

Table S1 List of the 100 most-cited articles in Wnt research

Rank	Paper	Country	Citation density	Citations in last five years	Citations
1	Wnt/beta-catenin signaling in development and disease	Netherlands	270.00	1,224	3,780
2	The Wnt signaling pathway in development and disease	United states	230.19	961	3,683
3	Wnt/beta-Catenin Signaling: Components, Mechanisms, and Diseases	United states	280.00	1,555	3,080
4	Wnt/beta-Catenin Signaling and Disease	Netherlands	361.63	1,807	2,893
5	Wnt signaling and cancer	United states	136.25	356	2,725
6	Wnt signalling in stem cells and cancer	United states	176.53	667	2,648
7	Functional interaction of beta-catenin with the transcription factor LEF-1	Germany	97.75	270	2,346
8	Wnt signaling: a common theme in animal development	United states	90.04	198	2,071
9	Convergence of Wnt, beta-catenin, and cadherin pathways	United states	125.69	374	2,011
10	beta-catenin is a target for the ubiquitin-proteasome pathway	Germany	85.48	352	1,966
11	Mechanisms of Wnt signaling in development	Germany	73.05	161	1,607
12	Maintenance of pluripotency in human and mouse embryonic stem cells through activation of Wnt signaling by a pharmacological GSK-3-specific inhibitor	United states	97.13	276	1,554
13	A role for Wnt signalling in self-renewal of haematopoietic stem cells	United states	91.35	243	1,553
14	LDL receptor-related protein 5 (LRP5) affects bone accrual and eye development	United states	81.32	287	1,545
15	Wnt proteins are lipid-modified and can act as stem cell growth factors	United states	89.76	308	1,526
16	XTcf-3 transcription factor mediates beta-catenin-induced axis formation in <i>Xenopus</i> embryos	Netherlands	59.25	157	1,422
17	The beta-catenin/TCF-4 complex imposes a crypt progenitor phenotype on colorectal cancer cells	Netherlands	77.44	249	1,394
18	Control of beta-catenin phosphorylation/degradation by a dual-kinase mechanism	United states	75.67	404	1,362
19	WNT and beta-catenin signalling: Diseases and therapies	United states	82.75	336	1,324
20	Inhibition of adipogenesis by Wnt signaling	United states	64.85	328	1,297
21	Secreted antagonists of the Wnt signalling pathway	United Kingdom	73.71	262	1,253
22	The Wnt-1 (int-1) proto-oncogene is required for development of a large region of the mouse brain	United states	41.43	78	1,243
23	Caught up in a Wnt storm: Wnt signaling in cancer	Netherlands	70.82	200	1,204
24	Tankyrase inhibition stabilizes axin and antagonizes Wnt signalling	United states	107.55	559	1,183
25	Dickkopf-1 is a member of a new family of secreted proteins and functions in head induction	Germany	53.77	223	1,183
26	Binding of GSK3beta to the APC-beta-catenin complex and regulation of complex assembly	United states	49.21	122	1,181
27	High bone density due to a mutation in LDL-receptor-related protein 5	United states	65.39	187	1,177
28	Linking colorectal cancer to Wnt signaling	United Kingdom	57.70	200	1,154
29	WNT signalling pathways as therapeutic targets in cancer	United states	162.14	783	1,135
30	Wnt/beta-catenin/Tcf signaling induces the transcription of Axin2, a negative regulator of the signaling pathway	United states	62.11	342	1,118
31	Wnt/beta-catenin signaling in mesenchymal progenitors controls osteoblast and chondrocyte differentiation during vertebrate skeletogenesis	United states	73.80	355	1,107
32	Cancer - Wnt signaling in oncogenesis and embryogenesis - a look outside the nucleus	United states	54.70	103	1,094
33	A new member of the frizzled family from <i>Drosophila</i> functions as a Wingless receptor	United states	45.54	131	1,093
34	The Hedgehog and Wnt signaling pathways in cancer	United states	56.58	175	1,075
35	Wnt signalling and its impact on development and cancer	Germany	87.67	394	1,052
36	Wnt activity defines colon cancer stem cells and is regulated by the microenvironment	Netherlands	103.40	524	1,034
37	Canonical Wnt signaling in differentiated osteoblasts controls osteoclast differentiation	United states	68.87	316	1,033
38	A second canon: Functions and mechanisms of beta-catenin-independent wnt signaling	United states	60.65	163	1,031
39	The role of the Wnt-signaling antagonist DKK1 in the development of osteolytic lesions in multiple myeloma	United states	59.24	203	1,007
40	Wnt signaling: Multiple pathways, multiple receptors, and multiple transcription factors	United states	69.64	262	975
41	Wnt signalling regulates adult hippocampal neurogenesis	United states	64.80	272	972
42	Regulation of bone mass by Wnt signaling	United states	69.14	332	968
43	Armadillo coactivates transcription driven by the product of the <i>Drosophila</i> segment polarity gene <i>dTCF</i>	Netherlands	41.87	108	963
44	Functional interaction of an axin homolog, conductin, with beta-catenin, APC, and GSK3beta	Germany	43.59	139	959
45	LDL-receptor-related proteins in Wnt signal transduction	United states	47.25	158	945
46	Axin, a negative regulator of the Wnt signaling pathway, forms a complex with GSK-3beta and beta-catenin and promotes GSK-3beta-dependent phosphorylation of beta-catenin	Japan	42.68	135	939
47	Small molecule-mediated disruption of Wnt-dependent signaling in tissue regeneration and cancer	United states	82.91	411	912
48	The axis-inducing activity, stability, and subcellular distribution of beta-catenin is regulated in <i>Xenopus</i> embryos by glycogen synthase kinase 3	United states	37.88	115	909
49	WNT signaling in bone homeostasis and disease: from human mutations to treatments	United states	125.86	645	881
50	Use of dsRNA-mediated genetic interference to demonstrate that frizzled and frizzled 2 act in the wingless pathway	United states	40.05	55	881
51	Sclerostin binds to LRP5/6 and antagonizes canonical Wnt signaling	United states	58.67	302	880
52	Wnt genes	United states	31.36	66	878
53	Purified Wnt5a protein activates or inhibits beta-catenin-TCF signaling depending on receptor context	United states	60.93	225	853
54	Dickkopf-1 is a master regulator of joint remodeling	Germany	64.08	276	833
55	Female development in mammals is regulated by Wnt-4 signalling	United states	39.62	163	832
56	Cbfa1-independent decrease in osteoblast proliferation, osteopenia, and persistent embryonic eye vascularization in mice deficient in Lrp5, a Wnt coreceptor	United states	46.11	119	830
57	De Novo hair follicle morphogenesis and hair tumors in mice expressing a truncated beta-catenin in skin	United states	37.64	82	828
58	The promise and perils of Wnt signaling through beta-catenin	United states	45.78	117	824
59	An LDL-receptor-related protein mediates Wnt signalling in mice	United states	41.20	106	824
60	Increased Wnt signaling during aging alters muscle stem cell fate and increases fibrosis	United states	63.31	324	823
61	TSC2 integrates Wnt and energy signals via a coordinated phosphorylation by AMPK and GSK3 to regulate cell growth	United states	58.36	299	817
62	Somatic mutations of the beta-catenin gene are frequent in mouse and human hepatocellular carcinomas	France	36.55	129	804
63	LDL-receptor-related protein 6 is a receptor for Dickkopf proteins	Germany	41.74	154	793
64	AXIN1 mutations in hepatocellular carcinomas, and growth suppression in cancer cells by virus-mediated transfer of AXIN1	Japan	39.15	103	783
65	Canonical Wnt/beta-catenin signaling prevents osteoblasts from differentiating into chondrocytes	Austria	51.60	214	774
66	Inactivation of the beta-catenin gene by Wnt1-Cre-mediated deletion results in dramatic brain malformation and failure of craniofacial development	Germany	40.63	196	772
67	Epigenetic inactivation of SFRP genes allows constitutive WNT signaling in colorectal cancer	United states	47.88	174	766
68	Wnt/beta-Catenin Signaling, Disease, and Emerging Therapeutic Modalities	United states	253.00	764	759
69	Targeted disruption of the murine int-1 proto-oncogene resulting in severe abnormalities in midbrain and cerebellar development	United states	25.30	44	759
70	Melanoma-intrinsic beta-catenin signalling prevents anti-tumour immunity	United states	151.60	783	758
71	Multiple roles for activated LEF/TCF transcription complexes during hair follicle development and differentiation	United states	36.00	103	756
72	The <i>Drosophila</i> homolog of the mouse mammary oncogene int-1 is identical to the segment polarity gene wingless	Brazil	22.76	66	751
73	Proximal events in Wnt signal transduction	Canada	67.55	273	743
74	Kremen proteins are Dickkopf receptors that regulate Wnt/beta-catenin signalling	Germany	41.28	156	743
75	Towards an integrated view of Wnt signaling in development	United states	66.18	252	728
76	Epithelial transformation of metanephric mesenchyme in the developing kidney regulated by Wnt-4	United states	28.00	98	728
77	Silberblick/Wnt11 mediates convergent extension movements during zebrafish gastrulation	United Kingdom	35.75	87	715
78	The mouse Fused locus encodes Axin, an inhibitor of the Wnt signaling pathway that regulates embryonic axis formation	United states	30.83	71	709
79	Wnt signaling in disease and in development	United states	47.00	180	705
80	Nuclear localization of beta-catenin by interaction with transcription factor LEF-1	Germany	29.17	52	700
81	LDL receptor-related proteins 5 and 6 in Wnt/beta-catenin signaling: Arrows point the way	United states	43.25	178	692
82	Organizing activity of wingless protein in <i>Drosophila</i>	United states	25.52	68	689
83	Mouse Wnt genes exhibit discrete domains of expression in the early embryonic CNS and limb buds	United states	25.48	34	688
84	Canonical WNT signaling promotes osteogenesis by directly stimulating Runx2 gene expression	United states	45.20	266	678
85	The many ways of Wnt in cancer	United states	51.92	163	675
86	A Wnt5a pathway underlies outgrowth of multiple structures in the vertebrate embryo	United states	31.95	117	671
87	Wnt5a signaling directly affects cell motility and invasion of metastatic melanoma	United states	37.22	137	670
88	BMP signaling inhibits intestinal stem cell self-renewal through suppression of Wnt-beta-catenin signaling	United states	41.75	163	668
89	The Wnt/Ca2+ pathway - a new vertebrate Wnt signaling pathway takes shape	Germany	32.90	76	658
90	Intestinal polyposis in mice with a dominant stable mutation of the beta-catenin gene	Japan	31.24	223	656
91	Negative feedback loop of Wnt signaling through upregulation of conductin/Axin2 in colorectal and liver tumors	Germany	36.28	184	653
92	Distinct roles for Hedgehog and canonical Wnt signaling in specification, differentiation and maintenance of osteoblast progenitors	United states	46.57	247	652
93	WNT signals are required for the initiation of hair follicle development	United states	36.17	183	651
94	Downregulation of beta-catenin by human Axin and its association with the APC tumor suppressor, beta-catenin and GSK3 beta	United states	29.45	85	648
95	Arrow encodes an LDL-receptor-related protein essential for Wingless signalling	United states	32.35	73	647
96	Robust cardiomyocyte differentiation from human pluripotent stem cells via temporal modulation of canonical Wnt signaling	United states	80.63	462	645
97	Function and biological roles of the Dickkopf family of Wnt modulators	Germany	45.43	229	636
98	Exosomes Mediate Stromal Mobilization of Autocrine Wnt-PCP Signaling in Breast Cancer Cell Migration	Canada	78.63	438	629
99	Canonical Wnt signals are essential for homeostasis of the intestinal epithelium	Netherlands	36.65	180	623
100	Lgr5 homologues associate with Wnt receptors and mediate R-spondin signalling	Netherlands	66.56	349	599

Table S2 Journal in which the top-cited 100 articles were published

Journal	Country	IF (2019)	Number of articles	Total Citations
Nature	United Kingdom	42.778	20	21,922
Cell	United States	38.637	18	22,697
Science	United States	41.845	7	8,189
Development	United Kingdom	5.611	7	4,959
Developmental Cell (Dev Cell)	United States	10.092	6	7,676
Genes & Development (Genes Dev)	United States	9.527	4	6,328
Nature Medicine (Nat Med)	United States	36.130	3	3,268
Nature Genetics (Nat Genet)	United States	27.603	3	2,217
The EMBO journal (EMBO J)	United States	9.889	3	3,561
The Journal of Biological Chemistry (J Biol Chem)	United States	4.238	3	2,533
The New England Journal of Medicine (N Engl J Med)	United States	74.699	2	2,184
Nature Reviews Cancer (Nat Rev Cancer)	United Kingdom	53.030	2	2,187
Annual Review of Cell and Developmental Biology (Annu Rev Cell Dev Biol)	United States	14.667	2	5,290
Proceedings of the National Academy of Sciences of the United States	United States	9.580	2	1,449
Molecular and Cellular Biology	United States	3.611	2	1,771
Nature Reviews Molecular Cell Biology (Nat Rev Mol Cell Biol)	United Kingdom	55.470	1	743
Nature Reviews Genetics (Nat Rev Genet)	United Kingdom	33.133	1	1,324
Cancer Cell	United States	26.602	1	670
Cell Research (Cell Res)	China	20.507	1	705
Nature Cell Biology (Nat Cell Biol)	United Kingdom	20.042	1	1,034
Nature Chemical Biology (Nat Chem Biol)	United States	12.587	1	912
The journal of Clinical Investigation (J Clin Invest)	United States	11.864	1	968
Trends in Genetics (Trends Genet)	Netherlands	11.333	1	658
Current biology (Curr Biol)	United States	9.601	1	648
Journal of Cell Biology (J Cell Biol)	United States	8.811	1	830
Oncogene	United Kingdom	7.971	1	636
Biochimica Et Biophysica Acta-Reviews on Cancer (Biochim Biophys Acta Rev Cancer)	Netherlands	7.365	1	1,204
Plos Biolog (PLoS Biol)	United States	7.076	1	853
Current Opinion in Genetics & Development (Curr Opin Genet Dev)	United States	5.512	1	675
Journal of Cell Science (J Cell Sci)	United Kingdom	4.573	1	1,253
Mechanisms of Development (Mech Dev)	Netherlands	2.126	1	700

Table S3 Top 30 keywords ranked by weight/total link strength

Keywords	cluster	Links	Weight/Total link strength	Occurrences	Average publication year
Wnt	2	104	3,904	2,788	2015.9062
Beta-catenin	4	108	3,010	2,249	2015.6066
Proliferation	4	100	1,669	856	2016.8452
Wnt signaling	3	104	1,586	1,526	2015.844
Apoptosis	4	99	1,257	749	2016.3735
Colorectal cancer	1	89	1,067	759	2016.5346
Wnt/beta-catenin	4	96	1,048	936	2016.7933
Metastasis	1	85	1,011	531	2016.6844
Invasion	4	68	926	392	2017
Cancer	1	96	879	559	2016.0219
Migration	4	76	746	331	2017.1037
Breast cancer	1	86	667	458	2016.1615
Differentiation	2	90	663	454	2015.6971
Notch	2	85	653	297	2015.3209
Epithelial-mesenchymal transition	1	76	590	336	2017.1541
Hepatocellular carcinoma	1	76	585	441	2016.355
Prognosis	1	68	573	375	2016.6166
Wnt signaling pathway	1	90	554	581	2016.7138
EMT	1	80	543	285	2016.7979
Stem cells	2	86	525	358	2015.431
Cancer stem cells	1	80	523	328	2016.0404
Wnt pathway	1	92	515	488	2015.8174
Gastric cancer	1	69	479	319	2016.7651
Inflammation	3	93	470	319	2016.3077
Wnt/beta-catenin signaling	3	79	470	473	2016.3511
Wnt/beta-catenin pathway	4	74	437	442	2017.153
Osteoporosis	3	56	430	369	2016.1181
Micrna	1	93	418	297	2016.375
Colon cancer	4	69	414	303	2015.9007
Osteoblast	3	67	412	252	2015.6964

Table S4 Top 30 keywords ranked by average publication year

Keywords	cluster	Links	Weight/Total link strength	Occurrences	Average publication year
RNA-SEQ	2	44	100	124	2017.3089
Wnt/beta-catenin signaling pathway	4	63	310	322	2017.2368
Epithelial-mesenchymal transition	1	76	590	336	2017.1541
Wnt/beta-catenin pathway	4	74	437	442	2017.153
Osteogenic differentiation	3	45	163	173	2017.1118
Migration	4	76	746	331	2017.1037
Invasion	4	68	926	392	2017
Biomarker	1	64	203	140	2016.9857
Autophagy	3	71	314	170	2016.9458
Glioblastoma	4	59	203	122	2016.9076
Micrnas	1	61	156	120	2016.8898
Proliferation	4	100	1,669	856	2016.8452
Glioma	4	49	282	169	2016.8393
Cervical cancer	1	51	179	113	2016.8036
EMT	1	80	543	285	2016.7979
Wnt/beta-catenin	4	96	1,048	936	2016.7933
Transcriptome	2	49	101	125	2016.7903
Gastric cancer	1	69	479	319	2016.7651
Osteogenesis	3	59	257	197	2016.7409
Osteoarthritis	3	51	215	189	2016.7258
Wnt signaling pathway	1	90	554	581	2016.7138
Metastasis	1	85	1,011	531	2016.6844
Biomarkers	1	55	125	106	2016.6699
Osteosarcoma	4	64	333	199	2016.6497
Cell proliferation	4	72	346	243	2016.6444
Prognosis	1	68	573	375	2016.6166
Mirna	1	74	209	183	2016.6111
Colorectal cancer	1	89	1,067	759	2016.5346
Ovarian cancer	1	64	253	159	2016.5063
Drug resistance	1	62	173	100	2016.5