Su Ryon Shin

List of Publications by Year in Descending Order

137 papers	10,978 citations	51 h-index	104 g-index
144 ext. papers	12,916 ext. citations	11 avg, IF	6.3 L-index

#	Paper	IF	Citations
137	Selection of natural biomaterials for micro-tissue and organ-on-chip models.. *Journal of Biomedical Materials Research - Part A*, **2022**,	5.4	2
136	A review on 3D printing functional brain model.. *Biomicrofluidics*, **2022**, 16, 011501	3.2	2
135	Enzyme-mediated Alleviation of Peroxide Toxicity in Self-oxygenating Biomaterials.. *Advanced Healthcare Materials*, **2022**, e2102697	10.1	0
134	Mimicking Native Heart Tissue Physiology and Pathology in Silk Fibroin Constructs Through Perfusion-based Dynamic Mechanical Stimulation Microdevice.. *Advanced Healthcare Materials*, **2021**, e2101678	10.1	1
133	Characterization of Leptin Receptor Stromal Cells in Lymph Node.. *Frontiers in Immunology*, **2021**, 12, 730438	8.4	
132	Emerging Biopolymer-Based Bioadhesives.. *Macromolecular Bioscience*, **2021**, e2100340	5.5	5
131	Effects of electrically conductive nano-biomaterials on regulating cardiomyocyte behavior for cardiac repair and regeneration. *Acta Biomaterialia*, **2021**, 139, 141-141	10.8	3
130	Photo-Cross-Linkable Human Albumin Colloidal Gels Facilitate In Vivo Vascular Integration for Regenerative Medicine.. *ACS Omega*, **2021**, 6, 33511-33522	3.9	1
129	Tethering Cells via Enzymatic Oxidative Crosslinking Enables Mechanotransduction in Non-Cell-Adhesive Materials (Adv. Mater. 42/2021). *Advanced Materials*, **2021**, 33, 2170333	24	
128	Nanoengineered Shear-Thinning Hydrogel Barrier for Preventing Postoperative Abdominal Adhesions. *Nano-Micro Letters*, **2021**, 13, 212	19.5	4
127	Suturable elastomeric tubular grafts with patterned porosity for rapid vascularization of 3D constructs. *Biofabrication*, **2021**,	10.5	4
126	Organ-on-a-Chip: A Heart-Breast Cancer-on-a-Chip Platform for Disease Modeling and Monitoring of Cardiotoxicity Induced by Cancer Chemotherapy (Small 15/2021). *Small*, **2021**, 17, 2170070	11	
125	Microfluidic integration of regeneratable electrochemical affinity-based biosensors for continual monitoring of organ-on-a-chip devices. *Nature Protocols*, **2021**, 16, 2564-2593	18.8	19
124	3D bioprinted human iPSC-derived somatosensory constructs with functional and highly purified sensory neuron networks. *Biofabrication*, **2021**, 13,	10.5	3
123	Injectable hydrogel derived from chitosan with tunable mechanical properties via hybrid-crosslinking system. *Carbohydrate Polymers*, **2021**, 251, 117036	10.3	19
122	A Heart-Breast Cancer-on-a-Chip Platform for Disease Modeling and Monitoring of Cardiotoxicity Induced by Cancer Chemotherapy. *Small*, **2021**, 17, e2004258	11	21
121	Designing Gelatin Methacryloyl (GelMA)-Based Bioinks for Visible Light Stereolithographic 3D Biofabrication. *Macromolecular Bioscience*, **2021**, 21, e2000317	5.5	14

120	Tissue Adhesives: From Research to Clinical Translation. *Nano Today*, **2021**, 36, 101049-101049	17.9	19
119	Oxygen-Releasing Biomaterials: Current Challenges and Future Applications. *Trends in Biotechnology*, **2021**, 39, 1144-1159	15.1	12
118	Light-Controlled Growth Factors Release on Tetrapodal ZnO-Incorporated 3D-Printed Hydrogels for Developing Smart Wound Scaffold. *Advanced Functional Materials*, **2021**, 31, 2007555	15.6	18
117	Synthesis and characterization of C2C12-laden gelatin methacryloyl (GelMA) from marine and mammalian sources. *International Journal of Biological Macromolecules*, **2021**, 183, 918-926	7.9	2
116	Tethering Cells via Enzymatic Oxidative Crosslinking Enables Mechanotransduction in Non-Cell-Adhesive Materials. *Advanced Materials*, **2021**, 33, e2102660	24	3
115	Recent trends in gelatin methacryloyl nanocomposite hydrogels for tissue engineering. *Journal of Biomedical Materials Research - Part A*, **2021**,	5.4	11
114	Kidney-Draining Lymph Node Fibrosis Following Unilateral Ureteral Obstruction.. *Frontiers in Immunology*, **2021**, 12, 768412	8.4	
113	Cell-Laden Gelatin Methacryloyl Bioink for the Fabrication of Z-Stacked Hydrogel Scaffolds for Tissue Engineering. *Polymers*, **2020**, 12,	4.5	3
112	Novel Cell-Based and Tissue Engineering Approaches for Induction of Angiogenesis as an Alternative Therapy for Diabetic Retinopathy. *International Journal of Molecular Sciences*, **2020**, 21,	6.3	3
111	Myocardial Tissue Engineering: Nonmulberry Silk Based Ink for Fabricating Mechanically Robust Cardiac Patches and Endothelialized Myocardium-on-a-Chip Application (Adv. Funct. Mater. 12/2020). *Advanced Functional Materials*, **2020**, 30, 2070079	15.6	2
110	Bioinspired Soft Robot with Incorporated Microelectrodes. *Journal of Visualized Experiments*, **2020**,	1.6	4
109	Materials and technical innovations in 3D printing in biomedical applications. *Journal of Materials Chemistry B*, **2020**, 8, 2930-2950	7.3	52
108	Silver Nanoparticles-Composing Alginate/Gelatine Hydrogel Improves Wound Healing In Vivo. *Nanomaterials*, **2020**, 10,	5.4	79
107	Nonmulberry Silk Based Ink for Fabricating Mechanically Robust Cardiac Patches and Endothelialized Myocardium-on-a-Chip Application. *Advanced Functional Materials*, **2020**, 30, 1907436	15.6	23
106	Combinatorial screening of biochemical and physical signals for phenotypic regulation of stem cell-based cartilage tissue engineering. *Science Advances*, **2020**, 6, eaaz5913	14.3	18
105	Lymph node fibroblastic reticular cells deposit fibrosis-associated collagen following organ transplantation. *Journal of Clinical Investigation*, **2020**, 130, 4182-4194	15.9	7
104	Hydrogel Production Platform with Dynamic Movement Using Photo-Crosslinkable/Temperature Reversible Chitosan Polymer and Stereolithography 4D Printing Technology. *Tissue Engineering and Regenerative Medicine*, **2020**, 17, 423-431	4.5	28
103	Toward a neurospheroid niche model: optimizing embedded 3D bioprinting for fabrication of neurospheroid brain-like co-culture constructs. *Biofabrication*, **2020**,	10.5	16

102	Ferritin Nanocage Conjugated Hybrid Hydrogel for Tissue Engineering and Drug Delivery Applications. *ACS Biomaterials Science and Engineering*, **2020**, 6, 277-287	5.5	16
101	Customizable Composite Fibers for Engineering Skeletal Muscle Models. *ACS Biomaterials Science and Engineering*, **2020**, 6, 1112-1123	5.5	18
100	A 3D-Printed Hybrid Nasal Cartilage with Functional Electronic Olfaction. *Advanced Science*, **2020**, 7, 1901878	15.8	38
99	Printing of Adhesive Hydrogel Scaffolds for the Treatment of Skeletal Muscle Injuries.. *ACS Applied Bio Materials*, **2020**, 3, 1568-1579	4.1	50
98	Development of bentonite-gelatin nanocomposite hybrid hydrogels for tissue engineering. *Applied Clay Science*, **2020**, 199, 105860	5.2	6
97	Kappa-Carrageenan-Based Dual Crosslinkable Bioink for Extrusion Type Bioprinting. *Polymers*, **2020**, 12,	4.5	14
96	Strategies to use fibrinogen as bioink for 3D bioprinting fibrin-based soft and hard tissues. *Acta Biomaterialia*, **2020**, 117, 60-76	10.8	53
95	Immune Organs and Immune Cells on a Chip: An Overview of Biomedical Applications. *Micromachines*, **2020**, 11,	3.3	21
94	Engineering Smart Targeting Nanovesicles and Their Combination with Hydrogels for Controlled Drug Delivery. *Pharmaceutics*, **2020**, 12,	6.4	31
93	A Foreign Body Response-on-a-Chip Platform. *Advanced Healthcare Materials*, **2019**, 8, e1801425	10.1	29
92	Flexible and Stretchable PEDOT-Embedded Hybrid Substrates for Bioengineering and Sensory Applications. *ChemNanoMat*, **2019**, 5, 729-737	3.5	8
91	Biocompatible Carbon Nanotube-Based Hybrid Microfiber for Implantable Electrochemical Actuator and Flexible Electronic Applications. *ACS Applied Materials & Interfaces*, **2019**, 11, 20615-20627	8.5	22
90	Multiscale bioprinting of vascularized models. *Biomaterials*, **2019**, 198, 204-216	15.6	118
89	Modular Fabrication of Intelligent Material-Tissue Interfaces for Bioinspired and Biomimetic Devices. *Progress in Materials Science*, **2019**, 106,	42.2	48
88	Nanoparticle-Based Hybrid Scaffolds for Deciphering the Role of Multimodal Cues in Cardiac Tissue Engineering. *ACS Nano*, **2019**, 13, 12525-12539	16.7	44
87	3D Printed Cartilage-Like Tissue Constructs with Spatially Controlled Mechanical Properties. *Advanced Functional Materials*, **2019**, 29, 1906330	15.6	33
86	3D Printed Tissues: 3D Printed Cartilage-Like Tissue Constructs with Spatially Controlled Mechanical Properties (Adv. Funct. Mater. 51/2019). *Advanced Functional Materials*, **2019**, 29, 1970350	15.6	1
85	Cardiac Fibrotic Remodeling on a Chip with Dynamic Mechanical Stimulation. *Advanced Healthcare Materials*, **2019**, 8, e1801146	10.1	33

84	Tissue Regeneration: A Multifunctional Polymeric Periodontal Membrane with Osteogenic and Antibacterial Characteristics (Adv. Funct. Mater. 3/2018). *Advanced Functional Materials*, **2018**, 28, 1870021	15.6	4
83	Electrically Driven Microengineered Bioinspired Soft Robots. *Advanced Materials*, **2018**, 30, 1704189	24	94
82	Interconnectable Dynamic Compression Bioreactors for Combinatorial Screening of Cell Mechanobiology in Three Dimensions. *ACS Applied Materials & Interfaces*, **2018**, 10, 13293-13303	9.5	25
81	Protein/polysaccharide-based scaffolds mimicking native extracellular matrix for cardiac tissue engineering applications. *Journal of Biomedical Materials Research - Part A*, **2018**, 106, 769-781	5.4	45
80	A Dual-layered Microfluidic System for Long-term Controlled In Situ Delivery of Multiple Anti-inflammatory Factors for Chronic Neural Applications. *Advanced Functional Materials*, **2018**, 28, 1702009	15.6	16
79	Reversible Redox Activity by Ion-pH Dually Modulated Duplex Formation of i-Motif DNA with Complementary G-DNA. *Nanomaterials*, **2018**, 8,	5.4	2
78	Microfluidics-Enabled Multimaterial Maskless Stereolithographic Bioprinting. *Advanced Materials*, **2018**, 30, e1800242	24	190
77	Delivery of Cargo with a Bioelectronic Trigger. *ACS Applied Materials & Interfaces*, **2018**, 10, 21782-21787	9.5	10
76	A Multifunctional Polymeric Periodontal Membrane with Osteogenic and Antibacterial Characteristics. *Advanced Functional Materials*, **2018**, 28, 1703437	15.6	111
75	Marine Biomaterial-Based Bioinks for Generating 3D Printed Tissue Constructs. *Marine Drugs*, **2018**, 16,	6	34
74	pH-Responsive DNA Nanolinker Conjugated Hybrid Materials for Electrochemical Microactuator and Biosensor Applications. *ACS Applied Nano Materials*, **2018**, 1, 6630-6640	5.6	6
73	Bioprinting: Microfluidics-Enabled Multimaterial Maskless Stereolithographic Bioprinting (Adv. Mater. 27/2018). *Advanced Materials*, **2018**, 30, 1870201	24	4
72	3D Bioprinting for Tissue and Organ Fabrication. *Annals of Biomedical Engineering*, **2017**, 45, 148-163	4.7	368
71	Bioprinting: Rapid Continuous Multimaterial Extrusion Bioprinting (Adv. Mater. 3/2017). *Advanced Materials*, **2017**, 29,	24	9
70	Gold Nanocomposite Bioink for Printing 3D Cardiac Constructs. *Advanced Functional Materials*, **2017**, 27, 1605352	15.6	173
69	Multisensor-integrated organs-on-chips platform for automated and continual in situ monitoring of organoid behaviors. *Proceedings of the National Academy of Sciences of the United States of America*, **2017**, 114, E2293-E2302	11.5	416
68	Label-Free and Regenerative Electrochemical Microfluidic Biosensors for Continual Monitoring of Cell Secretomes. *Advanced Science*, **2017**, 4, 1600522	13.6	80
67	Engineered 3D Cardiac Fibrotic Tissue to Study Fibrotic Remodeling. *Advanced Healthcare Materials*, **2017**, 6, 1601434	10.1	51

66	Bioprinted Osteogenic and Vasculogenic Patterns for Engineering 3D Bone Tissue. *Advanced Healthcare Materials*, **2017**, 6, 1700015	10.1	222
65	Biosensors: Label-Free and Regenerative Electrochemical Microfluidic Biosensors for Continual Monitoring of Cell Secretomes (Adv. Sci. 5/2017). *Advanced Science*, **2017**, 4,	13.6	3
64	Tissue Engineering: Gold Nanocomposite Bioink for Printing 3D Cardiac Constructs (Adv. Funct. Mater. 12/2017). *Advanced Functional Materials*, **2017**, 27,	15.6	2
63	Single Cell Microgel Based Modular Bioinks for Uncoupled Cellular Micro- and Macroenvironments. *Advanced Healthcare Materials*, **2017**, 6, 1600913	10.1	51
62	Spatially and Temporally Controlled Hydrogels for Tissue Engineering. *Materials Science and Engineering Reports*, **2017**, 119, 1-35	30.9	115
61	Integrin-Mediated Interactions Control Macrophage Polarization in 3D Hydrogels. *Advanced Healthcare Materials*, **2017**, 6, 1700289	10.1	101
60	Nanostructured Fibrous Membranes with Rose Spike-Like Architecture. *Nano Letters*, **2017**, 17, 6235-6240	11.5	60
59	In vitro and in vivo analysis of visible light crosslinkable gelatin methacryloyl (GelMA) hydrogels. *Biomaterials Science*, **2017**, 5, 2093-2105	7.4	152
58	Rapid Continuous Multimaterial Extrusion Bioprinting. *Advanced Materials*, **2017**, 29, 1604630	24	205
57	4D bioprinting: the next-generation technology for biofabrication enabled by stimuli-responsive materials. *Biofabrication*, **2016**, 9, 012001	10.5	190
56	Aptamer-Based Microfluidic Electrochemical Biosensor for Monitoring Cell-Secreted Trace Cardiac Biomarkers. *Analytical Chemistry*, **2016**, 88, 10019-10027	7.8	137
55	Cell-microenvironment interactions and architectures in microvascular systems. *Biotechnology Advances*, **2016**, 34, 1113-1130	17.8	40
54	A liver-on-a-chip platform with bioprinted hepatic spheroids. *Biofabrication*, **2016**, 8, 014101	10.5	353
53	Nanoengineered biomimetic hydrogels for guiding human stem cell osteogenesis in three dimensional microenvironments. *Journal of Materials Chemistry B*, **2016**, 4, 3544-3554	7.3	122
52	Elastomeric free-form blood vessels for interconnecting organs on chip systems. *Lab on A Chip*, **2016**, 16, 1579-86	7.2	70
51	Cold Water Fish Gelatin Methacryloyl Hydrogel for Tissue Engineering Application. *PLoS ONE*, **2016**, 11, e0163902	3.7	74
50	Reduced Graphene Oxide-GelMA Hybrid Hydrogels as Scaffolds for Cardiac Tissue Engineering. *Small*, **2016**, 12, 3677-89	11	283
49	Microfluidic Bioprinting of Heterogeneous 3D Tissue Constructs Using Low-Viscosity Bioink. *Advanced Materials*, **2016**, 28, 677-84	24	530

48	A Bioactive Carbon Nanotube-Based Ink for Printing 2D and 3D Flexible Electronics. *Advanced Materials*, **2016**, 28, 3280-9	24	156
47	Automated microfluidic platform of bead-based electrochemical immunosensor integrated with bioreactor for continual monitoring of cell secreted biomarkers. *Scientific Reports*, **2016**, 6, 24598	4.9	107
46	Graphene-based materials for tissue engineering. *Advanced Drug Delivery Reviews*, **2016**, 105, 255-274	18.5	404
45	Highly Elastic and Conductive Human-Based Protein Hybrid Hydrogels. *Advanced Materials*, **2016**, 28, 40-9	24	187
44	Platinum nanopetal-based potassium sensors for acute cell death monitoring. *RSC Advances*, **2016**, 6, 40517-40526	3.7	13
43	Direct 3D bioprinting of perfusable vascular constructs using a blend bioink. *Biomaterials*, **2016**, 106, 58-68	15.6	544
42	Aligned carbon nanotube-based flexible gel substrates for engineering bio-hybrid tissue actuators. *Advanced Functional Materials*, **2015**, 25, 4486-4495	15.6	116
41	Controlling mechanical properties of cell-laden hydrogels by covalent incorporation of graphene oxide. *Small*, **2014**, 10, 514-23	11	159
40	Microfluidics-assisted fabrication of gelatin-silica core-shell microgels for injectable tissue constructs. *Biomacromolecules*, **2014**, 15, 283-90	6.9	100
39	Surgical Materials: Current Challenges and Nano-enabled Solutions. *Nano Today*, **2014**, 9, 574-589	17.9	128
38	Injectable graphene oxide/hydrogel-based angiogenic gene delivery system for vasculogenesis and cardiac repair. *ACS Nano*, **2014**, 8, 8050-62	16.7	359
37	Tough and flexible CNT-polymeric hybrid scaffolds for engineering cardiac constructs. *Biomaterials*, **2014**, 35, 7346-54	15.6	209
36	Layer-by-layer assembly of 3D tissue constructs with functionalized graphene. *Advanced Functional Materials*, **2014**, 24, 6136-6144	15.6	131
35	Chitin Nanofiber Micropatterned Flexible Substrates for Tissue Engineering. *Journal of Materials Chemistry B*, **2013**, 1,	7.3	55
34	Cell-laden microengineered and mechanically tunable hybrid hydrogels of gelatin and graphene oxide. *Advanced Materials*, **2013**, 25, 6385-91	24	225
33	Carbon-nanotube-embedded hydrogel sheets for engineering cardiac constructs and bioactuators. *ACS Nano*, **2013**, 7, 2369-80	16.7	659
32	Carbon-based nanomaterials: multifunctional materials for biomedical engineering. *ACS Nano*, **2013**, 7, 2891-7	16.7	573
31	DNA-coated MWNT microfibers for electrochemical actuator. *Sensors and Actuators B: Chemical*, **2012**, 162, 173-177	8.5	11

30	Carbon nanotube reinforced hybrid microgels as scaffold materials for cell encapsulation. *ACS Nano* , **2012**, 6, 362-72	16.7	347
29	Effect of C(60) fullerene on the duplex formation of i-motif DNA with complementary DNA in solution. *Journal of Physical Chemistry B*, **2010**, 114, 4783-8	3.4	23
28	Enhanced actuation of PPy/CNT hybrid fibers using porous structured DNA hydrogel. *Sensors and Actuators B: Chemical*, **2010**, 145, 89-92	8.5	28
27	Nanocomposite Hydrogel with High Toughness for Bioactuators. *Advanced Materials*, **2009**, 21, 1712-1715	24	174
26	Fullerene Attachment Enhances Performance of a DNA Nanomachine. *Advanced Materials*, **2009**, 21, 1907-1910	24	46
25	Tough supersoft sponge fibers with tunable stiffness from a DNA self-assembly technique. *Angewandte Chemie - International Edition*, **2009**, 48, 5116-20	16.4	31
24	pH-dependent structures of an i-motif DNA in solution. *Journal of Physical Chemistry B*, **2009**, 113, 1852-6	3.4	54
23	Switchable redox activity by proton fuelled DNA nano-machines. *Chemical Communications*, **2009**, 1240-2	3.8	16
22	Hydrogel-Assisted Polyaniline Microfiber as Controllable Electrochemical Actuatable Supercapacitor. *Journal of the Electrochemical Society*, **2009**, 156, A313	3.9	51
21	Electrochemical pH oscillations of ethyl viologen/ionic liquid. *Langmuir*, **2008**, 24, 3562-5	4	3
20	DNA hydrogel fiber with self-entanglement prepared by using an ionic liquid. *Angewandte Chemie - International Edition*, **2008**, 47, 2470-4	16.4	45
19	Electrochemical actuation in chitosan/polyaniline microfibers for artificial muscles fabricated using an in situ polymerization. *Sensors and Actuators B: Chemical*, **2008**, 129, 834-840	8.5	121
18	A novel dual mode actuation in chitosan/polyaniline/carbon nanotube fibers. *Sensors and Actuators B: Chemical*, **2007**, 121, 616-621	8.5	60
17	Fabrication of Polymeric Composite Nanostructures Containing Ferritin Nanoparticles and Carbon Nanotubes. *Materials Research Society Symposia Proceedings*, **2006**, 921, 1		1
16	Mechanical properties of chitosan/CNT microfibers obtained with improved dispersion. *Sensors and Actuators B: Chemical*, **2006**, 115, 678-684	8.5	104
15	Synthesis of conducting polyaniline in semi-IPN based on chitosan. *Synthetic Metals*, **2005**, 154, 213-216	3.6	34
14	Swelling Behavior of Semi-Interpenetrating Polymer Network Hydrogels Based on Chitosan and Poly(acryl amide). *Journal of Macromolecular Science - Pure and Applied Chemistry*, **2005**, 42, 1073-1083	2.2	24
13	Synthesis and characteristics of semi-interpenetrating polymer network hydrogels based on chitosan and poly(hydroxy ethyl methacrylate). *Journal of Applied Polymer Science*, **2005**, 96, 86-92	2.9	28

12	Synthesis and characteristics of a semi-interpenetrating polymer network based on chitosan/polyaniline under different pH conditions. *Journal of Applied Polymer Science*, **2005**, 96, 867-873	2.9	53
11	Enhancement of the electromechanical behavior of IPMCs based on chitosan/polyaniline ion exchange membranes fabricated by freeze-drying. *Smart Materials and Structures*, **2005**, 14, 889-894	3.4	20
10	Electromechanical properties of hydrogels based on chitosan and poly(hydroxyethyl methacrylate) in NaCl solution. *Smart Materials and Structures*, **2004**, 13, 1036-1039	3.4	50
9	Synthesis and characteristics of polyelectrolyte complexes composed of chitosan and hyaluronic acid. *Journal of Applied Polymer Science*, **2004**, 91, 2908-2913	2.9	30
8	Electrical behavior of chitosan and poly(hydroxyethyl methacrylate) hydrogel in the contact system. *Journal of Applied Polymer Science*, **2004**, 92, 915-919	2.9	30
7	Swelling characterizations of chitosan and polyacrylonitrile semi-interpenetrating polymer network hydrogels. *Journal of Applied Polymer Science*, **2003**, 87, 2011-2015	2.9	49
6	Water and temperature response of semi-IPN hydrogels composed of chitosan and polyacrylonitrile. *Journal of Applied Polymer Science*, **2003**, 88, 2721-2724	2.9	14
5	Electrical response characterization of chitosan/polyacrylonitrile hydrogel in NaCl solutions. *Journal of Applied Polymer Science*, **2003**, 90, 91-96	2.9	49
4	Thermal Characteristics of Polyelectrolyte Complexes Composed of Chitosan and Hyaluronic Acid. *Journal of Macromolecular Science - Pure and Applied Chemistry*, **2003**, 40, 807-815	2.2	17
3	Engineering bioactive synthetic polymers for biomedical applications: a review with emphasis on tissue engineering and controlled release. *Materials Advances*,	3.3	6
2	hiPSC-derived 3D Bioprinted Skeletal Muscle Tissue Implants Regenerate Skeletal Muscle Following Volumetric Muscle Loss		2
1	Wirelessly Powered 3D Printed Hierarchical Biohybrid Robots with Multiscale Mechanical Properties. *Advanced Functional Materials*,2202674	15.6	0