteristics Influence Adipose-Derived Stem Cell Fate. 2023, 24, 3551	0
5	Cytochalasin B Influences Cytoskeletal Organization and Osteogenic Potential of Human Wharton's Jelly Mesenchymal Stem Cells. 2023, 16, 289	0
4	The enhanced generation of motor neurons from mESCs by MgAl layered double hydroxide nanoparticles. 2023, 18, 034101	0

- 3 Evaluation of the effects of glucosamine sulfate on poly(3- hydroxybutyrate) -chitosan/carbon nanotubes electrospun scaffold for cartilage tissue engineering applications. **2022**, 61, 1244-1264 ○
- 2 Unique osteogenic profile of bone marrow stem cells stimulated in perfusion bioreactor is Rho-ROCK -mediated contractility dependent. ○
- 1 The dependences of mesenchymal stem cells commitments on the size, concentration, internalization and exposure time of Iron Oxide Nanoparticles through F-actin, Lamin A and ROS. ○