

“Code Biology Database – A List of Biological Codes”

Compiled in December 2022 by Robert Prinz

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for the International Society of Code Biology

<https://www.codebiology.org>

Number	Code Name	Descriptive Name(s)	Full Citation(s), Hyperlinked to Source
1	Acoustic code	The Acoustic Codes	Farina, A. and N. Pieretti (2014). "Acoustic Codes in Action in a Soundscape Context." <i>Biosemiotics</i> 7(2): 321-328. Malavasi, R., K. Kull and A. Farina (2014). "The Acoustic Codes: How Animal Sign Processes Create Sound-Topes and Consortia via Conflict Avoidance." <i>Biosemiotics</i> 7(1): 89-95. Farina, A. (2019). "Acoustic codes from a rural sanctuary: How ecoacoustic events operate across a landscape scale." <i>Biosystems</i> 183: 103986.
2	Actin code	The Actin Code SEE also Cytoskeleton Code	Vedula, P. and A. Kashina (2018). "The makings of the 'actin code': regulation of actin's biological function at the amino acid and nucleotide level." <i>J Cell Sci</i> 131(9).
3	Adenylation code	The Adenylation Code	Stachelhaus, T., H. D. Mootz and M. A. Marahiel (1999). "The specificity-conferring code of adenylation domains in nonribosomal peptide synthetases." <i>Chem Biol</i> 6(8): 493-505. Davis, R. and Y. Shi (2014). "The polyadenylation code: a unified model for the regulation of mRNA alternative polyadenylation." <i>J Zhejiang UnivSci B</i> 15(5): 429-437. Zhang, F., Y. Wang, Q. Jiang, Q. Chen, L. Karthik, Y.-L. Zhao and Z. Li (2018). "Substrate selection of adenylation domains for nonribosomal peptide synthetase (NRPS) in

			bacillamide C biosynthesis by marine Bacillus atrophaeus C89." Journal of Industrial Microbiology & Biotechnology 45(5): 335-344.
4	Adhesion code	The Adhesion Code SEE also Synaptic code(s) SEE also Cadherin code(s)	<p>Redies, C. and M. Takeichi (1996). "Cadherins in the developing central nervous system: an adhesive code for segmental and functional subdivisions." Dev Biol 180(2): 413-423.</p> <p>Shapiro, L. and D. R. Colman (1999). "The diversity of cadherins and implications for a synaptic adhesive code in the CNS." Neuron 23(3): 427-430.</p> <p>Faria, M. (2018). "Aggregating, polarizing, networking – The evolution of cell adhesion codes." Biosystems 164: 60-67.</p> <p>Tsai, T. Y., M. Sikora, P. Xia, T. Colak-Champollion, H. Knaut, C. P. Heisenberg and S. G. Megason (2020). "An adhesion code ensures robust pattern formation during tissue morphogenesis." Science 370(6512): 113-116.</p>
5	Allosteric code	The Allosteric Code	<p>Daugherty, M. A., M. A. Shea, J. A. Johnson, V. J. LiCata, G. J. Turner and G. K. Ackers (1991). "Identification of the intermediate allosteric species in human hemoglobin reveals a molecular code for cooperative switching." Proc Natl Acad Sci U S A 88(4): 1110-1114.</p> <p>Goldbeck, R. A., R. M. Esquerra, D. S. Kliger, J. M. Holt and G. K. Ackers (2004). "The molecular code for hemoglobin allostery revealed by linking the thermodynamics and kinetics of quaternary structural change. 2. Cooperative free energies of (alphaFeCObetaFe)2 and (alphaFebetaFeCO)2 T-state tetramers." Biochemistry 43(38): 12065-12080.</p> <p>Armour-Garb, I., I. S. M. Han, B. S. Cowan and K. M. Thayer (2022). "Variable Regions of p53 Isoforms Allosterically Hard Code DNA Interaction." J Phys Chem B.</p>
6	Angiotensin code	The Angiotensin Receptor Code	Sadybekov, A. and V. Katritch (2020). "Breaking the Enigma Code of Angiotensin II Type 2 Receptor Signaling." Structure 28(4): 390-392.
7	Antibiotic resistance code	The Antibiotic Resistance Codes	Lo, S. W., N. Kumar and N. E. Wheeler (2018). "Breaking the code of antibiotic resistance." Nat Rev Microbiol 16(5): 262.
8	Apoptosis code	The Apoptosis Code	Basañez, G. and J. M. Hardwick (2008). "Unravelling the bcl-2 apoptosis code with a simple model system." PLoSBiol 6(6): e154.

			<p>Füllgrabe, J., N. Hajji and B. Joseph (2010). "Cracking the death code: apoptosis-related histone modifications." Cell Death Differ 17(8): 1238-1243.</p> <p>Biermann, M., C. Maueröder, J. M. Brauner, R. Chaurio, C. Janko, M. Herrmann and L. E. Muñoz (2013). "Surface code--biophysical signals for apoptotic cell clearance." Phys Biol 10(6): 065007.</p> <p>Shih, H. C., M. El-Shazly, Y. S. Juan, C. Y. Chang, J. H. Su, Y. C. Chen, S. P. Shih, H. M. Chen, Y. C. Wu and M. C. Lu (2014). "Cracking the cytotoxicity code: apoptotic induction of 10-acetylirciformonin B is mediated through ROS generation and mitochondrial dysfunction." Mar Drugs 12(5): 3072-3090.</p> <p>Wook Choi, D. and C. Yong Choi (2014). "HIPK2 modification code for cell death and survival." Mol Cell Oncol 1(2): e955999.</p> <p>Jiang, S., Y. Liu, B. Xu, Y. Zhang and M. Yang (2020). "Noncoding RNAs: New regulatory code in chondrocyte apoptosis and autophagy." Wiley Interdiscip Rev RNA 11(4): e1584.</p> <p>Rothlin, C. V. and S. Ghosh (2020). "Cracking the Cell Death Code." Cold Spring Harb Perspect Biol 12(5).</p>
9	Archetype codes	The Archetype Codes	Major, J. C. (2021). "Archetypes and code biology." Biosystems 208: 104501.
10	Area code	The Area / Cell Recognition Code	<p>Hood, L., H. V. Huang and W. J. Dreyer (1977). "The area-code hypothesis: The immune system provides clues to understanding the genetic and molecular basis of cell recognition during development." Journal of Supramolecular Structure 7(3-4): 531-559.</p> <p>Springer, T. A. (1993). "Signals on endothelium for lymphocyte recirculation and leukocyte emigration: the area code paradigm." Harvey Lect 89: 53-103.</p> <p>Dreyer, W. J. (1998). "The area code hypothesis revisited: olfactory receptors and other related transmembrane receptors may function as the last digits in a cell surface code for assembling embryos." Proc Natl Acad Sci U S A 95(16): 9072-9077.</p> <p>Liu, C. Y. (2020). "β7 Gives Tregs a Gut Area Code." Cell Mol Gastroenterol Hepatol 9(3): 543-544.</p>
11	Arrestin code	The Arrestin Receptor Code	Draper-Joyce, C. J. and A. Christopoulos (2018). "Strength in numbers-an arrestin interaction code." Nat Struct Mol Biol 25(6): 437-439.

12	Assembly code	The Assembly Code	Shelton, C. L., D. G. Conrady and A. B. Herr (2017). "Functional consequences of B-repeat sequence variation in the staphylococcal biofilm protein Aap: deciphering the assembly code." Biochem J 474(3): 427-443.
13	Auxin code	The Auxin Metabolism Code	Campos, M. L. (2021). "Breaking the code of auxin metabolism: an additional role for DIOXYGENASE FOR AUXIN OXIDATION 1." Plant Physiol 187(1): 7-8.
14	Axon guidance code	The Axon Guidance Codes	<p>Goodhill, G. J. (2003). "A theoretical model of axon guidance by the Robo code." Neural Comput 15(3): 549-564.</p> <p>Kinrade, E. F. and A. Hidalgo (2004). "Lateral neuron--glia interactions steer the response of axons to the Robo code." Neuron Glia Biol 1(2): 101-112.</p> <p>Shirasaki, R., J. W. Lewcock, K. Lettieri and S. L. Pfaff (2006). "FGF as a target-derived chemoattractant for developing motor axons genetically programmed by the LIM code." Neuron 50(6): 841-853.</p> <p>Zarin, A. A., A. C. Daly, J. Hülsmeier, J. Asadzadeh and J. P. Labrador (2012). "A GATA/homeodomain transcriptional code regulates axon guidance through the Unc-5 receptor." Development 139(10): 1798-1805.</p> <p>Kohl, A., T. Marquardt, A. Klar and D. Sela-Donenfeld (2015). "Control of axon guidance and neurotransmitter phenotype of dB1 hindbrain interneurons by Lim-HD code." J Neurosci 35(6): 2596-2611.</p>
15	BAFF code	The BAFF Immune Code	Mackay, F. and P. Schneider (2009). "Cracking the BAFF code." Nat Rev Immunol 9(7): 491-502.
16	Bile code	The Bile Acid Code	Gadaleta, R. M., M. Cariello, L. Crudele and A. Moschetta (2022). "Bile Salt Hydrolase-Competent Probiotics in the Management of IBD: Unlocking the "Bile Acid Code"." Nutrients 14(15).
17	Binaural code	The Binaural Code	Encke, J. and M. Dietz (2022). "A hemispheric two-channel code accounts for binaural unmasking in humans." CommunBiol 5(1): 1122.
18	Bioelectric code	The Bioelectric Code	<p>Tseng, A. and M. Levin (2013). "Cracking the bioelectric code: Probing endogenous ionic controls of pattern formation." Commun Integr Biol 6(1): e22595.</p> <p>Levin, M. and C. J. Martyniuk (2018). "The bioelectric code: An ancient computational medium for dynamic control of growth and form." Biosystems 164: 76-93.</p>

			Silver, B. B. and C. M. Nelson (2018). "The Bioelectric Code: Reprogramming Cancer and Aging From the Interface of Mechanical and Chemical Microenvironments." Front Cell Dev Biol 6: 21.
19	Biosynthetic code	The Biosynthetic Code	Xu, Z., M. Baunach, L. Ding, H. Peng, J. Franke and C. Hertweck (2014). "Biosynthetic code for divergolide assembly in a bacterial mangrove endophyte." Chembiochem 15(9): 1274-1279.
20	Body plan code	The (Epigenetic) Body Plan Code	Elder D (1979) An epigenetic code. Differentiation, 14, 119-122.
21	Brain code	The Universal Brain Code	Rosenberg, R. N. (2021). "The universal brain code a genetic mechanism for memory." J Neurol Sci 429: 118073.
22	Cadherin code	The Cadherin Neuronal Code	Pearson, Caroline A., Samantha J. Butler and Bennett G. Novitch (2014). "Neuronal Organization: Unsticking the Cadherin Code." Current Biology 24(23): R1127-R1129. Canzio, D. and T. Maniatis (2019). "The generation of a protocadherin cell-surface recognition code for neural circuit assembly." Curr Opin Neurobiol 59: 213-220. Bao, M., J. Cornwall-Scoones, E. Sanchez-Vasquez, D. Y. Chen, J. De Jonghe, S. Shadkhoo, F. Hollfelder, M. Thomson, D. M. Glover and M. Zernicka-Goetz (2022). "Stem cell-derived synthetic embryos self-assemble by exploiting cadherin codes and cortical tension." Nat Cell Biol 24(9): 1341-1349.
23	Calcium code	The Calcium Code	Thomine, S. (2001). "Cracking the calcium code." Trends Plant Sci 6(11): 501. Allen, G. J. and J. I. Schroeder (2001). "Combining genetics and cell biology to crack the code of plant cell calcium signaling." Sci STKE 2001(102): re13. Mauro, T. (2003). "'The discovery channel': CRAC'king the code of calcium influx." J Invest Dermatol 121(1): 1x-x. Parekh, A. B. (2006). "Cell biology: cracking the calcium entry code." Nature 441(7090): 163-165. DeFalco, T. A., K. W. Bender and W. A. Snedden (2009). "Breaking the code: Ca²⁺ sensors in plant signalling." Biochem J 425(1): 27-40. Haiech, J. and M. Moreau (2011). "The calcium signal: a universal carrier to code, decode and transduce information." Biochimie 93(12): v.

			Covelo, A., A. Badoual and A. Denizot (2022). "Reinforcing Interdisciplinary Collaborations to Unravel the Astrocyte "Calcium Code"." J Mol Neurosci 72(7): 1443-1455.
24	Cancer code	The Epigenetic Cancer Code	<p>Altarc, S. (1993). "Numerical quadruplet code of human cervical carcinoma tissue proteins." Acta Med Croatica 47(2): 85-87.</p> <p>Smith, L. T., G. A. Otterson and C. Plass (2007). "Unraveling the epigenetic code of cancer for therapy." Trends Genet 23(9): 449-456.</p> <p>Ozawa, M. G., M. Cardó-Vila, P. J. Mintz, W. Arap and R. Pasqualini (2010). "Cracking the code for compartment-specific dual functionality proteins in cancer: the case for CRKL." Cell Cycle 9(1): 8-9</p> <p>Brower, V. (2011). "Epigenetics: Unravelling the cancer code." Nature 471(7339): S12-13.</p> <p>New, M., H. Olzscha and N. B. La Thangue (2012). "HDAC inhibitor-based therapies: can we interpret the code?" Mol Oncol 6(6): 637-656.</p> <p>Blancafort, P., J. Jin and S. Frye (2013). "Writing and rewriting the epigenetic code of cancer cells: from engineered proteins to small molecules." Mol Pharmacol 83(3): 563-576.</p> <p>Karpathakis, A., H. Dibra and C. Thirlwell (2013). "Neuroendocrine tumours: cracking the epigenetic code." Endocr Relat Cancer 20(3): R65-82.</p> <p>Sato, K., T. Hara and M. Ohya (2013). "The code structure of the p53 DNA-binding domain and the prognosis of breast cancer patients." Bioinformatics 29(22): 2822-2825.</p> <p>Kulkarni, R. A. and J. L. Meier (2014). "Chemical cryptology of cancer's histone code." Chem Biol 21(11): 1419-1421.</p> <p>Lomberk, G. A. and R. Urrutia (2015). "The Triple-Code Model for Pancreatic Cancer: Cross Talk Among Genetics, Epigenetics, and Nuclear Structure." Surg Clin North Am 95(5): 935-952.</p> <p>Roschewski, M. and W. H. Wilson (2015). "Cracking the diverse biologic code of diffuse large B-cell lymphoma." Semin Hematol 52(2): 55-56</p>

			<p>Bonci, D., V. Coppola, M. Patrizii, A. Addario, A. Cannistraci, F. Francescangeli, R. Pecci, G. Muto, D. Collura, R. Bedini, A. Zeuner, M. Valtieri, S. Sentinelli, M. S. Benassi, M. Gallucci, P. Carlini, S. Piccolo and R. De Maria (2016). "A microRNA code for prostate cancer metastasis." <i>Oncogene</i> 35(9): 1180-1192.</p> <p>Qiao, H. and C. M. Lovly (2016). "Cracking the Code of Resistance across Multiple Lines of ALK Inhibitor Therapy in Lung Cancer." <i>Cancer Discov</i> 6(10): 1084-1086.</p> <p>Søreide, K., M. M. Watson and H. R. Hagland (2016). "Deciphering the Molecular Code to Colorectal Liver Metastasis Biology Through Microsatellite Alterations and Allelic Loss: The Good, the Bad, and the Ugly." <i>Gastroenterology</i> 150(4): 811-814.</p> <p>Lucas, C. (2017). "Cracking the cancer code: a personalised genomic approach." <i>Lancet Oncol</i> 18(6): 717.</p> <p>Yotsukura, S., M. Karasuyama, I. Takigawa and H. Mamitsuka (2017). "Exploring phenotype patterns of breast cancer within somatic mutations: a modicum in the intrinsic code." <i>Brief Bioinform</i> 18(4): 619-633.</p> <p>Rodríguez, E., S. T. T. Schetters and Y. van Kooyk (2018). "The tumour glyco-code as a novel immune checkpoint for immunotherapy." <i>Nat Rev Immunol</i> 18(3): 204-211.</p> <p>Lopes, N., V. G. Correia, A. S. Palma and C. Brito (2021). "Cracking the Breast Cancer Glyco-Code through Glycan-Lectin Interactions: Targeting Immunosuppressive Macrophages." <i>Int J Mol Sci</i> 22(4).</p> <p>Xia, Z., N. Kon, A. P. Gu, O. Tavana and W. Gu (2022). "Deciphering the acetylation code of p53 in transcription regulation and tumor suppression." <i>Oncogene</i> 41(22): 3039-3050.</p>
25	Cell access code	The Cell Access Code	Zengel, J. and J. E. Crette (2020). "Cracking the cell access code for the deadly virus VEEV." <i>Nature</i> 588(7837): 223-224.
26	Cell surface code	The Cell Surface Recognition Code	Mountoufaris, G., D. Canzio, C. L. Nwakeze, W. V. Chen and T. Maniatis (2018). "Writing, Reading, and Translating the Clustered Protocadherin Cell Surface Recognition Code for Neural Circuit Assembly." <i>Annu Rev Cell Dev Biol</i> 34: 471-493.
27	Cell wall code	The Plant Cell Wall Code	Tavares, E. Q. and M. S. Buckeridge (2015). "Do plant cell walls have a code?" <i>Plant Sci</i> 241: 286-294.

28	Cerebral resistance code	The Cerebral Resistance Code	Sharma, A. and R. Goyal (2016). "Cross tolerance: a tread to decipher the code of endogenous global cerebral resistance." Neural Regen Res 11(5): 719-720.
29	Chaperone code	The Chaperone Code	<p>Cloutier, P. and B. Coulombe (2013). "Regulation of molecular chaperones through post-translational modifications: decrypting the chaperone code." Biochim Biophys Acta 1829(5): 443-454.</p> <p>Nitika and A. W. Truman (2017). "Cracking the Chaperone Code: Cellular Roles for Hsp70 Phosphorylation." Trends Biochem Sci 42(12): 932-935.</p> <p>Backe, S. J., R. A. Sager, M. R. Woodford, A. M. Makedon and M. Mollapour (2020). "Post-translational modifications of Hsp90 and translating the chaperone code." J Biol Chem 295(32): 11099-11117.</p> <p>Nitika, C. M. Porter, A. W. Truman and M. C. Truttmann (2020). "Post-translational modifications of Hsp70 family proteins: Expanding the chaperone code." J Biol Chem 295(31): 10689-10708.</p> <p>Truman, A. W., D. Bourboulia and M. Mollapour (2021). "Decrypting the chaperone code." J Biol Chem 296: 100293.</p> <p>Woodford, M. R., S. J. Backe, L. A. Wengert, D. M. Dunn, D. Bourboulia and M. Mollapour (2021). "Hsp90 chaperone code and the tumor suppressor VHL cooperatively regulate the mitotic checkpoint." Cell Stress Chaperones 26(6): 965-971.</p>
30	Checkpoint code	The Checkpoint Codes SEE also Immune Code	Zeng, P., J. Ma, R. Yang and Y. C. Liu (2017). "Immune Regulation by Ubiquitin Tagging as Checkpoint Code." Curr Top Microbiol Immunol 410: 215-248.
31	Chitin code	The Chitin (Defense) Code	Khokhani, D., C. Carrera Carriel, S. Vayla, T. B. Irving, C. Stonoha-Arther, N. P. Keller and J. M. Ané (2021). "Deciphering the Chitin Code in Plant Symbiosis, Defense, and Microbial Networks." Annu Rev Microbiol 75: 583-607.
32	Chromosome code	The Chromosome Codes	<p>Artandi, S. E. and J. P. Cooper (2009). "Reverse transcribing the code for chromosome stability." Mol Cell 36(5): 715-719.</p> <p>Kiyomitsu, T. and I. M. Cheeseman (2012). "Chromosome- and spindle-pole-derived signals generate an intrinsic code for spindle position and orientation." Nat Cell Biol 14(3): 311-317.</p>

			Podgornaya, O., E. Gavrilova, V. Stephanova, S. Demin and A. Komissarov (2013). "Large tandem repeats make up the chromosome bar code: a hypothesis." Adv Protein Chem Struct Biol 90: 1-30.
33	Circadian codes	The Circadian Rhythm Codes	<p>Arjona, A. and D. K. Sarkar (2008). "Are Circadian Rhythms the Code of Hypothalamic-Immune Communication? Insights from Natural Killer Cells." Neurochemical Research 33(4): 708-718.</p> <p>He, W., K. Kraus, D. Druzd, A. de Juan, L. Ince, C.-S. Chen and C. Scheiermann (2017). "A circadian zip code determines rhythmic leukocyte trafficking to tissues." The FASEB Journal 31(S1): 55.54-55.54.</p> <p>Wang, B., A. N. Kettenbach, X. Zhou, J. J. Loros and J. C. Dunlap (2019). "The Phospho-Code Determining Circadian Feedback Loop Closure and Output in Neurospora." Molecular Cell 74(4): 771-784.e773.</p>
34	Circular ribosome code	The Circular Motif (Ribosome) Code	<p>Pirillo, G. and M. A. Pirillo (2005). "Growth function of self-complementary circular codes." Rivista di biologia 98(1): 97-110.</p> <p>El Soufi, K. and C. J. Michel (2014). "Circular code motifs in the ribosome decoding center." ComputBiol Chem 52: 9-17.</p> <p>Dila, G., R. Ripp, C. Mayer, O. Poch, C. J. Michel and J. D. Thompson (2019). "Circular code motifs in the ribosome: a missing link in the evolution of translation?" Rna 25(12): 1714-1730.</p> <p>Thompson, J. D., R. Ripp, C. Mayer, O. Poch and C. J. Michel (2021). "Potential role of the X circular code in the regulation of gene expression." Biosystems 203: 104368.</p>
35	Cis-regulatory transcription code	The Transcriptional Cis-Regulatory Code	<p>Istrail, S. and E. H. Davidson (2005). "Logic functions of the genomic cis-regulatory code." Proceedings of the National Academy of Sciences 102(14): 4954-4959.</p> <p>Ochoa-Espinosa, A. and S. Small (2006). "Developmental mechanisms and cis-regulatory codes." Current Opinion in Genetics & Development 16(2): 165-170.</p> <p>Conte, I. and P. Bovolenta (2007). "Comprehensive characterization of the cis-regulatory code responsible for the spatio-temporal expression of oSix3.2 in the developing medaka forebrain." Genome Biol 8(7): R137.</p>

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			<p>Tokuhiro, S. and Y. Satou (2021). "Cis-regulatory code for determining the action of Foxd as both an activator and a repressor in ascidian embryos." Dev Biol 476: 11-17.</p> <p>Zemlyanskaya, E. V., V. A. Dolgikh, V. G. Levitsky and V. Mironova (2021). "Transcriptional regulation in plants: Using omics data to crack the cis-regulatory code." Curr Opin Plant Biol 63: 102058.</p> <p>Benoit, M. (2022). "Hot 'n cold: Applying the cis-regulatory code to predict heat and cold stress response in maize." Plant Cell 34(1): 497-498.</p>
36	CKD code	The Chronic Kidney Disease Code	<p>O'Toole, J. F. and J. R. Sedor (2018). "CKD, Genetic Variation, and the Epigenome: Decrypting the Code." Am J Kidney Dis 72(2): 164-167.</p>
37	Coactivator code	The Coactivator/Corepressor/ Epigenetic Code	<p>Rosenfeld, M. G., V. V. Lunyak and C. K. Glass (2006). "Sensors and signals: a coactivator/corepressor/epigenetic code for integrating signal-dependent programs of transcriptional response." Genes Dev 20(11): 1405-1428.</p>
38	Cohesin code	The Cohesin-Dockerin Code	<p>Vera, A. M., A. Galera-Prat, M. Wojciechowski, B. Różycki, D. V. Laurents, M. Carrión-Vázquez, M. Cieplak and P. Tinnefeld (2021). "Cohesin-dockerin code in cellulosomal dual binding modes and its allosteric regulation by proline isomerization." Structure 29(6): 587-597.e588.</p>
39	Communication code	The Communication Code(s)	<p>Salmond, G. P., B. W. Bycroft, G. S. Stewart and P. Williams (1995). "The bacterial 'enigma': cracking the code of cell-cell communication." Mol Microbiol 16(4): 615-624.</p> <p>Fontanari, J. F. and L. I. Perlovsky (2008). "A game theoretical approach to the evolution of structured communication codes." Theory in Biosciences 127(3): 205-214.</p> <p>Li, P. and M. B. Elowitz (2019). "Communication codes in developmental signaling pathways." Development 146(12).</p> <p>Bonato, B., F. Peressotti, S. Guerra, Q. Wang and U. Castiello (2021). "Cracking the code: a comparative approach to plant communication." Communicative & Integrative Biology 14(1): 176-185.</p>
40	Compartment code	The Compartment Code	<p>Barbieri, M. (2003). The organic codes. An introduction to semantic biology., Cambridge University Press.</p> <p>Artmann, S. (2009). "Basic Semiosis as Code-Based Control." Biosemiotics 2(1): 31-38.</p>

			Maza, N. A., W. E. Schiesser and P. D. Calvert (2019). "An intrinsic compartmentalization code for peripheral membrane proteins in photoreceptor neurons." Journal of Cell Biology 218(11): 3753-3772.
41	Connexin code	The Connexin Code	Kelsell, D. P., J. Dunlop and M. B. Hodgins (2001). "Human diseases: clues to cracking the connexin code?" Trends Cell Biol 11(1): 2-6.
42	Cooperation codes	The Moral Cooperation Code	Proverbio, A. M., F. Riva, L. Paganelli, S. F. Cappa, N. Canessa, D. Perani and A. Zani (2011). "Neural coding of cooperative vs. affective human interactions: 150 ms to code the action's purpose." PLoS One 6(7): e22026. Efferson, C. and E. Fehr (2018). "Simple moral code supports cooperation." Nature 555(7695): 169-170.
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