

## 参考文献

- [1] MARTIN J H. Neuroanatomy text and atlas[M]. McGraw-Hill, 2012.
- [2] NIEUWENHUYS R, VOOGD J, VAN HUIJZEN C. The human central nervous system: a synopsis and atlas[M]. Springer Science & Business Media, 2007.
- [3] GESCHWIND N. Specializations of the human brain[J]. Scientific American, 1979, 241(3): 180-201.
- [4] MACSWEENEY M, WOLL B, CAMPBELL R, et al. Neural systems underlying British Sign Language and audio-visual English processing in native users[J]. Brain, 2002, 125(7): 1583-1593.
- [5] MCGUE M, BOUCHARD JR T J. Genetic and environmental influences on human behavioral differences[J]. Annual review of neuroscience, 1998, 21(1): 1-24.
- [6] GOTTESMAN I I. Schizophrenia genesis: The origins of madness.[M]. WH Freeman/Times Books/Henry Holt & Co, 1991.
- [7] ALBERTS B. Molecular biology of the cell[M]. Garland science, 2017.
- [8] WATSON J. Recombinant DNA, a short course[J]. A Scientific American Book, 1983.
- [9] ROWEN L Q S, Madan A. Initial sequencing and analysis of the human genome[J]. nature, 2001, 409(6822): 860-921.
- [10] VENTER J C, ADAMS M D, MYERS E W, et al. The sequence of the human genome[J]. science, 2001, 291(5507): 1304-1351.
- [11] TSIEN J Z, HUERTA P T, TONEGAWA S. The essential role of hippocampal CA1 NMDA receptor-dependent synaptic plasticity in spatial memory[J]. Cell, 1996, 87(7): 1327-1338.
- [12] MAYFORD M, BACH M E, HUANG Y Y, et al. Control of memory formation through regulated expression of a CaMKII transgene[J]. Science, 1996, 274(5293): 1678-1683.
- [13] KONOPKA R J, BENZER S. Clock mutants of *Drosophila melanogaster*[J]. Proceedings of the National Academy of Sciences, 1971, 68(9): 2112-2116.
- [14] TAKAHASHI J S, PINTO L H, VITATERNA M H. Forward and reverse genetic approaches to behavior in the mouse[J]. Science, 1994, 264(5166): 1724-1733.
- [15] SOKOLOWSKI M B. *Drosophila*: genetics meets behaviour[J]. Nature Reviews Genetics, 2001, 2(11): 879-890.
- [16] DE BONO M, BARGMANN C I. Natural variation in a neuropeptide Y receptor homolog modifies social behavior and food response in *C. elegans*[J]. Cell, 1998, 94(5): 679-689.
- [17] YOUNG L J, LIM M M, GINGRICH B, et al. Cellular mechanisms of social attachment[J]. Hormones and behavior, 2001, 40(2): 133-138.
- [18] HODGKIN A L, HUXLEY A F. Action potentials recorded from inside a nerve fibre[J]. Nature, 1939, 144(3651): 710-711.
- [19] ROSS M H, PAWLINA W. Histology[M]. Lippincott Williams & Wilkins, 2006.
- [20] DACEY D M, PETERSON B B, ROBINSON F R, et al. Fireworks in the primate retina: in vitro photodynamics reveals diverse LGN-projecting ganglion cell types[J]. Neuron, 2003, 37(1): 15-27.
- [21] HEIMER L. The human brain and spinal cord: functional neuroanatomy and dissection guide[M]. Springer Science & Business Media, 2012.

- [22] JONES E G. Connectivity of the primate sensory-motor cortex[G]//Sensory-motor areas and aspects of cortical connectivity. Springer, 1986: 113-183.
- [23] FELLEMAN D J, VAN ESSEN D C. Distributed hierarchical processing in the primate cerebral cortex.[J]. Cerebral cortex (New York, NY: 1991), 1991, 1(1): 1-47.
- [24] BUZSÁKI G. Hippocampal sharp wave-ripple: A cognitive biomarker for episodic memory and planning[J]. Hippocampus, 2015, 25(10): 1073-1188.
- [25] BUZSÁKI G, HORVATH Z, URIOSTE R, et al. High-frequency network oscillation in the hippocampus[J]. Science, 1992, 256(5059): 1025-1027.
- [26] DIBA K, BUZSÁKI G. Forward and reverse hippocampal place-cell sequences during ripples[J]. Nature neuroscience, 2007, 10(10): 1241-1242.
- [27] SCHRIMPF M, KUBILIUS J, HONG H, et al. Brain-score: Which artificial neural network for object recognition is most brain-like?[J]. BioRxiv, 2018: 407007.
- [28] WILLIAMS P, WARWICK R, DYSON M. Bannister LH[J]. Gray's Anatomy, 1989, 37: 756-8.
- [29] PETERS A, PALAY S, WEBSTER H D F. The neuropil[J]. The Fine Structure of the Nervous System. Neurons and their Supporting Cells. Oxford University Press, Oxford, 1991: 356-383.
- [30] DE CAMILLI P, MORETTI M, DONINI S D, et al. Heterogeneous distribution of the cAMP receptor protein RII in the nervous system: evidence for its intracellular accumulation on microtubules, microtubule-organizing centers, and in the area of the Golgi complex.[J]. The Journal of cell biology, 1986, 103(1): 189-203.
- [31] COONEY J R, HURLBURT J L, SELIG D K, et al. Endosomal compartments serve multiple hippocampal dendritic spines from a widespread rather than a local store of recycling membrane[J]. Journal of Neuroscience, 2002, 22(6): 2215-2224.
- [32] HARRIS K M, STEVENS J K. Dendritic spines of CA 1 pyramidal cells in the rat hippocampus: serial electron microscopy with reference to their biophysical characteristics[J]. Journal of Neuroscience, 1989, 9(8): 2982-2997.
- [33] SORRA K, HARRIS K M. Occurrence and three-dimensional structure of multiple synapses between individual radiatum axons and their target pyramidal cells in hippocampal area CA1[J]. Journal of Neuroscience, 1993, 13(9): 3736-3748.
- [34] BERSHADSKY A D, VASILIEV J M. Cytoskeleton[J]. 2012.
- [35] OCHS S. Fast Transport of Materials in Mammalian Nerve Fibers: A fast transport mechanism for materials exists in nerve fibers, which depends on oxidative metabolism.[J]. Science, 1972, 176(4032): 252-260.
- [36] SCHNAPP B J, REESE T. Cytoplasmic structure in rapid-frozen axons.[J]. The Journal of cell biology, 1982, 94(3): 667-669.
- [37] RAINE C S. Morphology of myelin and myelination[G]//Myelin. Springer, 1984: 1-50.
- [38] THOMAS P. Clinical features and differential diagnosis of peripheral neuropathy. Dyck PJ, Thomas PK, Lambert EH, Bunge R, editors. Peripheral neuropathy, vol. 2[Z]. 1984.
- [39] PELES E, SALZER J L. Molecular domains of myelinated axons[J]. Current opinion in neurobiology, 2000, 10(5): 558-565.
- [40] READHEAD C, POPKO B, TAKAHASHI N, et al. Expression of a myelin basic protein gene in transgenic shiverer mice: correction of the dysmyelinating phenotype[J]. Cell, 1987, 48(4): 703-712.
- [41] BUSHONG E A, MARTONE M E, JONES Y Z, et al. Protoplasmic astrocytes in CA1 stratum radiatum occupy separate anatomical domains[J]. Journal of Neuroscience, 2002, 22(1): 183-192.

- [42] HAMA K, ARII T, KOSAKA T. Three-dimensional organization of neuronal and glial processes: High voltage electron microscopy[J]. Microscopy research and technique, 1994, 29(5): 357-367.
- [43] VENTURA R, HARRIS K M. Three-dimensional relationships between hippocampal synapses and astrocytes[J]. Journal of Neuroscience, 1999, 19(16): 6897-6906.
- [44] GALLO V, CHITTAJALLU R. Unwrapping glial cells from the synapse: what lies inside?[J]. Science, 2001, 292(5518): 872-873.
- [45] SCHOFIELD P R, DARLISON M G, FUJITA N, et al. Sequence and functional expression of the GABAA receptor shows a ligand-gated receptor super-family[J]. Nature, 1987, 328(6127): 221-227.
- [46] DOYLE D A, CABRAL J M, PFUETZNER R A, et al. The structure of the potassium channel: molecular basis of K<sup>+</sup> conduction and selectivity[J]. science, 1998, 280(5360): 69-77.
- [47] MORAIS-CABRAL J H, ZHOU Y, MACKINNON R. Energetic optimization of ion conduction rate by the K<sup>+</sup> selectivity filter[J]. Nature, 2001, 414(6859): 37-42.
- [48] MILLER C. See potassium run[J]. Nature, 2001, 414(6859): 23-24.
- [49] LONG S B, TAO X, CAMPBELL E B, et al. Atomic structure of a voltage-dependent K<sup>+</sup> channel in a lipid membrane-like environment[J]. Nature, 2007, 450(7168): 376-382.
- [50] GADSBY D C. Spot the difference[J]. Nature, 2004, 427(6977): 795-797.
- [51] HILLE B. Ionic channels in excitable membranes. Current problems and biophysical approaches[J]. Biophysical journal, 1978, 22(2): 283-294.
- [52] SIGWORTH F J, NEHER E. Single Na<sup>+</sup> channel currents observed in cultured rat muscle cells[J]. Nature, 1980, 287(5781): 447-449.
- [53] ARMSTRONG C M, GILLY W F. Fast and slow steps in the activation of sodium channels.[J]. The Journal of general physiology, 1979, 74(6): 691-711.
- [54] AHERN C A, PAYANDEH J, BOSMANS F, et al. The hitchhiker' s guide to the voltage-gated sodium channel galaxy[J]. Journal of General Physiology, 2016, 147(1): 1-24.
- [55] DEKIN M S, GETTING P A. In vitro characterization of neurons in the ventral part of the nucleus tractus solitarius. II. Ionic basis for repetitive firing patterns[J]. Journal of Neurophysiology, 1987, 58(1): 215-229.
- [56] LLINÁS R, JAHNSEN H. Electrophysiology of mammalian thalamic neurones in vitro[J]. Nature, 1982, 297(5865): 406-408.
- [57] MCCORMICK D A, HUGUENARD J R. A model of the electrophysiological properties of thalamocortical relay neurons[J]. Journal of neurophysiology, 1992, 68(4): 1384-1400.
- [58] JACKSON A C, YAO G L, BEAN B P. Mechanism of spontaneous firing in dorsomedial suprachiasmatic nucleus neurons[J]. Journal of Neuroscience, 2004, 24(37): 7985-7998.
- [59] JOHNSTON J, FORSYTHE I D, KOPP-SCHEINPFLUG C. SYMPOSIUM REVIEW: Going native: voltage-gated potassium channels controlling neuronal excitability[J]. The Journal of physiology, 2010, 588(17): 3187-3200.
- [60] NOWAK L G, AZOUZ R, SANCHEZ-VIVES M V, et al. Electrophysiological classes of cat primary visual cortical neurons in vivo as revealed by quantitative analyses[J]. Journal of neurophysiology, 2003, 89(3): 1541-1566.
- [61] FURSHPAN E, POTTER D. Transmission at the giant motor synapses of the crayfish[J]. The Journal of physiology, 1959, 145(2): 289.
- [62] FURSHPAN E, POTTER D. Mechanism of nerve-impulse transmission at a crayfish synapse[J]. Nature, 1957, 180(4581): 342-343.

- [63] MAKOWSKI L, CASPAR D, PHILLIPS W, et al. Gap junction structures: Analysis of the x-ray diffraction data [J]. *The Journal of cell biology*, 1977, 74(2): 629-645.
- [64] UNWIN P, ZAMPIGHI G. Structure of the junction between communicating cells[J]. *Nature*, 1980, 283(5747): 545-549.
- [65] CAREW T J, KANDEL E R. Two functional effects of decreased conductance EPSP's: synaptic augmentation and increased electrotonic coupling[J]. *Science*, 1976, 192(4235): 150-153.
- [66] MCMAHAN U, KUFFLER S W, KATZ B. Visual identification of synaptic boutons on living ganglion cells and of varicosities in postganglionic axons in the heart of the frog[J]. *Proceedings of the Royal Society of London. Series B. Biological Sciences*, 1971, 177(1049): 485-508.
- [67] MORALES-PEREZ C L, NOVIELLO C M, HIBBS R E. X-ray structure of the human  $\alpha 4\beta 2$  nicotinic receptor [J]. *Nature*, 2016, 538(7625): 411-415.
- [68] COLQUHOUN D. How fast do drugs work?[J]. *Trends in Pharmacological Sciences*, 1981, 2: 212-217.
- [69] ARMSTRONG N, SUN Y, CHEN G Q, et al. Structure of a glutamate-receptor ligand-binding core in complex with kainate[J]. *Nature*, 1998, 395(6705): 913-917.
- [70] SOBOLEVSKY A I, ROSCONI M P, GOUAUX E. X-ray structure, symmetry and mechanism of an AMPA-subtype glutamate receptor[J]. *Nature*, 2009, 462(7274): 745-756.
- [71] MAYER M L. Structural biology of glutamate receptor ion channel complexes[J]. *Current opinion in structural biology*, 2016, 41: 119-127.
- [72] SAKMANN B. Nobel Lecture. Elementary steps in synaptic transmission revealed by currents through single ion channels.[J]. *The EMBO Journal*, 1992, 11(6): 2002-2016.
- [73] SHENG M, HOOGENRAAD C C. The postsynaptic architecture of excitatory synapses: a more quantitative view [J]. *Annu. Rev. Biochem.*, 2007, 76: 823-847.
- [74] HESTRIN S, NICOLL R, PERKEL D, et al. Analysis of excitatory synaptic action in pyramidal cells using whole-cell recording from rat hippocampal slices.[J]. *The Journal of Physiology*, 1990, 422(1): 203-225.
- [75] MORGAN S, TEYLER T. Electrical stimuli patterned after the theta-rhythm induce multiple forms of LTP[J]. *Journal of neurophysiology*, 2001, 86(3): 1289-1296.
- [76] ECKERT R. Propagation and transmission of signals[J]. *Animal Physiology: Mechanisms and Adaptations*, 1988: 134-176.
- [77] STUART G, SPRUSTON N, HÄUSSER M. Dendrites[M]. Oxford University Press, 2016.
- [78] LARKUM M E, ZHU J J, SAKMANN B. A new cellular mechanism for coupling inputs arriving at different cortical layers[J]. *Nature*, 1999, 398(6725): 338-341.
- [79] LANG C, BARCO A, ZABLOW L, et al. Transient expansion of synaptically connected dendritic spines upon induction of hippocampal long-term potentiation[J]. *Proceedings of the National Academy of Sciences*, 2004, 101(47): 16665-16670.
- [80] YUSTE R, DENK W. Dendritic spines as basic functional units of neuronal integration[J]. *Nature*, 1995, 375(6533): 682-684.
- [81] FRIELLE T, KOBILKA B, DOHLMAN H, et al. The  $\beta$ -adrenergic receptor and other receptors coupled to guanine nucleotide regulatory proteins[J]. *Molecular Biology in Physiology*, 1989: 79-91.
- [82] KOBILKA B. The structural basis of G-protein-coupled receptor signaling (Nobel Lecture)[J]. *Angewandte Chemie (International ed. in English)*, 2013, 52(25): 6380.

- [83] ADAMS P, JONES S, PENNEFATHER P, et al. Slow synaptic transmission in frog sympathetic ganglia[J]. *Journal of experimental biology*, 1986, 124(1): 259-285.
- [84] WHORTON M R, MACKINNON R. X-ray structure of the mammalian GIRK2- $\beta\gamma$  G-protein complex[J]. *Nature*, 2013, 498(7453): 190-197.
- [85] TODA N, WEST T C. Interactions of K, Na, and vagal stimulation in the SA node of the rabbit[J]. *American Journal of Physiology-Legacy Content*, 1967, 212(2): 416-423.
- [86] SOEJIMA M, NOMA A. Mode of regulation of the ACh-sensitive K-channel by the muscarinic receptor in rabbit atrial cells[J]. *Pflügers Archiv*, 1984, 400: 424-431.
- [87] SIEGELBAUM S A, CAMARDO J S, KANDEL E R. Serotonin and cyclic AMP close single K<sup>+</sup> channels in Aplysia sensory neurones[J]. *Nature*, 1982, 299(5882): 413-417.
- [88] SHUSTER M, CAMARDO J, SIEGELBAUM S, et al. Cyclic AMP-dependent protein kinase closes the serotonin-sensitive K<sup>+</sup> channels of Aplysia sensory neurones in cell-free membrane patches[J]. *Nature*, 1985, 313(6001): 392-395.
- [89] EISEN J S, MARDER E. A mechanism for production of phase shifts in a pattern generator[J]. *Journal of neurophysiology*, 1984, 51(6): 1375-1393.
- [90] MARDER E, BUCHER D. Understanding circuit dynamics using the stomatogastric nervous system of lobsters and crabs[J]. *Annu. Rev. Physiol.*, 2007, 69: 291-316.
- [91] HARRIS-WARRICK R M. Neuromodulation and flexibility in central pattern generator networks[J]. *Current opinion in neurobiology*, 2011, 21(5): 685-692.
- [92] KATZ B, MILEDI R. A study of synaptic transmission in the absence of nerve impulses[J]. *The Journal of physiology*, 1967, 192(2): 407.
- [93] LLINÁS R R. Depolarization-release coupling systems in neurons.[J]. *Neurosciences Research Program Bulletin*, 1977, 15(4): 555-687.
- [94] ROBITAILLE R, ADLER E, CHARLTON M P. Strategic location of calcium channels at transmitter release sites of frog neuromuscular synapses[J]. *Neuron*, 1990, 5(6): 773-779.
- [95] WACHMAN E S, POAGE R E, STILES J R, et al. Spatial distribution of calcium entry evoked by single action potentials within the presynaptic active zone[J]. *Journal of Neuroscience*, 2004, 24(12): 2877-2885.
- [96] MEINRENKEN C J, BORST J G G, SAKMANN B. The Hodgkin-Huxley-Katz Prize Lecture: Local routes revisited: the space and time dependence of the Ca<sup>2+</sup> signal for phasic transmitter release at the rat calyx of Held [J]. *The Journal of physiology*, 2003, 547(3): 665-689.
- [97] SUN J, PANG Z P, QIN D, et al. A dual-Ca<sup>2+</sup>-sensor model for neurotransmitter release in a central synapse[J]. *Nature*, 2007, 450(7170): 676-682.
- [98] LILEY A. The quantal components of the mammalian end-plate potential[J]. *The Journal of physiology*, 1956, 133(3): 571.
- [99] BOYD I, MARTIN A. The end-plate potential in mammalian muscle[J]. *The Journal of physiology*, 1956, 132(1): 74.
- [100] DITTMAN J S, KREITZER A C, REGEHR W G. Interplay between facilitation, depression, and residual calcium at three presynaptic terminals[J]. *Journal of Neuroscience*, 2000, 20(4): 1374-1385.
- [101] FERNÁNDEZ-CHACÓN R, KÖNIGSTORFER A, GERBER S H, et al. Synaptotagmin I functions as a calcium regulator of release probability[J]. *Nature*, 2001, 410(6824): 41-49.

- [102] GEIGER J R, JONAS P. Dynamic control of presynaptic  $\text{Ca}^{2+}$  inflow by fast-inactivating  $\text{K}^{+}$  channels in hippocampal mossy fiber boutons[J]. *Neuron*, 2000, 28(3): 927-939.
- [103] CHUNG S, LI X, NELSON S B. Short-term depression at thalamocortical synapses contributes to rapid adaptation of cortical sensory responses in vivo[J]. *Neuron*, 2002, 34(3): 437-446.
- [104] HEUSER J, REESE T. Structural changes after transmitter release at the frog neuromuscular junction.[J]. *The Journal of cell biology*, 1981, 88(3): 564-580.
- [105] FERNANDEZ J, NEHER E, GOMPERTS B. Capacitance measurements reveal stepwise fusion events in degranulating mast cells[J]. *Nature*, 1984, 312(5993): 453-455.
- [106] ZENISEK D, HORST N K, MERRIFIELD C, et al. Visualizing synaptic ribbons in the living cell[J]. *Journal of Neuroscience*, 2004, 24(44): 9752-9759.
- [107] MONCK J R, FERNANDEZ J M. The exocytotic fusion pore.[J]. *The Journal of cell biology*, 1992, 119(6): 1395-1404.
- [108] SPRUCE A, BRECKENRIDGE L, LEE A, et al. Properties of the fusion pore that forms during exocytosis of a mast cell secretory vesicle[J]. *Neuron*, 1990, 4(5): 643-654.
- [109] SCHWEIZER F E, BETZ H, AUGUSTINE G J. From vesicle docking to endocytosis: intermediate reactions of exocytosis[J]. *Neuron*, 1995, 14(4): 689-696.
- [110] TAKAMORI S, HOLT M, STENIUS K, et al. Molecular anatomy of a trafficking organelle[J]. *Cell*, 2006, 127(4): 831-846.
- [111] SÜDHOF T C. Neurotransmitter release: the last millisecond in the life of a synaptic vesicle[J]. *Neuron*, 2013, 80(3): 675-690.
- [112] RIZO J, SÜDHOF T C. Snares and Munc18 in synaptic vesicle fusion[J]. *Nature Reviews Neuroscience*, 2002, 3(8): 641-653.
- [113] GEPPERT M, GODA Y, HAMMER R E, et al. Synaptotagmin I: a major  $\text{Ca}^{2+}$  sensor for transmitter release at a central synapse[J]. *Cell*, 1994, 79(4): 717-727.
- [114] FERNANDEZ I, ARAÇ D, UBACH J, et al. Three-dimensional structure of the synaptotagmin 1 C2B-domain: synaptotagmin 1 as a phospholipid binding machine[J]. *Neuron*, 2001, 32(6): 1057-1069.
- [115] ZHOU Q, ZHOU P, WANG A L, et al. The primed SNARE–complexin–synaptotagmin complex for neuronal exocytosis[J]. *Nature*, 2017, 548(7668): 420-425.
- [116] HARLOW M L, RESS D, STOSCHEK A, et al. The architecture of active zone material at the frog's neuromuscular junction[J]. *Nature*, 2001, 409(6819): 479-484.
- [117] CHAUDHRY F A, BOULLAND J L, JENSTAD M, et al. Pharmacology of neurotransmitter transport into secretory vesicles[J]. *Pharmacology of Neurotransmitter Release*, 2008: 77-106.
- [118] GARDNER J C. Grendel[M]. Hachette UK, 2015.
- [119] SWETS J A. The Relative Operating Characteristic in Psychology: A technique for isolating effects of response bias finds wide use in the study of perception and cognition.[J]. *Science*, 1973, 182(4116): 990-1000.
- [120] ALBE-FESSARD D, ANDRES K, BATES J, et al. Morphology of cutaneous receptors[J]. *Somatosensory system*, 1973: 3-28.
- [121] DOWLING J E. The retina: an approachable part of the brain[M]. Harvard University Press, 1987.
- [122] MOUNTCASTLE V B, TALBOT W H, KORNHUBER H H. The neural transformation of mechanical stimuli delivered to the monkey's hand[C]//Ciba Foundation Symposium-Hormonal Factors in Carbohydrate Metabolism (Colloquia on Endocrinology). 1966: 325-351.



- [123] TALBOT W H, DARIAN-SMITH I, KORNHUBER H H, et al. The sense of flutter-vibration: comparison of the human capacity with response patterns of mechanoreceptive afferents from the monkey hand[J]. *Journal of neurophysiology*, 1968, 31(2): 301-334.
- [124] GLASSER M F, COALSON T S, ROBINSON E C, et al. A multi-modal parcellation of human cerebral cortex[J]. *Nature*, 2016, 536(7615): 171-178.
- [125] BIEDERMAN-THORSON M A, SCHMIDT R F, THEWS G. *Human Physiology*[M]. Springer Science & Business Media, 2013.
- [126] GANDHI S P, HEEGER D J, BOYNTON G M. Spatial attention affects brain activity in human primary visual cortex[J]. *Proceedings of the National Academy of Sciences*, 1999, 96(6): 3314-3319.
- [127] ALBRIGHT T D, STONER G R. Contextual influences on visual processing[J]. *Annual review of neuroscience*, 2002, 25(1): 339-379.
- [128] LI L, RUTLIN M, ABRAIRA V E, et al. The functional organization of cutaneous low-threshold mechanosensory neurons[J]. *Cell*, 2011, 147(7): 1615-1627.
- [129] ERLANGER J, GASSER H S. *Electrical signs of nervous activity*[M]. University of Pennsylvania Press, 2016.
- [130] SACHS F. Stretch-sensitive ion channels: an update[J]. *Soc. Gen. Physiol. Ser*, 1992, 47: 241-260.
- [131] CONE R A, CURRY G M, FEINLEIB M E, et al. Transducer properties and integrative mechanisms in the frog's muscle spindle[J]. *Principles of receptor physiology*, 1971: 442-499.
- [132] GUHARAY F, SACHS F. Stretch-activated single ion channel currents in tissue-cultured embryonic chick skeletal muscle[J]. *The Journal of physiology*, 1984, 352(1): 685-701.
- [133] LIN S Y, COREY D P. TRP channels in mechanosensation[J]. *Current opinion in neurobiology*, 2005, 15(3): 350-357.
- [134] MURTHY S E, DUBIN A E, PATAPOUTIAN A. Piezos thrive under pressure: mechanically activated ion channels in health and disease[J]. *Nature reviews Molecular cell biology*, 2017, 18(12): 771-783.
- [135] SAOTOME K, MURTHY S E, KEFAUVER J M, et al. Structure of the mechanically activated ion channel Piezo1[J]. *Nature*, 2018, 554(7693): 481-486.
- [136] MAKSIMOVIC S, NAKATANI M, BABA Y, et al. Epidermal Merkel cells are mechanosensory cells that tune mammalian touch receptors[J]. *Nature*, 2014, 509(7502): 617-621.
- [137] ZIMMERMAN A, BAI L, GINTY D D. The gentle touch receptors of mammalian skin[J]. *Science*, 2014, 346(6212): 950-954.
- [138] BAI L, LEHNERT B P, LIU J, et al. Genetic identification of an expansive mechanoreceptor sensitive to skin stroking[J]. *Cell*, 2015, 163(7): 1783-1795.
- [139] JORDT S E, MCKEMY D D, JULIUS D. Lessons from peppers and peppermint: the molecular logic of thermosensation[J]. *Current opinion in neurobiology*, 2003, 13(4): 487-492.
- [140] PERL E. Myelinated afferent fibres innervating the primate skin and their response to noxious stimuli[J]. *The Journal of physiology*, 1968, 197(3): 593-615.
- [141] GHITANI N, BARIK A, SZCZOT M, et al. Specialized mechanosensory nociceptors mediating rapid responses to hair pull[J]. *Neuron*, 2017, 95(4): 944-954.
- [142] JOHANSSON R S, VALLBO Å B. Tactile sensory coding in the glabrous skin of the human hand[J]. *Trends in neurosciences*, 1983, 6: 27-32.

- [143] BOLANOWSKI S J, PAWSON L. Organization of Meissner corpuscles in the glabrous skin of monkey and cat[J]. *Somatosensory & motor research*, 2003, 20(3-4): 223-231.
- [144] WEINSTEIN S. Intensive and extensive aspects of tactile sensitivity as a function of body part, sex and laterality [C]//the First Int'l symp. on the Skin Senses, 1968. 1968.
- [145] JOHNSON K O, PHILLIPS J R. Tactile spatial resolution. I. Two-point discrimination, gap detection, grating resolution, and letter recognition[J]. *Journal of neurophysiology*, 1981, 46(6): 1177-1192.
- [146] PHILLIPS J, JOHANSSON R, JOHNSON K. Representation of braille characters in human nerve fibres[J]. *Experimental Brain Research*, 1990, 81: 589-592.
- [147] BRISBEN A, HSIAO S, JOHNSON K. Detection of vibration transmitted through an object grasped in the hand [J]. *Journal of neurophysiology*, 1999, 81(4): 1548-1558.
- [148] MOUNTCASTLE V B, LAMOTTE R H, CARLIG. Detection thresholds for stimuli in humans and monkeys: comparison with threshold events in mechanoreceptive afferent nerve fibers innervating the monkey hand.[J]. *Journal of neurophysiology*, 1972, 35(1): 122-136.
- [149] JOHANSSON R S, LANDSTRO U, LUNDSTRO R, et al. Responses of mechanoreceptive afferent units in the glabrous skin of the human hand to sinusoidal skin displacements[J]. *Brain research*, 1982, 244(1): 17-25.
- [150] MUNIAK M A, RAY S, HSIAO S S, et al. The neural coding of stimulus intensity: linking the population response of mechanoreceptive afferents with psychophysical behavior[J]. *Journal of Neuroscience*, 2007, 27(43): 11687-11699.
- [151] SALINAS E, HERNANDEZ A, ZAINOS A, et al. Periodicity and firing rate as candidate neural codes for the frequency of vibrotactile stimuli[J]. *Journal of neuroscience*, 2000, 20(14): 5503-5515.
- [152] JOHANSSON R S. Sensory control of dexterous manipulation in humans[G]//*Hand and brain*. Elsevier, 1996: 381-414.
- [153] OBERLAENDER M, de KOCK C P, BRUNO R M, et al. Cell type-specific three-dimensional structure of thalamocortical circuits in a column of rat vibrissal cortex[J]. *Cerebral cortex*, 2012, 22(10): 2375-2391.
- [154] GARDNER E P. Somatosensory cortical mechanisms of feature detection in tactile and kinesthetic discrimination [J]. *Canadian journal of physiology and pharmacology*, 1988, 66(4): 439-454.
- [155] IWAMURA Y, TANAKA M, SAKAMOTO M, et al. Rostrocaudal gradients in the neuronal receptive field complexity in the finger region of the alert monkey's postcentral gyrus[J]. *Experimental Brain Research*, 1993, 92: 360-368.
- [156] IWAMURA Y, IRIKI A, TANAKA M. Bilateral hand representation in the postcentral somatosensory cortex[J]. *Nature*, 1994, 369(6481): 554-556.
- [157] NELSON R, SUR M, FELLEMAN D, et al. Representations of the body surface in postcentral parietal cortex of *Macaca fascicularis*[J]. *Journal of Comparative Neurology*, 1980, 192(4): 611-643.
- [158] DICARLO J J, JOHNSON K O, HSIAO S S. Structure of receptive fields in area 3b of primary somatosensory cortex in the alert monkey[J]. *Journal of neuroscience*, 1998, 18(7): 2626-2645.
- [159] SRIPATI A P, YOSHIOKA T, DENCHEV P, et al. Spatiotemporal receptive fields of peripheral afferents and cortical area 3b and 1 neurons in the primate somatosensory system[J]. *Journal of Neuroscience*, 2006, 26(7): 2101-2114.
- [160] WARREN S, HAMALAINEN H A, GARDNER E P. Objective classification of motion-and direction-sensitive neurons in primary somatosensory cortex of awake monkeys[J]. *Journal of Neurophysiology*, 1986, 56(3): 598-622.



- [161] HINKLEY L B, KRUBITZER L A, NAGARAJAN S S, et al. Sensorimotor integration in S2, PV, and parietal rostroventral areas of the human sylvian fissure[J]. *Journal of neurophysiology*, 2007, 97(2): 1288-1297.
- [162] ROMO R, HERNÁNDEZ A, ZAINOS A, et al. Neuronal correlates of decision-making in secondary somatosensory cortex[J]. *Nature neuroscience*, 2002, 5(11): 1217-1225.
- [163] PAUSE M, KUNESCH E, BINKOFSKI F, et al. Sensorimotor disturbances in patients with lesions of the parietal cortex[J]. *Brain*, 1989, 112(6): 1599-1625.
- [164] HIKOSAKA O, TANAKA M, SAKAMOTO M, et al. Deficits in manipulative behaviors induced by local injections of muscimol in the first somatosensory cortex of the conscious monkey[J]. *Brain research*, 1985, 325(1-2): 375-380.
- [165] PERL E R. Ideas about pain, a historical view[J]. *Nature Reviews Neuroscience*, 2007, 8(1): 71-80.
- [166] FIELDS H. Painful dysfunction of the nervous system[J]. *Pain*, 1987: 133-167.
- [167] TOMINAGA M, CATERINA M J. Thermosensation and pain[J]. *Journal of neurobiology*, 2004, 61(1): 3-12.
- [168] BAUTISTA D M, JORDT S E, NIKAI T, et al. TRPA1 mediates the inflammatory actions of environmental irritants and proalgesic agents[J]. *Cell*, 2006, 124(6): 1269-1282.
- [169] RAJA S N, CAMPBELL J N, MEYER R A. Evidence for different mechanisms of primary and secondary hyperalgesia following heat injury to the glabrous skin[J]. *Brain*, 1984, 107(4): 1179-1188.
- [170] FLOR H, NIKOLAJSSEN L, STAEHELIN JENSEN T. Phantom limb pain: a case of maladaptive CNS plasticity? [J]. *Nature reviews neuroscience*, 2006, 7(11): 873-881.
- [171] DE BIASI S, RUSTIONI A. Ultrastructural immunocytochemical localization of excitatory amino acids in the somatosensory system.[J]. *Journal of Histochemistry & Cytochemistry*, 1990, 38(12): 1745-1754.
- [172] CRAIG A, BUSHNELL M. The thermal grill illusion: unmasking the burn of cold pain[J]. *Science*, 1994, 265(5169): 252-255.
- [173] FIELD D J, HAYES A, HESS R F. Contour integration by the human visual system: evidence for a local “association field” [J]. *Vision research*, 1993, 33(2): 173-193.
- [174] HUBEL D H. Eye, brain, and vision.[M]. *Scientific American Library/Scientific American Books*, 1995.
- [175] BLASDEL G G, LUND J S. Termination of afferent axons in macaque striate cortex[J]. *Journal of Neuroscience*, 1983, 3(7): 1389-1413.
- [176] KAPADIA M K, WESTHEIMER G, GILBERT C D. Spatial distribution of contextual interactions in primary visual cortex and in visual perception[J]. *Journal of neurophysiology*, 2000, 84(4): 2048-2062.
- [177] CURCIO C A, HENDRICKSON A E. Organization and development of the primate photoreceptor mosaic[J]. *Progress in retinal research*, 1991, 10: 89-120.
- [178] BOYCOTT B B, DOWLING J E. Organization of the primate retina: light microscopy, with an appendix: a second type of midrange bipolar cell in the primate retina[J]. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 1969, 255(799): 109-184.
- [179] POLYAK S L. The retina.[J]. 1941.
- [180] HURVICH L M. Color vision[J]. 1981.
- [181] O'BRIEN D F. The chemistry of vision[J]. *Science*, 1982, 218(4576): 961-966.
- [182] YOUNG R W. Visual cells[J]. *Scientific American*, 1970, 223(4): 80-91.
- [183] SCHNEEWEIS D M, SCHNAPF J L. Photovoltage of rods and cones in the macaque retina[J]. *Science*, 1995, 268(5213): 1053-1056.

- [184] NATHANS J, HOGNESS D S. Isolation and nucleotide sequence of the gene encoding human rhodopsin.[J]. Proceedings of the National Academy of Sciences, 1984, 81(15): 4851-4855.
- [185] NATHANS J, THOMAS D, HOGNESS D S. Molecular genetics of human color vision: the genes encoding blue, green, and red pigments[J]. Science, 1986, 232(4747): 193-202.
- [186] SAKMANN B, CREUTZFELDT O D. Scotopic and mesopic light adaptation in the cat's retina[J]. Pflügers Archiv, 1969, 313: 168-185.
- [187] WYSZECKI G, STILES W S. Color science: concepts and methods, quantitative data and formulae: vol. 40[M]. John wiley & sons, 2000.
- [188] SCHNEEWEIS D, SCHNAPF J. Noise and light adaptation in rods of the macaque monkey[J]. Visual neuroscience, 2000, 17(5): 659-666.
- [189] DE VALOIS R L, MORGAN H, SNODDERLY D M. Psychophysical studies of monkey vision-III. Spatial luminance contrast sensitivity tests of macaque and human observers[J]. Vision research, 1974, 14(1): 75-81.
- [190] DERRINGTON A, LENNIE P. Spatial and temporal contrast sensitivities of neurones in lateral geniculate nucleus of macaque.[J]. The Journal of physiology, 1984, 357(1): 219-240.
- [191] ENROTH-CUGELL C, ROBSON J G. Functional characteristics and diversity of cat retinal ganglion cells. Basic characteristics and quantitative description.[J]. Investigative ophthalmology & visual science, 1984, 25(3): 250-267.
- [192] HUBEL D H, WIESEL T N. Receptive fields and functional architecture of monkey striate cortex[J]. The Journal of physiology, 1968, 195(1): 215-243.
- [193] LI W, GILBERT C D. Global contour saliency and local colinear interactions[J]. Journal of neurophysiology, 2002, 88(5): 2846-2856.
- [194] POGGIO G F. Mechanisms of stereopsis in monkey visual cortex[J]. Cerebral Cortex, 1995, 5(3): 193-204.
- [195] BAKIN J S, NAKAYAMA K, GILBERT C D. Visual responses in monkey areas V1 and V2 to three-dimensional surface configurations[J]. Journal of Neuroscience, 2000, 20(21): 8188-8198.
- [196] ZHOU H, FRIEDMAN H S, VON DER HEYDT R. Coding of border ownership in monkey visual cortex[J]. Journal of Neuroscience, 2000, 20(17): 6594-6611.
- [197] PRIEBEN J, FERSTER D. Inhibition, spike threshold, and stimulus selectivity in primary visual cortex[J]. Neuron, 2008, 57(4): 482-497.
- [198] ADELSON E H. Perceptual organization and the judgment of brightness[J]. Science, 1993, 262(5142): 2042-2044.
- [199] CRIST R E, LI W, GILBERT C D. Learning to see: experience and attention in primary visual cortex[J]. Nature neuroscience, 2001, 4(5): 519-525.
- [200] LI W, PIËCH V, GILBERT C D. Learning to link visual contours[J]. Neuron, 2008, 57(3): 442-451.
- [201] WANG Q, CAVANAGH P, GREEN M. Familiarity and pop-out in visual search[J]. Perception & psychophysics, 1994, 56: 495-500.
- [202] DUHAMEL J R, COLBY C L, GOLDBERG M E. The updating of the representation of visual space in parietal cortex by intended eye movements[J]. Science, 1992, 255(5040): 90-92.
- [203] SOMMER M A, WURTZ R H. Brain circuits for the internal monitoring of movements[J]. Annu. Rev. Neurosci., 2008, 31: 317-338.
- [204] CAVANAUGH J, BERMAN R A, JOINER W M, et al. Saccadic corollary discharge underlies stable visual perception[J]. Journal of Neuroscience, 2016, 36(1): 31-42.

- [205] ANDERSEN R A, ESSICK G K, SIEGEL R M. Encoding of spatial location by posterior parietal neurons[J]. *Science*, 1985, 230(4724): 456-458.
- [206] ASSAD J A, SHEPHERD G M, COREY D P. Tip-link integrity and mechanical transduction in vertebrate hair cells[J]. *Neuron*, 1991, 7(6): 985-994.
- [207] HUDSPETH A, GILLESPIE P G. Pulling springs to tune transduction: adaptation by hair cells[J]. *Neuron*, 1994, 12(1): 1-9.
- [208] HOWARD J, HUDSPETH A. Compliance of the hair bundle associated with gating of mechanoelectrical transduction channels in the bullfrog's saccular hair cell[J]. *Neuron*, 1988, 1(3): 189-199.
- [209] HUDSPETH A J. How the ear's works work[J]. *Nature*, 1989, 341(6241): 397-404.
- [210] WU Z, MÜLLER U. Molecular identity of the mechanotransduction channel in hair cells: not quiet there yet[J]. *Journal of Neuroscience*, 2016, 36(43): 10927-10934.
- [211] PAN B, AKYUZ N, LIU X P, et al. TMC1 forms the pore of mechanosensory transduction channels in vertebrate inner ear hair cells[J]. *Neuron*, 2018, 99(4): 736-753.
- [212] WILSON J. Evidence for a cochlear origin for acoustic re-emissions, threshold fine-structure and tonal tinnitus[J]. *Hearing research*, 1980, 2(3-4): 233-252.
- [213] MURPHY W, TALMADGE C, TUBIS A, et al. Relaxation dynamics of spontaneous otoacoustic emissions perturbed by external tones. I. Response to pulsed single-tone suppressors[J]. *The Journal of the Acoustical Society of America*, 1995, 97(6): 3702-3710.
- [214] SPOENDLIN H. Neuroanatomy of the cochlea[C]//Facts and Models in Hearing: Proceedings of the Symposium on Psychophysical Models and Physiological Facts in Hearing, held at Tutzing, Oberbayern, Federal Republic of Germany, April 22-26, 1974. 1974: 18-32.
- [215] KIANG N Y S, WATANABE T, THOMAS E C, et al. Discharge patterns of single fibers in the cat's auditory nerve: vol. 35[M]. MIT press Cambridge, MA, 1965.
- [216] IURATO S. Submicroscopic structure of the inner ear[M]. Elsevier, 2013.
- [217] FLOCK Å. Transducing mechanisms in the lateral line canal organ receptors[C]//Cold Spring Harbor Symposia on Quantitative Biology: vol. 30. 1965: 133-145.
- [218] SPOENDLIN H. The ultrastructure of the vestibular sense organ[J]. *The vestibular system and its diseases*, 2016, 1968: 39-68.
- [219] GACEK R, LYON M. The localization of vestibular efferent neurons in the kitten with horseradish peroxidase[J]. *Acta oto-laryngologica*, 1974, 77(1-6): 92-101.
- [220] EINSTEIN A. Über das Relativitätsprinzip und die aus demselben gezogenen Folgerungen[M]. S. Hirzel Leipzig, Germany, 1908.
- [221] SUGIUCHI Y, IZAWA Y, EBATA S, et al. Vestibular cortical area in the periarculate cortex: its afferent and efferent projections[J]. *Annals of the New York Academy of Sciences*, 2005, 1039(1): 111-123.
- [222] MILES F, EIGHMY B. Long-term adaptive changes in primate vestibuloocular reflex. I. Behavioral observations. [J]. *Journal of Neurophysiology*, 1980, 43(5): 1406-1425.
- [223] GEISLER C D. From sound to synapse: physiology of the mammalian ear[M]. Oxford University Press, USA, 1998.
- [224] Y Cajal. Histologie du systeme nerveux de l' homme et des vertebre s II[J]. (No Title), 1909.

- [225] JEFFRESS L A. A place theory of sound localization.[J]. Journal of comparative and physiological psychology, 1948, 41(1): 35.
- [226] YIN T C. Neural mechanisms of encoding binaural localization cues in the auditory brainstem[J]. Integrative functions in the mammalian auditory pathway, 2002: 99-159.
- [227] DARROW K N, MAISON S F, LIBERMAN M C. Cochlear efferent feedback balances interaural sensitivity[J]. Nature neuroscience, 2006, 9(12): 1474-1476.
- [228] KING A J. Sensory experience and the formation of a computational map of auditory space in the brain[J]. Bioessays, 1999, 21(11): 900-911.
- [229] COHEN Y E, KNUDSEN E I. Maps versus clusters: different representations of auditory space in the midbrain and forebrain[J]. Trends in neurosciences, 1999, 22(3): 128-135.
- [230] WANG X. Cortical coding of auditory features[J]. Annual review of neuroscience, 2018, 41: 527-552.
- [231] WANG X, LU T, SNIDER R K, et al. Sustained firing in auditory cortex evoked by preferred stimuli[J]. Nature, 2005, 435(7040): 341-346.
- [232] MIDDLEBROOKS J C. Auditory cortex cheers the overture and listens through the finale[J]. Nature neuroscience, 2005, 8(7): 851-852.
- [233] ZHANG L I, BAO S, MERZENICH M M. Persistent and specific influences of early acoustic environments on primary auditory cortex[J]. Nature neuroscience, 2001, 4(11): 1123-1130.
- [234] MERZENICH M M, KNIGHT P L, ROTH G L. Representation of cochlea within primary auditory cortex in the cat[J]. Journal of neurophysiology, 1975, 38(2): 231-249.
- [235] RAUSCHER J P, TIAN B. Mechanisms and streams for processing of “what” and “where” in auditory cortex[J]. Proceedings of the National Academy of Sciences, 2000, 97(22): 11800-11806.
- [236] LU T, LIANG L, WANG X. Temporal and rate representations of time-varying signals in the auditory cortex of awake primates[J]. Nature neuroscience, 2001, 4(11): 1131-1138.
- [237] BARTLETT E L, WANG X. Neural representations of temporally modulated signals in the auditory thalamus of awake primates[J]. Journal of neurophysiology, 2007, 97(2): 1005-1017.
- [238] BENDOR D, WANG X. The neuronal representation of pitch in primate auditory cortex[J]. Nature, 2005, 436(7054): 1161-1165.
- [239] SUGA N, O'NEILL W E, KUJIRAI K, et al. Specificity of combination-sensitive neurons for processing of complex biosonar signals in auditory cortex of the mustached bat[J]. Journal of Neurophysiology, 1983, 49(6): 1573-1626.
- [240] SUGA N. Neural mechanisms of complex-sound processing for echolocation[J]. Trends in Neurosciences, 1984, 7(1): 20-27.
- [241] HOUDE J F, CHANG E F. The cortical computations underlying feedback control in vocal production[J]. Current opinion in neurobiology, 2015, 33: 174-181.
- [242] ELIADES S J, WANG X. Sensory-motor interaction in the primate auditory cortex during self-initiated vocalizations[J]. Journal of neurophysiology, 2003, 89(4): 2194-2207.
- [243] ELIADES S J, WANG X. Neural substrates of vocalization feedback monitoring in primate auditory cortex[J]. Nature, 2008, 453(7198): 1102-1106.
- [244] MALNIC B, HIRONO J, SATO T, et al. Combinatorial receptor codes for odors[J]. Cell, 1999, 96(5): 713-723.

- [245] RESSLER K J, SULLIVAN S L, BUCK L B. A zonal organization of odorant receptor gene expression in the olfactory epithelium[J]. *Cell*, 1993, 73(3): 597-609.
- [246] HABERLY L B, SHEPHERD G M. The synaptic organization of the brain[J]. *Olfactory cortex*, 1998: 377-416.
- [247] RESSLER K J, SULLIVAN S L, BUCK L B. Information coding in the olfactory system: evidence for a stereotyped and highly organized epitope map in the olfactory bulb[J]. *Cell*, 1994, 79(7): 1245-1255.
- [248] JOHNSON B A, FARAHBOD H, LEON M. Interactions between odorant functional group and hydrocarbon structure influence activity in glomerular response modules in the rat olfactory bulb[J]. *Journal of Comparative Neurology*, 2005, 483(2): 205-216.
- [249] BLAKEMORE S J, GOODBODY S J, WOLPERT D M. Predicting the consequences of our own actions: the role of sensorimotor context estimation[J]. *Journal of Neuroscience*, 1998, 18(18): 7511-7518.
- [250] FLANAGAN J R, BELTZNER M A. Independence of perceptual and sensorimotor predictions in the size-weight illusion[J]. *Nature neuroscience*, 2000, 3(7): 737-741.
- [251] MORASSO P. Spatial control of arm movements[J]. *Experimental brain research*, 1981, 42(2): 223-227.
- [252] SCHMIDT R A, ZELAZNIK H, HAWKINS B, et al. Motor-output variability: a theory for the accuracy of rapid motor acts.[J]. *Psychological review*, 1979, 86(5): 415.
- [253] BRASHERS-KRUG T, SHADMEHR R, BIZZI E. Consolidation in human motor memory[J]. *Nature*, 1996, 382(6588): 252-255.
- [254] ROEMMICH R T, LONG A W, BASTIAN A J. Seeing the errors you feel enhances locomotor performance but not learning[J]. *Current biology*, 2016, 26(20): 2707-2716.
- [255] BOTTERMAN B, IWAMOTO G, GONYEA W. Gradation of isometric tension by different activation rates in motor units of cat flexor carpi radialis muscle[J]. *Journal of neurophysiology*, 1986, 56(2): 494-506.
- [256] FUGLEVAND A J, MACEFIELD V G, BIGLAND-RITCHIE B. Force-frequency and fatigue properties of motor units in muscles that control digits of the human hand[J]. *Journal of neurophysiology*, 1999, 81(4): 1718-1729.
- [257] MACEFIELD V G, FUGLEVAND A J, BIGLAND-RITCHIE B. Contractile properties of single motor units in human toe extensors assessed by intraneural motor axon stimulation[J]. *Journal of neurophysiology*, 1996, 75(6): 2509-2519.
- [258] CUTSEM M V, FEIEREISEN P, DUCHATEAU J, et al. Mechanical properties and behaviour of motor units in the tibialis anterior during voluntary contractions[J]. *Canadian journal of applied physiology*, 1997, 22(6): 585-597.
- [259] BOTTINELLI R, CANEPARI M, PELLEGRINO M, et al. Force-velocity properties of human skeletal muscle fibres: myosin heavy chain isoform and temperature dependence.[J]. *The Journal of physiology*, 1996, 495(2): 573-586.
- [260] DESMEDT J E, GODAUX E. Ballistic contractions in man: characteristic recruitment pattern of single motor units of the tibialis anterior muscle.[J]. *The Journal of physiology*, 1977, 264(3): 673-693.
- [261] MILNER-BROWN H, STEIN R, YEMM R. The orderly recruitment of human motor units during voluntary isometric contractions[J]. *The Journal of physiology*, 1973, 230(2): 359.
- [262] MORITZ C T, BARRY B K, PASCOE M A, et al. Discharge rate variability influences the variation in force fluctuations across the working range of a hand muscle[J]. *Journal of neurophysiology*, 2005, 93(5): 2449-2459.
- [263] HECKMAN C, MOTTRAM C, QUINLAN K, et al. Motoneuron excitability: the importance of neuromodulatory inputs[J]. *Clinical Neurophysiology*, 2009, 120(12): 2040-2054.
- [264] ERIM Z, DE LUCA C J, MINEO K, et al. Rank-ordered regulation of motor units[J]. *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine*, 1996, 19(5): 563-573.

- [265] BLOOM W, MAXIMOW A. A textbook of histology[M]. WB Saunders, 1952.
- [266] GORDON A, REGNIER M, HOMSHER E. Skeletal and cardiac muscle contractile activation: tropomyosin “rocks and rolls” [J]. *Physiology*, 2001, 16(2): 49-55.
- [267] WINTERS J M, WOO S L, DELP I. Multiple muscle systems: biomechanics and movement organization[M]. Springer Science & Business Media, 2012.
- [268] LIEBER R L, FRIDÉN J. Functional and clinical significance of skeletal muscle architecture[J]. *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine*, 2000, 23(11): 1647-1666.
- [269] FINNI T, KOMI P V, LEPOLA V. In vivo human triceps surae and quadriceps femoris muscle function in a squat jump and counter movement jump[J]. *European journal of applied physiology*, 2000, 83: 416-426.
- [270] GREGOR R, ROY R, WHITING W, et al. Mechanical output of the cat soleus during treadmill locomotion: in vivo vs in situ characteristics[J]. *Journal of Biomechanics*, 1988, 21(9): 721-732.
- [271] LIDDELL E G T, SHERRINGTON C S. Reflexes in response to stretch (myotatic reflexes)[J]. *Proceedings of the Royal Society of London. Series B, Containing Papers of a Biological Character*, 1924, 96(675): 212-242.
- [272] SCHMIDT R F, WIESENDANGER M. Motor systems[G]//*Human physiology*. Springer, 1989: 82-123.
- [273] HUNT C C, KUFFLER S W. Stretch receptor discharges during muscle contraction[J]. *The Journal of physiology*, 1951, 113(2-3): 298.
- [274] HULLIGER M. The mammalian muscle spindle and its central control[J]. *Reviews of Physiology, Biochemistry and Pharmacology*, Volume 101: Volume: 101, 1984: 1-110.
- [275] BOYD I. The isolated mammalian muscle spindle[J]. *Trends in neurosciences*, 1980, 3(11): 258-265.
- [276] BROWN M, MATTHEWS P. On the subdivision of the efferent fibres to muscle spindles into static and dynamic fusimotor fibres[J]. *Control and innervation of skeletal muscle*, 1966: 18-31.
- [277] CRAGO P E, HOUK J C, RYMER W Z. Sampling of total muscle force by tendon organs.[J]. *Journal of neurophysiology*, 1982, 47(6): 1069-1083.
- [278] VALLBO Å. Basic patterns of muscle spindle discharge in man[C]//*Muscle Receptors and Movement: Proceedings of a Symposium held at the Sherrington School of Physiology, St Thomas’ s Hospital Medical School, London, on July 8th and 9th, 1980*. 1981: 263-275.
- [279] ENGBERG I, LUNDBERG A. An electromyographic analysis of muscular activity in the hindlimb of the cat during unrestrained locomotion[J]. *Acta Physiologica Scandinavica*, 1969, 75(4): 614-630.
- [280] GRILLNER S, ZANGGER P. The effect of dorsal root transection on the efferent motor pattern in the cat’s hindlimb during locomotion[J]. *Acta Physiologica Scandinavica*, 1984, 120(3): 393-405.
- [281] GRILLNER S, ZANGGER P. On the central generation of locomotion in the low spinal cat[J]. *Experimental brain research*, 1979, 34: 241-261.
- [282] PEARSON K, ROSSIGNOL S. Fictive motor patterns in chronic spinal cats[J]. *Journal of neurophysiology*, 1991, 66(6): 1874-1887.
- [283] RYBAK I A, STECINA K, SHEVTSOVA N A, et al. Modelling spinal circuitry involved in locomotor pattern generation: insights from the effects of afferent stimulation[J]. *The Journal of physiology*, 2006, 577(2): 641-658.
- [284] GRILLNER S. Biological pattern generation: the cellular and computational logic of networks in motion[J]. *Neuron*, 2006, 52(5): 751-766.
- [285] KIEHN O. Decoding the organization of spinal circuits that control locomotion[J]. *Nature Reviews Neuroscience*, 2016, 17(4): 224-238.



- [286] KRIELLAARS D, BROWNSTONE R, NOGA B, et al. Mechanical entrainment of fictive locomotion in the decerebrate cat[J]. *Journal of neurophysiology*, 1994, 71(6): 2074-2086.
- [287] HIEBERT G W, WHELAN P J, PROCHAZKA A, et al. Contribution of hind limb flexor muscle afferents to the timing of phase transitions in the cat step cycle[J]. *Journal of neurophysiology*, 1996, 75(3): 1126-1137.
- [288] WHELAN P, HIEBERT G, PEARSON K. Stimulation of the group I extensor afferents prolongs the stance phase in walking cats[J]. *Experimental Brain Research*, 1995, 103: 20-30.
- [289] CAGGIANO V, LEIRAS R, GOÑI-ERRO H, et al. Midbrain circuits that set locomotor speed and gait selection [J]. *Nature*, 2018, 553(7689): 455-460.
- [290] DREW T. Motor cortical cell discharge during voluntary gait modification[J]. *Brain research*, 1988, 457(1): 181-187.
- [291] DREW T, MARIGOLD D S. Taking the next step: cortical contributions to the control of locomotion[J]. *Current opinion in neurobiology*, 2015, 33: 25-33.
- [292] MCVEA D A, PEARSON K G. Object avoidance during locomotion[J]. *Progress in Motor Control: A Multidisciplinary Perspective*, 2009: 293-315.
- [293] LAJOIE K, ANDUJAR J E, PEARSON K, et al. Neurons in area 5 of the posterior parietal cortex in the cat contribute to interlimb coordination during visually guided locomotion: a role in working memory[J]. *Journal of neurophysiology*, 2010, 103(4): 2234-2254.
- [294] WERNIG A, MÜLLER S, NANASSY A, et al. Laufband therapy based on ‘rules of spinal locomotion’ is effective in spinal cord injured persons[J]. *European Journal of Neuroscience*, 1995, 7(4): 823-829.
- [295] CRAMMOND D J, KALASKA J F. Prior information in motor and premotor cortex: activity during the delay period and effect on pre-movement activity[J]. *Journal of neurophysiology*, 2000, 84(2): 986-1005.
- [296] MARAVITA A, IRIKI A. Tools for the body (schema)[J]. *Trends in cognitive sciences*, 2004, 8(2): 79-86.
- [297] TANJI J. Sequential organization of multiple movements: involvement of cortical motor areas[J]. *Annual review of neuroscience*, 2001, 24(1): 631-651.
- [298] CISEK P, KALASKA J F. Neural mechanisms for interacting with a world full of action choices[J]. *Annual review of neuroscience*, 2010, 33: 269-298.
- [299] KLAES C, WESTENDORFF S, CHAKRABARTI S, et al. Choosing goals, not rules: deciding among rule-based action plans[J]. *Neuron*, 2011, 70(3): 536-548.
- [300] WALLIS J D, MILLER E K. From rule to response: neuronal processes in the premotor and prefrontal cortex[J]. *Journal of neurophysiology*, 2003, 90(3): 1790-1806.
- [301] ROMO R, HERNÁNDEZ A, ZAINOS A. Neuronal correlates of a perceptual decision in ventral premotor cortex [J]. *Neuron*, 2004, 41(1): 165-173.
- [302] RIZZOLATTI G, FADIGA L, GALLESE V, et al. Premotor cortex and the recognition of motor actions[J]. *Cognitive brain research*, 1996, 3(2): 131-141.
- [303] SCHAFFELHOFER S, SCHERBERGER H. Object vision to hand action in macaque parietal, premotor, and motor cortices[J]. *elife*, 2016, 5: e15278.
- [304] PARK M C, BELHAJ-SAÏF A, GORDON M, et al. Consistent features in the forelimb representation of primary motor cortex in rhesus macaques[J]. *Journal of Neuroscience*, 2001, 21(8): 2784-2792.
- [305] RATHELOT J A, STRICK P L. Muscle representation in the macaque motor cortex: an anatomical perspective [J]. *Proceedings of the National Academy of Sciences*, 2006, 103(21): 8257-8262.

- [306] SHINODA Y, YOKOTA J I, FUTAMI T. Divergent projection of individual corticospinal axons to motoneurons of multiple muscles in the monkey[J]. Neuroscience letters, 1981, 23(1): 7-12.
- [307] CHENEY P D, FETZ E E, PALMER S S. Patterns of facilitation and suppression of antagonist forelimb muscles from motor cortex sites in the awake monkey[J]. Journal of neurophysiology, 1985, 53(3): 805-820.
- [308] EVARTS E V. Relation of pyramidal tract activity to force exerted during voluntary movement.[J]. Journal of neurophysiology, 1968, 31(1): 14-27.
- [309] FETZ E E, CHENEY P D. Postspike facilitation of forelimb muscle activity by primate corticomotoneuronal cells [J]. Journal of neurophysiology, 1980, 44(4): 751-772.
- [310] SERGIO L E, KALASKA J F. Systematic changes in motor cortex cell activity with arm posture during directional isometric force generation[J]. Journal of neurophysiology, 2003, 89(1): 212-228.
- [311] GEORGOPOULOS A P, KALASKA J F, CAMINITI R, et al. On the relations between the direction of two-dimensional arm movements and cell discharge in primate motor cortex[J]. Journal of Neuroscience, 1982, 2(11): 1527-1537.
- [312] SCOTT S H, GRIBBLE P L, GRAHAM K M, et al. Dissociation between hand motion and population vectors from neural activity in motor cortex[J]. Nature, 2001, 413(6852): 161-165.
- [313] GRIFFIN D M, HUDSON H M, BELHAJ-SAIF A, et al. Do corticomotoneuronal cells predict target muscle EMG activity?[J]. Journal of neurophysiology, 2008, 99(3): 1169-1986.
- [314] GEORGOPOULOS A P, CAMINITI R, KALASKA J F, et al. Spatial coding of movement: a hypothesis concerning the coding of movement direction by motor cortical populations[J]. Experimental Brain Research, 1983, 49(Suppl. 7): 327-336.
- [315] NUDO R J, MILLIKEN G W, JENKINS W M, et al. Use-dependent alterations of movement representations in primary motor cortex of adult squirrel monkeys[J]. The Journal of neuroscience, 1996, 16(2): 785.
- [316] INOUE M, UCHIMURA M, KITAZAWA S. Error signals in motor cortices drive adaptation in reaching[J]. Neuron, 2016, 90(5): 1114-1126.
- [317] HENN V, HEPP K, BÜTTNER-ENNEVER J. The primate oculomotor system. II. Premotor system. A synthesis of anatomical, physiological, and clinical data.[J]. Human Neurobiology, 1982, 1(2): 87-95.
- [318] YARBUS A L. Eye movements and vision[M]. Springer, 2013.
- [319] FUCHS A, LUSCHEI E. Firing patterns of abducens neurons of alert monkeys in relationship to horizontal eye movement.[J]. Journal of neurophysiology, 1970, 33(3): 382-392.
- [320] CURTIS C E, CONNOLLY J D. Saccade preparation signals in the human frontal and parietal cortices[J]. Journal of Neurophysiology, 2008, 99(1): 133-145.
- [321] AIZAWA H, WURTZ R H. Reversible inactivation of monkey superior colliculus. I. Curvature of saccadic trajectory[J]. Journal of neurophysiology, 1998, 79(4): 2082-2096.
- [322] HIKOSAKA O, SAKAMOTO M, USUI S. Functional properties of monkey caudate neurons. I. Activities related to saccadic eye movements[J]. Journal of neurophysiology, 1989, 61(4): 780-798.
- [323] POWELL K D, GOLDBERG M E. Response of neurons in the lateral intraparietal area to a distractor flashed during the delay period of a memory-guided saccade[J]. Journal of Neurophysiology, 2000, 84(1): 301-310.
- [324] BRUCE C J, GOLDBERG M E. Primate frontal eye fields. I. Single neurons discharging before saccades[J]. Journal of neurophysiology, 1985, 53(3): 603-635.
- [325] ZEE D S. Disorders of eye-head coordination[C]//Eye movements: ARVO symposium 1976. 1977: 9-39.

- [326] LAURUTIS V, ROBINSON D. The vestibulo-ocular reflex during human saccadic eye movements.[J]. The Journal of Physiology, 1986, 373(1): 209-233.
- [327] OTTEN E. Balancing on a narrow ridge: biomechanics and control[J]. Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 1999, 354(1385): 869-875.
- [328] MACPHERSON J M. Strategies that simplify the control of quadrupedal stance. II. Electromyographic activity[J]. Journal of neurophysiology, 1988, 60(1): 218-231.
- [329] DUNBAR D C, HORAK F B, MACPHERSON J M, et al. Neural control of quadrupedal and bipedal stance: implications for the evolution of erect posture[J]. American journal of physical anthropology, 1986, 69(1): 93-105.
- [330] HORAK F B, NASHNER L M. Central programming of postural movements: adaptation to altered support-surface configurations[J]. Journal of neurophysiology, 1986, 55(6): 1369-1381.
- [331] GERA G, FLING B W, VAN OOTEGHEM K, et al. Postural motor learning deficits in people with MS in spatial but not temporal control of center of mass[J]. Neurorehabilitation and Neural Repair, 2016, 30(8): 722-730.
- [332] LEE W, MICHAELS C, PAI Y. The organization of torque and EMG activity during bilateral handle pulls by standing humans[J]. Experimental Brain Research, 1990, 82: 304-314.
- [333] CORDO P J, NASHNER L M. Properties of postural adjustments associated with rapid arm movements[J]. Journal of neurophysiology, 1982, 47(2): 287-302.
- [334] MACKINNON C D, WINTER D A. Control of whole body balance in the frontal plane during human walking[J]. Journal of biomechanics, 1993, 26(6): 633-644.
- [335] PETERKA R J. Sensorimotor integration in human postural control[J]. Journal of neurophysiology, 2002, 88(3): 1097-1118.
- [336] HORAK F, DIENER H. Cerebellar control of postural scaling and central set in stance[J]. Journal of neurophysiology, 1994, 72(2): 479-493.
- [337] HORAK F, NUTT J, NASHNER L. Postural inflexibility in parkinsonian subjects[J]. Journal of the neurological sciences, 1992, 111(1): 46-58.
- [338] BASTIAN A, ZACKOWSKI K, THACH W. Cerebellar ataxia: torque deficiency or torque mismatch between joints?[J]. Journal of neurophysiology, 2000, 83(5): 3019-3030.
- [339] LARSELL O, JANSEN J. The comparative anatomy and histology of the cerebellum: the human cerebellum, cerebellar connections, and cerebellar cortex[J]. (No Title), 1972.
- [340] BOSTAN A C, DUM R P, STRICK P L. Cerebellar networks with the cerebral cortex and basal ganglia[J]. Trends in cognitive sciences, 2013, 17(5): 241-254.
- [341] BROOKS V, THACH W. Handbook of physiology, The Nervous System[J]. Motor control, 1981: 877-946.
- [342] MARTINEZ F, CRILL W, KENNEDY T. Electrogenesis of cerebellar Purkinje cell responses in cats.[J]. Journal of neurophysiology, 1971, 34(3): 348-356.
- [343] RAYMOND J L, LISBERGER S G, MAUK M D. The cerebellum: a neuronal learning machine?[J]. Science, 1996, 272(5265): 1126-1131.
- [344] ITO M, SAKURAI M, TONGROACH P. Climbing fibre induced depression of both mossy fibre responsiveness and glutamate sensitivity of cerebellar Purkinje cells[J]. The Journal of physiology, 1982, 324(1): 113-134.
- [345] GILBERT P, THACH W. Purkinje cell activity during motor learning[J]. Brain research, 1977, 128(2): 309-328.
- [346] MARTIN T, KEATING J, GOODKIN H, et al. Throwing while looking through prisms: I. Focal olivocerebellar lesions impair adaptation[J]. Brain, 1996, 119(4): 1183-1198.

- [347] LISBERGER S. The neural basis for motor learning in the vestibulo-ocular reflex in monkeys[J]. Trends in Neurosciences, 1988, 11(4): 147-152.
- [348] CAREY M R, LISBERGER S G. Embarrassed, but not depressed: eye opening lessons for cerebellar learning[J]. Neuron, 2002, 35(2): 223-226.
- [349] DRAGANSKI B, KHERIF F, KLÖPPEL S, et al. Evidence for segregated and integrative connectivity patterns in the human basal ganglia[J]. Journal of Neuroscience, 2008, 28(28): 7143-7152.
- [350] BLABE C H, GILJA V, CHESTEK C A, et al. Assessment of brain-machine interfaces from the perspective of people with paralysis[J]. Journal of neural engineering, 2015, 12(4): 043002.
- [351] SANTHANAM G, RYU S I, YU B M, et al. A high-performance brain-computer interface[J]. nature, 2006, 442(7099): 195-198.
- [352] GILJA V, NUYUJUKIAN P, CHESTEK C A, et al. A high-performance neural prosthesis enabled by control algorithm design[J]. Nature neuroscience, 2012, 15(12): 1752-1757.
- [353] PANDARINATH C, NUYUJUKIAN P, BLABE C H, et al. High performance communication by people with paralysis using an intracortical brain-computer interface[J]. Elife, 2017, 6: e18554.
- [354] HOCHBERG L R, BACHER D, JAROSIEWICZ B, et al. Reach and grasp by people with tetraplegia using a neurally controlled robotic arm[J]. Nature, 2012, 485(7398): 372-375.
- [355] WODLINGER B, DOWNEY J, TYLER-KABARA E, et al. Ten-dimensional anthropomorphic arm control in a human brain-machine interface: difficulties, solutions, and limitations[J]. Journal of neural engineering, 2014, 12(1): 016011.
- [356] AJIBOYE A B, WILLETT F R, YOUNG D R, et al. Restoration of reaching and grasping movements through brain-controlled muscle stimulation in a person with tetraplegia: a proof-of-concept demonstration[J]. The Lancet, 2017, 389(10081): 1821-1830.
- [357] RICHERSON G B, GETTING P A. Maintenance of complex neural function during perfusion of the mammalian brain[J]. Brain research, 1987, 409(1): 128-132.
- [358] SMITH J C, ELLENBERGER H H, BALLANYI K, et al. Pre-Bötzinger complex: a brainstem region that may generate respiratory rhythm in mammals[J]. Science, 1991, 254(5032): 726-729.
- [359] WANG W, BRADLEY S R, RICHERSON G B. Quantification of the response of rat medullary raphe neurones to independent changes in pH<sub>o</sub> and PCO<sub>2</sub>[J]. The Journal of Physiology, 2002, 540(3): 951-970.
- [360] BRADLEY S R, PIERIBONE V A, WANG W, et al. Chemosensitive serotonergic neurons are closely associated with large medullary arteries[J]. Nature neuroscience, 2002, 5(5): 401-402.
- [361] GRUNSTEIN R, SULLIVAN C. Neural control of respiration during sleep[J]. Handbook of sleep disorders, 1990: 76-102.
- [362] LAHIRI S, MARET K H, SHERPA M G, et al. Sleep and periodic breathing at high altitude: Sherpa natives versus sojourners[J]. High altitude and man, 1984: 73-90.
- [363] ASTON-JONES G, BLOOM F. Activity of norepinephrine-containing locus coeruleus neurons in behaving rats anticipates fluctuations in the sleep-waking cycle[J]. Journal of Neuroscience, 1981, 1(8): 876-886.
- [364] RICHERSON G B. Serotonergic neurons as carbon dioxide sensors that maintain pH homeostasis[J]. Nature Reviews Neuroscience, 2004, 5(6): 449-461.
- [365] FILIANO J J, KINNEY H C. A perspective on neuropathologic findings in victims of the sudden infant death syndrome: the triple-risk model[J]. Neonatology, 1994, 65(3-4): 194-197.

- [366] ASTON-JONES G, RAJKOWSKI J, COHEN J. Role of locus coeruleus in attention and behavioral flexibility[J]. *Biological psychiatry*, 1999, 46(9): 1309-1320.
- [367] SPEAKMAN J R, LEVITSKY D A, ALLISON D B, et al. Set points, settling points and some alternative models: theoretical options to understand how genes and environments combine to regulate body adiposity[J]. *Disease models & mechanisms*, 2011, 4(6): 733-745.
- [368] FURNESS J, COSTA M. Types of nerves in the enteric nervous system[J]. *Commentaries in the Neurosciences*, 1980: 235-252.
- [369] De GROAT W C. Neurophysiology of micturition and its modification in animal models of human disease[J]. In *The Autonomic Nervous System*, 1993, 3: 227-290.
- [370] SWANSON L W. Cerebral hemisphere regulation of motivated behavior[J]. *Brain research*, 2000, 886(1-2): 113-164.
- [371] LEDOUX J, BEMPORAD J R. The emotional brain[J]. *Journal of the American Academy of Psychoanalysis*, 1997, 25(3): 525-528.
- [372] MEDINA J F, CHRISTOPHER REPA J, MAUK M D, et al. Parallels between cerebellum-and amygdala-dependent conditioning[J]. *Nature Reviews Neuroscience*, 2002, 3(2): 122-131.
- [373] FEINSTEIN J S, ADOLPHS R, DAMASIO A, et al. The human amygdala and the induction and experience of fear[J]. *Current biology*, 2011, 21(1): 34-38.
- [374] SCHULTZ W, DAYAN P, MONTAGUE P R. A neural substrate of prediction and reward[J]. *Science*, 1997, 275(5306): 1593-1599.
- [375] RUSSO S J, NESTLER E J. The brain reward circuitry in mood disorders[J]. *Nature reviews neuroscience*, 2013, 14(9): 609-625.
- [376] GRANT S, LONDON E D, NEWLIN D B, et al. Activation of memory circuits during cue-elicited cocaine craving. [J]. *Proceedings of the National Academy of Sciences*, 1996, 93(21): 12040-12045.
- [377] TRIMBLE M. *Molecular neuropharmacology, a foundation for clinical neuroscience*: Edited by Eric J Nestler, Steven E Hyman, and Robert C Malenka (Pp 503,£ 36.99). Published by McGraw-Hill, New York, 2001. ISBN 0-8385-6379-1[Z]. 2002.
- [378] BAL T, von KROSIGK M, MCCORMICK D A. Synaptic and membrane mechanisms underlying synchronized oscillations in the ferret lateral geniculate nucleus in vitro.[J]. *The Journal of physiology*, 1995, 483(3): 641-663.
- [379] CROCKER A, ESPAÑA R A, PAPADOPOULOU M, et al. Concomitant loss of dynorphin, NARP, and orexin in narcolepsy[J]. *Neurology*, 2005, 65(8): 1184-1188.
- [380] WURST W, BALLY-CUIF L. Neural plate patterning: upstream and downstream of the isthmic organizer[J]. *Nature Reviews Neuroscience*, 2001, 2(2): 99-108.
- [381] ADDISON M, WILKINSON D G. Segment identity and cell segregation in the vertebrate hindbrain[J]. *Current topics in developmental biology*, 2016, 117: 581-596.
- [382] GOULDING M, LANUZA G, SAPIR T, et al. The formation of sensorimotor circuits[J]. *Current opinion in neurobiology*, 2002, 12(5): 508-515.
- [383] KIECKER C, LUMSDEN A. Compartments and their boundaries in vertebrate brain development[J]. *Nature Reviews Neuroscience*, 2005, 6(7): 553-564.
- [384] WOLPERT L, TICKLE C, ARIAS A M. *Principles of development*[M]. Oxford University Press, USA, 2015.
- [385] STUDER M, LUMSDEN A, ARIZA-MCNAUGHTON L, et al. Altered segmental identity and abnormal migration of motor neurons in mice lacking Hoxb-1[J]. *Nature*, 1996, 384(6610): 630-634.

- [386] DASEN J S, TICE B C, BRENNER-MORTON S, et al. A Hox regulatory network establishes motor neuron pool identity and target-muscle connectivity[J]. *Cell*, 2005, 123(3): 477-491.
- [387] HAMASAKI T, LEINGÄRTNER A, RINGSTEDT T, et al. EMX2 regulates sizes and positioning of the primary sensory and motor areas in neocortex by direct specification of cortical progenitors[J]. *Neuron*, 2004, 43(3): 359-372.
- [388] SCHLAGGAR B L, O'LEARY D D. Potential of visual cortex to develop an array of functional units unique to somatosensory cortex[J]. *Science*, 1991, 252(5012): 1556-1560.
- [389] SHARMA J, ANGELUCCI A, SUR M. Induction of visual orientation modules in auditory cortex[J]. *Nature*, 2000, 404(6780): 841-847.
- [390] QIAN X, GODERIE S K, SHEN Q, et al. Intrinsic programs of patterned cell lineages in isolated vertebrate CNS ventricular zone cells[J]. *Development*, 1998, 125(16): 3143-3152.
- [391] OLSON E C, WALSH C A. Smooth, rough and upside-down neocortical development[J]. *Current opinion in genetics & development*, 2002, 12(3): 320-327.
- [392] GLEESON J G, WALSH C A. Neuronal migration disorders: from genetic diseases to developmental mechanisms [J]. *Trends in neurosciences*, 2000, 23(8): 352-359.
- [393] BANDLER R C, MAYER C, FISHELL G. Cortical interneuron specification: the juncture of genes, time and geometry[J]. *Current opinion in neurobiology*, 2017, 42: 17-24.
- [394] GIANDOMENICO S L, LANCASTER M A. Probing human brain evolution and development in organoids[J]. *Current opinion in cell biology*, 2017, 44: 36-43.
- [395] PURVES D, LICHTMAN J W. Principles of neural development[J]. (No Title), 1985.
- [396] REICHARDT L F, FARINAS I. Neurotrophic factors and their receptors: roles in neuronal development and function[J]. *Molecular and cellular approaches to neural development*, 1997: 220-263.
- [397] JESENBERGER V, JENTSCH S. Deadly encounter: ubiquitin meets apoptosis[J]. *Nature Reviews Molecular Cell Biology*, 2002, 3(2): 112-121.
- [398] KAECH S, BANKER G. Culturing hippocampal neurons[J]. *Nature protocols*, 2006, 1(5): 2406-2415.
- [399] KISHI M, PAN Y A, CRUMP J G, et al. Mammalian SAD kinases are required for neuronal polarization[J]. *Science*, 2005, 307(5711): 929-932.
- [400] HEIDEMANN S R. Cytoplasmic mechanisms of axonal and dendritic growth in neurons[J]. *International review of cytology*, 1996, 165: 235-296.
- [401] MING G L, SONG H J, BERNINGER B, et al. cAMP-dependent growth cone guidance by netrin-1[J]. *Neuron*, 1997, 19(6): 1225-1235.
- [402] LEUNG K M, van HORCK F P, LIN A C, et al. Asymmetrical  $\beta$ -actin mRNA translation in growth cones mediates attractive turning to netrin-1[J]. *Nature neuroscience*, 2006, 9(10): 1247-1256.
- [403] WALTER J, HENKE-FAHLE S, BONHOEFFER F. Avoidance of posterior tectal membranes by temporal retinal axons[J]. *Development*, 1987, 101(4): 909-913.
- [404] NJÅ A, PURVES D. Specific innervation of guinea-pig superior cervical ganglion cells by preganglionic fibres arising from different levels of the spinal cord.[J]. *The Journal of physiology*, 1977, 264(2): 565-583.
- [405] SANES J R, YAMAGATA M. Many paths to synaptic specificity[J]. *Annual Review of Cell and Developmental*, 2009, 25: 161-195.



- [406] HUANG Z J. Subcellular organization of GABAergic synapses: role of ankyrins and L1 cell adhesion molecules [J]. *Nature neuroscience*, 2006, 9(2): 163-166.
- [407] SALMONS S, SRETER F. Significance of impulse activity in the transformation of skeletal muscle type[J]. *Nature*, 1976, 263(5572): 30-34.
- [408] HALL Z W, SANES J R. Synaptic structure and development: the neuromuscular junction[J]. *Cell*, 1993, 72: 99-121.
- [409] ANDERSON M, COHEN M. Nerve-induced and spontaneous redistribution of acetylcholine receptors on cultured muscle cells.[J]. *The Journal of Physiology*, 1977, 268(3): 757-773.
- [410] LUPA M, GORDON H, HALL Z. A specific effect of muscle cells on the distribution of presynaptic proteins in neurites and its absence in a C2 muscle cell variant[J]. *Developmental biology*, 1990, 142(1): 31-43.
- [411] GLICKSMAN M A, SANES J R. Differentiation of motor nerve terminals formed in the absence of muscle fibres [J]. *Journal of neurocytology*, 1983, 12(4): 661-671.
- [412] BURDEN S J, SARGENT P B, MCMAHAN U. Acetylcholine receptors in regenerating muscle accumulate at original synaptic sites in the absence of the nerve.[J]. *The Journal of cell biology*, 1979, 82(2): 412-425.
- [413] NOAKES P G, GAUTAM M, MUDD J, et al. Aberrant differentiation of neuromuscular junctions in mice lacking s-laminin/laminin  $\beta 2$ [J]. *Nature*, 1995, 374(6519): 258-262.
- [414] DECHIARA T M, BOWEN D C, VALENZUELA D M, et al. The receptor tyrosine kinase MuSK is required for neuromuscular junction formation in vivo[J]. *Cell*, 1996, 85(4): 501-512.
- [415] MISGELD T, KUMMER T T, LICHTMAN J W, et al. Agrin promotes synaptic differentiation by counteracting an inhibitory effect of neurotransmitter[J]. *Proceedings of the National Academy of Sciences*, 2005, 102(31): 11088-11093.
- [416] GAUTAM M, NOAKES P G, MOSCOSO L, et al. Defective neuromuscular synaptogenesis in agrin-deficient mutant mice[J]. *Cell*, 1996, 85(4): 525-535.
- [417] SANES J R, LICHTMAN J W. Induction, assembly, maturation and maintenance of a postsynaptic apparatus[J]. *Nature Reviews Neuroscience*, 2001, 2(11): 791-805.
- [418] FENG G, TINTRUP H, KIRSCH J, et al. Dual requirement for gephyrin in glycine receptor clustering and molybdoenzyme activity[J]. *Science*, 1998, 282(5392): 1321-1324.
- [419] ALLEN N J. Astrocyte regulation of synaptic behavior[J]. *Annual review of cell and developmental biology*, 2014, 30: 439-463.
- [420] BEHEN M E, HELDER E, ROTHERMEL R, et al. Incidence of specific absolute neurocognitive impairment in globally intact children with histories of early severe deprivation[J]. *Child Neuropsychology*, 2008, 14(5): 453-469.
- [421] ELUVATHINGAL T J, CHUGANI H T, BEHEN M E, et al. Abnormal brain connectivity in children after early severe socioemotional deprivation: a diffusion tensor imaging study[J]. *Pediatrics*, 2006, 117(6): 2093-2100.
- [422] HUBEL D H, WIESEL T N. Ferrier lecture-Functional architecture of macaque monkey visual cortex[J]. *Proceedings of the Royal Society of London. Series B. Biological Sciences*, 1977, 198(1130): 1-59.
- [423] CONSTANTINE-PATON M, LAW M I. Eye-specific termination bands in tecta of three-eyed frogs[J]. *Science*, 1978, 202(4368): 639-641.
- [424] HENSCH T K. Critical period plasticity in local cortical circuits[J]. *Nature Reviews Neuroscience*, 2005, 6(11): 877-888.
- [425] DAW N W. Critical periods and amblyopia[J]. *Archives of ophthalmology*, 1998, 116(4): 502-505.

- [426] ORAY S, MAJEWSKA A, SUR M. Dendritic spine dynamics are regulated by monocular deprivation and extracellular matrix degradation[J]. *Neuron*, 2004, 44(6): 1021-1030.
- [427] ANTONINI A, STRYKER M P. Rapid remodeling of axonal arbors in the visual cortex[J]. *Science*, 1993, 260(5115): 1819-1821.
- [428] MCGEE A W, YANG Y, FISCHER Q S, et al. Experience-driven plasticity of visual cortex limited by myelin and Nogo receptor[J]. *Science*, 2005, 309(5744): 2222-2226.
- [429] SANES J R, YAMAGATA M. Formation of lamina-specific synaptic connections[J]. *Current opinion in neurobiology*, 1999, 9(1): 79-87.
- [430] KNUDSEN E I. Instructed learning in the auditory localization pathway of the barn owl[J]. *Nature*, 2002, 417(6886): 322-328.
- [431] MERZENICH M M, NELSON R J, STRYKER M P, et al. Somatosensory cortical map changes following digit amputation in adult monkeys[J]. *Journal of comparative Neurology*, 1984, 224(4): 591-605.
- [432] BEIROWSKI B, BEREK L, ADALBERT R, et al. Quantitative and qualitative analysis of Wallerian degeneration using restricted axonal labelling in YFP-H mice[J]. *Journal of neuroscience methods*, 2004, 134(1): 23-35.
- [433] DAVID S, AGUAYO A J. Axonal elongation into peripheral nervous system" bridges" after central nervous system injury in adult rats[J]. *Science*, 1981, 214(4523): 931-933.
- [434] SCHWEGLER G, SCHWAB M E, KAPFHAMMER J P. Increased collateral sprouting of primary afferents in the myelin-free spinal cord[J]. *Journal of Neuroscience*, 1995, 15(4): 2756-2767.
- [435] YIU G, HE Z. Glial inhibition of CNS axon regeneration[J]. *Nature Reviews Neuroscience*, 2006, 7(8): 617-627.
- [436] SMITH P D, SUN F, PARK K K, et al. SOCS3 deletion promotes optic nerve regeneration in vivo[J]. *Neuron*, 2009, 64(5): 617-623.
- [437] BAREYRE F M, KERSCHENSTEINER M, RAINETEAU O, et al. The injured spinal cord spontaneously forms a new intraspinal circuit in adult rats[J]. *Nature neuroscience*, 2004, 7(3): 269-277.
- [438] TAVAZOIE M, VAN DER VEKEN L, SILVA-VARGAS V, et al. A specialized vascular niche for adult neural stem cells[J]. *Cell stem cell*, 2008, 3(3): 279-288.
- [439] KORDOWER J H, SORTWELL C E. Neuropathology of fetal nigra transplants for Parkinson's disease[J]. *Progress in brain research*, 2000, 127: 333-344.
- [440] WEN Z, CHRISTIAN K M, SONG H, et al. Modeling psychiatric disorders with patient-derived iPSCs[J]. *Current opinion in neurobiology*, 2016, 36: 118-127.
- [441] FRANKLIN R J, FFRENCH-CONSTANT C. Remyelination in the CNS: from biology to therapy[J]. *Nature Reviews Neuroscience*, 2008, 9(11): 839-855.
- [442] KEIRSTEAD S A, RASMINSKY M, FUKUDA Y, et al. Electrophysiologic responses in hamster superior colliculus evoked by regenerating retinal axons[J]. *Science*, 1989, 246(4927): 255-257.
- [443] WILHELM D, PALMER S, KOOPMAN P. Sex determination and gonadal development in mammals[J]. *Physiological reviews*, 2007.
- [444] WU M V, MANOLI D S, FRASER E J, et al. Estrogen masculinizes neural pathways and sex-specific behaviors [J]. *Cell*, 2009, 139(1): 61-72.
- [445] WIERMAN M E. Sex steroid effects at target tissues: mechanisms of action[J]. *Advances in physiology education*, 2007, 31(1): 26-33.
- [446] GREENSPAN R J, FERVEUR J F. Courtship in drosophila[J]. *Annual review of genetics*, 2000, 34(1): 205-232.

- [447] KIMURA K I, OTE M, TAZAWA T, et al. Fruitless specifies sexually dimorphic neural circuitry in the *Drosophila* brain[J]. *Nature*, 2005, 438(7065): 229-233.
- [448] MORRIS J A, JORDAN C L, BREEDLOVE S M. Sexual differentiation of the vertebrate nervous system[J]. *Nature neuroscience*, 2004, 7(10): 1034-1039.
- [449] COOKE B M, WOOLLEY C S. Gonadal hormone modulation of dendrites in the mammalian CNS[J]. *Journal of neurobiology*, 2005, 64(1): 34-46.
- [450] BRAINARD M S, DOUPE A J. What songbirds teach us about learning[J]. *Nature*, 2002, 417(6886): 351-358.
- [451] KONISHI M, AKUTAGAWA E. Neuronal growth, atrophy and death in a sexually dimorphic song nucleus in the zebra finch brain[J]. *Nature*, 1985, 315: 145-147.
- [452] DULAC C, WAGNER S. Genetic analysis of brain circuits underlying pheromone signaling[J]. *Annu. Rev. Genet.*, 2006, 40: 449-467.
- [453] KIMCHI T, XU J, DULAC C. A functional circuit underlying male sexual behaviour in the female mouse brain [J]. *Nature*, 2007, 448(7157): 1009-1014.
- [454] EDWARDS D A, BURGE K G. Early androgen treatment and male and female sexual behavior in mice[J]. *Hormones and Behavior*, 1971, 2(1): 49-58.
- [455] SAPOLSKY R M. Mothering style and methylation[J]. *Nature neuroscience*, 2004, 7(8): 791-792.
- [456] XU X, COATS J K, YANG C F, et al. Modular genetic control of sexually dimorphic behaviors[J]. *Cell*, 2012, 148(3): 596-607.
- [457] GORSKI R. Hormone-induced sex differences in hypothalamic structure[J]. *Bull. TMIN*, 1988, 16(Suppl. 3): 67-90.
- [458] CAHILL L. Why sex matters for neuroscience[J]. *Nature reviews neuroscience*, 2006, 7(6): 477-484.
- [459] BERGLUND H, LINDSTRÖM P, SAVIC I. Brain response to putative pheromones in lesbian women[J]. *Proceedings of the National Academy of Sciences*, 2006, 103(21): 8269-8274.
- [460] SAVIC I, LINDSTRÖM P. PET and MRI show differences in cerebral asymmetry and functional connectivity between homo-and heterosexual subjects[J]. *Proceedings of the National Academy of Sciences*, 2008, 105(27): 9403-9408.
- [461] KRUIJVER F P, ZHOU J N, POOL C W, et al. Male-to-female transsexuals have female neuron numbers in a limbic nucleus[J]. *The Journal of Clinical Endocrinology & Metabolism*, 2000, 85(5): 2034-2041.
- [462] RAINER G, ASAAD W F, MILLER E K. Memory fields of neurons in the primate prefrontal cortex[J]. *Proceedings of the National Academy of Sciences*, 1998, 95(25): 15008-15013.
- [463] CORKIN S, AMARAL D G, GONZÁLEZ R G, et al. HM' s medial temporal lobe lesion: findings from magnetic resonance imaging[J]. *Journal of Neuroscience*, 1997, 17(10): 3964-3979.
- [464] BLAKEMORE C. *Mechanics of the Mind*[J]. 1977.
- [465] SQUIRE L R. *Memory and brain*. [M]. Oxford University Press, 1987.
- [466] WAGNER A D, SCHACTER D L, ROTTE M, et al. Building memories: remembering and forgetting of verbal experiences as predicted by brain activity[J]. *Science*, 1998, 281(5380): 1188-1191.
- [467] SCHACTER D L, BENOIT R G, SZPUNAR K K. Episodic future thinking: Mechanisms and functions[J]. *Current opinion in behavioral sciences*, 2017, 17: 41-50.
- [468] BROWN T I, CARR V A, LAROCQUE K F, et al. Prospective representation of navigational goals in the human hippocampus[J]. *Science*, 2016, 352(6291): 1323-1326.

- [469] EICHENBAUM H, COHEN N J. Can we reconcile the declarative memory and spatial navigation views on hippocampal function?[J]. *Neuron*, 2014, 83(4): 764-770.
- [470] VAIDYA C J, GABRIELI J D, VERFAELLIE M, et al. Font-specific priming following global amnesia and occipital lobe damage.[J]. *Neuropsychology*, 1998, 12(2): 183.
- [471] DUNCAN K, DOLL B B, DAW N D, et al. More than the sum of its parts: a role for the hippocampus in configural reinforcement learning[J]. *Neuron*, 2018, 98(3): 645-657.
- [472] RESCORLA R A. Probability of shock in the presence and absence of CS in fear conditioning.[J]. *Journal of comparative and physiological psychology*, 1968, 66(1): 1.
- [473] PINSKER H, KUPFERMANN I, CASTELLUCCI V, et al. Habituation and dishabituation of the gill-withdrawal reflex in *Aplysia*[J]. *Science*, 1970, 167(3926): 1740-1742.
- [474] CASTELLUCCI V, CAREW T, KANDEL E. Cellular analysis of long-term habituation of the gill-withdrawal reflex of *Aplysia californica*[J]. *Science*, 1978, 202(4374): 1306-1308.
- [475] KLEIN M, KANDEL E R. Mechanism of calcium current modulation underlying presynaptic facilitation and behavioral sensitization in *Aplysia*. [J]. *Proceedings of the National Academy of Sciences*, 1980, 77(11): 6912-6916.
- [476] HAWKINS R D, ABRAMS T W, CAREW T J, et al. A cellular mechanism of classical conditioning in *Aplysia*: activity-dependent amplification of presynaptic facilitation[J]. *Science*, 1983, 219(4583): 400-405.
- [477] BAILEY C H, CHEN M. Morphological basis of long-term habituation and sensitization in *Aplysia*[J]. *Science*, 1983, 220(4592): 91-93.
- [478] GLANZMAN D L, KANDEL E R, SCHACHER S. Target-dependent structural changes accompanying long-term synaptic facilitation in *Aplysia* neurons[J]. *Science*, 1990, 249(4970): 799-802.
- [479] MARTIN K C, CASADIO A, ZHU H, et al. Synapse-specific, long-term facilitation of *aplysia* sensory to motor synapses: a function for local protein synthesis in memory storage[J]. *Cell*, 1997, 91(7): 927-938.
- [480] CASADIO A, MARTIN K C, GIUSTETTO M, et al. A transient, neuron-wide form of CREB-mediated long-term facilitation can be stabilized at specific synapses by local protein synthesis[J]. *Cell*, 1999, 99(2): 221-237.
- [481] BAILEY C H, KANDEL E R, SI K. The persistence of long-term memory: a molecular approach to self-sustaining changes in learning-induced synaptic growth[J]. *Neuron*, 2004, 44(1): 49-57.
- [482] KANDEL E R. In search of memory: The emergence of a new science of mind[M]. WW Norton & Company, 2007.
- [483] ROGAN M T, LEON K S, PEREZ D L, et al. Distinct neural signatures for safety and danger in the amygdala and striatum of the mouse[J]. *Neuron*, 2005, 46(2): 309-320.
- [484] MAREN S. Long-term potentiation in the amygdala: a mechanism for emotional learning and memory[J]. *Trends in neurosciences*, 1999, 22(12): 561-567.
- [485] HUANG Y Y, KANDEL E R. Postsynaptic induction and PKA-dependent expression of LTP in the lateral amygdala[J]. *Neuron*, 1998, 21(1): 169-178.
- [486] HUANG Y Y, MARTIN K C, KANDEL E R. Both protein kinase A and mitogen-activated protein kinase are required in the amygdala for the macromolecular synthesis-dependent late phase of long-term potentiation[J]. *Journal of Neuroscience*, 2000, 20(17): 6317-6325.
- [487] JENKINS W M, MERZENICH M M, OCHS M T, et al. Functional reorganization of primary somatosensory cortex in adult owl monkeys after behaviorally controlled tactile stimulation[J]. *Journal of neurophysiology*, 1990, 63(1): 82-104.

- [488] ELBERT T, PANTEV C, WIENBRUCH C, et al. Increased cortical representation of the fingers of the left hand in string players[J]. *Science*, 1995, 270(5234): 305-307.
- [489] ZALUTSKY R A, NICOLL R A. Comparison of two forms of long-term potentiation in single hippocampal neurons[J]. *Science*, 1990, 248(4963): 1619-1624.
- [490] MONTGOMERY J M, PAVLIDIS P, MADISON D V. Pair recordings reveal all-silent synaptic connections and the postsynaptic expression of long-term potentiation[J]. *Neuron*, 2001, 29(3): 691-701.
- [491] HUANG Y Y, KANDEL E R. Recruitment of long-lasting and protein kinase A-dependent long-term potentiation in the CA1 region of hippocampus requires repeated tetanization.[J]. *Learning & memory*, 1994, 1(1): 74-82.
- [492] DUDEK S M, BEAR M F. Homosynaptic long-term depression in area CA1 of hippocampus and effects of N-methyl-D-aspartate receptor blockade.[J]. *Proceedings of the National Academy of Sciences*, 1992, 89(10): 4363-4367.
- [493] NICHOLLS R E, ALARCON J M, MALLERET G, et al. Transgenic mice lacking NMDAR-dependent LTD exhibit deficits in behavioral flexibility[J]. *Neuron*, 2008, 58(1): 104-117.
- [494] LIU X, RAMIREZ S, PANG P T, et al. Optogenetic stimulation of a hippocampal engram activates fear memory recall[J]. *Nature*, 2012, 484(7394): 381-385.
- [495] MARR D, WILLSHAW D, MCNAUGHTON B. Simple memory: a theory for archicortex[M]. Springer, 1991.
- [496] MULLER R U, KUBIE J L, RANCK J B. Spatial firing patterns of hippocampal complex-spike cells in a fixed environment[J]. *Journal of Neuroscience*, 1987, 7(7): 1935-1950.
- [497] STENSOLA H, STENSOLA T, SOLSTAD T, et al. The entorhinal grid map is discretized[J]. *Nature*, 2012, 492(7427): 72-78.
- [498] KJELSTRUP K B, SOLSTAD T, BRUN V H, et al. Finite scale of spatial representation in the hippocampus[J]. *Science*, 2008, 321(5885): 140-143.
- [499] SARGOLINI F, FYHN M, HAFTING T, et al. Conjunctive representation of position, direction, and velocity in entorhinal cortex[J]. *Science*, 2006, 312(5774): 758-762.
- [500] SOLSTAD T, BOCCARA C N, KROPFF E, et al. Representation of geometric borders in the entorhinal cortex[J]. *Science*, 2008, 322(5909): 1865-1868.
- [501] KROPFF E, CARMICHAEL J E, MOSER M B, et al. Speed cells in the medial entorhinal cortex[J]. *Nature*, 2015, 523(7561): 419-424.
- [502] ALME C B, MIAO C, JEZEK K, et al. Place cells in the hippocampus: eleven maps for eleven rooms[J]. *Proceedings of the National Academy of Sciences*, 2014, 111(52): 18428-18435.
- [503] ROTENBERG A, MAYFORD M, HAWKINS R D, et al. Mice expressing activated CaMKII lack low frequency LTP and do not form stable place cells in the CA1 region of the hippocampus[J]. *Cell*, 1996, 87(7): 1351-1361.
- [504] DOUPE A J, KUHL P K. Birdsong and human speech: common themes and mechanisms[J]. *Annual review of neuroscience*, 1999, 22(1): 567-631.
- [505] KUHL P K, TSAO F M, LIU H M. Foreign-language experience in infancy: Effects of short-term exposure and social interaction on phonetic learning[J]. *Proceedings of the National Academy of Sciences*, 2003, 100(15): 9096-9101.
- [506] BROCA P. Remarques sur le siège de la faculté du langage articulé, suivies d' une observation d' aphémie (perte de la parole)[J]. *Bulletin et Memoires de la Societe anatomique de Paris*, 1861, 6: 330-357.

- [507] WERNICKE C, WERNICKE C. Der Aphasische Symptomenkomplex: eine psychologische Studie auf anatomischer basis[J]. Der aphasische Symptomencomplex: Eine psychologische Studie auf anatomischer Basis, 1974: 1-70.
- [508] LICHTHEIM L. On aphasia[J]. Brain, 1885, 7: 433-484.
- [509] GESCHWIND N. The Organization of Language and the Brain: Language disorders after brain damage help in elucidating the neural basis of verbal behavior.[J]. Science, 1970, 170(3961): 940-944.
- [510] HICKOK G, POEPEL D. The cortical organization of speech processing[J]. Nature reviews neuroscience, 2007, 8(5): 393-402.
- [511] SKEIDE M A, FRIEDERICI A D. The ontogeny of the cortical language network[J]. Nature reviews neuroscience, 2016, 17(5): 323-332.
- [512] XU Y, GANDOUR J, TALAVAGE T, et al. Activation of the left planum temporale in pitch processing is shaped by language experience[J]. Human brain mapping, 2006, 27(2): 173-183.
- [513] ROMO R, SALINAS E. Touch and go: decision-making mechanisms in somatosensation[J]. Annual review of neuroscience, 2001, 24(1): 107-137.
- [514] BRITTEN K H, SHADLEN M N, NEWSOME W T, et al. The analysis of visual motion: a comparison of neuronal and psychophysical performance[J]. Journal of Neuroscience, 1992, 12(12): 4745-4765.
- [515] MAZUREK M E, ROITMAN J D, DITTERICH J, et al. A role for neural integrators in perceptual decision making [J]. Cerebral cortex, 2003, 13(11): 1257-1269.
- [516] DITTERICH J, MAZUREK M E, SHADLEN M N. Microstimulation of visual cortex affects the speed of perceptual decisions[J]. Nature neuroscience, 2003, 6(8): 891-898.
- [517] GOLD J I, SHADLEN M N. The neural basis of decision making[J]. Annu. Rev. Neurosci., 2007, 30: 535-574.
- [518] ROITMAN J D, SHADLEN M N. Response of neurons in the lateral intraparietal area during a combined visual discrimination reaction time task[J]. Journal of neuroscience, 2002, 22(21): 9475-9489.
- [519] YANG T, SHADLEN M N. Probabilistic reasoning by neurons[J]. Nature, 2007, 447(7148): 1075-1080.
- [520] BROMBERG M. Acute and chronic dysimmune polyneuropathies diagnostic algorithms[J]. Neuromuscular function and disease. Brown, Bolton, Aminoff, 2002, 2: 1041-60.
- [521] TAYLOR J P, BROWN JR R H, CLEVELAND D W. Decoding ALS: from genes to mechanism[J]. Nature, 2016, 539(7628): 197-206.
- [522] LUPSKI J. Molecular genetics of peripheral neuropathies[J]. Scientific American molecular neurology, 1998: 239-256.
- [523] BROWN R, AMATO A. Inherited peripheral neuropathies. Classification, clinical features, and review of molecular pathophysiology[J]. Neuromuscular function and disease. 1st ed. Philadelphia: Saunders, 2002: 619-635.
- [524] HOFFMAN E P, BROWN JR R H, KUNKEL L M. Dystrophin: the protein product of the Duchenne muscular dystrophy locus[J]. Cell, 1987, 51(6): 919-928.
- [525] BROWN JR R, MENDELL J. Harrison' s Principles of Internal Medicine: 2527[J]. 2005.
- [526] CANNON S C. Sodium channelopathies of skeletal muscle[J]. Voltage-gated sodium channels: structure, function and channelopathies, 2018: 309-330.
- [527] LOTHMAN E, COLLINS R. Seizures and epilepsy[J]. Neurobiology of disease, 1990: 276-298.
- [528] LOTHMAN E W. The neurobiology of epileptiform discharges[J]. American Journal of EEG Technology, 1993, 33(2): 93-112.



- [529] STACEY W C, LITT B. Technology insight: neuroengineering and epilepsy—designing devices for seizure control [J]. *Nature clinical practice Neurology*, 2008, 4(4): 190-201.
- [530] HECK C N, KING-STEPHENS D, MASSEY A D, et al. Two-year seizure reduction in adults with medically intractable partial onset epilepsy treated with responsive neurostimulation: final results of the RNS System Pivotal trial[J]. *Epilepsia*, 2014, 55(3): 432-441.
- [531] LOTHMAN E. Pathophysiology of seizures and epilepsy in the mature and immature brain: cells, synapses, and circuits.[J]. *Pediatric epilepsy.*, 1993: 1-15.
- [532] SUTULA T, CASCINO G, CAVAZOS J, et al. Mossy fiber synaptic reorganization in the epileptic human temporal lobe[J]. *Annals of Neurology: Official Journal of the American Neurological Association and the Child Neurology Society*, 1989, 26(3): 321-330.
- [533] MARSHALL J C, HALLIGAN P W. Blindsight and insight in visuo-spatial neglect[J]. *Nature*, 1988, 336(6201): 766-767.
- [534] TONG F, NAKAYAMA K, VAUGHAN J T, et al. Binocular rivalry and visual awareness in human extrastriate cortex[J]. *Neuron*, 1998, 21(4): 753-759.
- [535] HOWARD R, BRAMMER M, DAVID A, et al. The anatomy of conscious vision: an fMRI study of visual hallucinations[J]. *Nature neuroscience*, 1998, 1(8): 738-742.
- [536] BECK D M, REES G, FRITH C D, et al. Neural correlates of change detection and change blindness[J]. *Nature neuroscience*, 2001, 4(6): 645-650.
- [537] MILNER D, GOODALE M. *The visual brain in action: vol. 27*[M]. OUP Oxford, 2006.
- [538] HAGGARD P, CLARK S, KALOGERAS J. Voluntary action and conscious awareness[J]. *Nature neuroscience*, 2002, 5(4): 382-385.
- [539] FOURNERET P, JEANNEROD M. Limited conscious monitoring of motor performance in normal subjects[J]. *Neuropsychologia*, 1998, 36(11): 1133-1140.
- [540] RUGG M D, MARK R E, WALLA P, et al. Dissociation of the neural correlates of implicit and explicit memory [J]. *Nature*, 1998, 392(6676): 595-598.
- [541] O’CRAVEN K M, KANWISHER N. Mental imagery of faces and places activates corresponding stimulus-specific brain regions[J]. *Journal of cognitive neuroscience*, 2000, 12(6): 1013-1023.
- [542] CANNON T D, THOMPSON P M, van ERP T G, et al. Cortex mapping reveals regionally specific patterns of genetic and disease-specific gray-matter deficits in twins discordant for schizophrenia[J]. *Proceedings of the National Academy of Sciences*, 2002, 99(5): 3228-3233.
- [543] BARCH D M, CARTER C S, BRAVER T S, et al. Selective deficits in prefrontal cortex function in medication-naive patients with schizophrenia[J]. *Archives of general psychiatry*, 2001, 58(3): 280-288.
- [544] LYNALL M E, BASSETT D S, KERWIN R, et al. Functional connectivity and brain networks in schizophrenia [J]. *Journal of Neuroscience*, 2010, 30(28): 9477-9487.
- [545] GAREY L, ONG W, PATEL T, et al. Reduced dendritic spine density on cerebral cortical pyramidal neurons in schizophrenia[J]. *Journal of Neurology, Neurosurgery & Psychiatry*, 1998, 65(4): 446-453.
- [546] SEEMAN P, LEE T, CHAU-WONG M, et al. Antipsychotic drug doses and neuroleptic/dopamine receptors[J]. *Nature*, 1976, 261(5562): 717-719.
- [547] VAHIA V N. Diagnostic and statistical manual of mental disorders 5: A quick glance[J]. *Indian journal of psychiatry*, 2013, 55(3): 220.

- [548] NESTLER E J, KENNY P J, RUSSO S J, et al. Nestler, Hyman & Malenka's molecular neuropharmacology: a foundation for clinical neuroscience[J]. (No Title), 2020.
- [549] SEELEY W W, MENON V, SCHATZBERG A F, et al. Dissociable intrinsic connectivity networks for salience processing and executive control[J]. *Journal of Neuroscience*, 2007, 27(9): 2349-2356.
- [550] ETKIN A, KLEMENHAGEN K C, DUDMAN J T, et al. Individual differences in trait anxiety predict the response of the basolateral amygdala to unconsciously processed fearful faces[J]. *Neuron*, 2004, 44(6): 1043-1055.
- [551] MAYBERG H S, BRANNAN S K, MAHURIN R K, et al. Cingulate function in depression: a potential predictor of treatment response[J]. *Neuroreport*, 1997, 8(4): 1057-1061.
- [552] GALLAGHER H L, HAPPÉ F, BRUNSWICK N, et al. Reading the mind in cartoons and stories: an fMRI study of 'theory of mind' in verbal and nonverbal tasks[J]. *Neuropsychologia*, 2000, 38(1): 11-21.
- [553] CASTELLI F, FRITH C, HAPPÉ F, et al. Autism, Asperger syndrome and brain mechanisms for the attribution of mental states to animated shapes[J]. *Brain*, 2002, 125(8): 1839-1849.
- [554] KLIN A, JONES W, SCHULTZ R, et al. Defining and quantifying the social phenotype in autism[J]. *American Journal of Psychiatry*, 2002, 159(6): 895-908.
- [555] STREHLER B L. Implications of aging research for society[G]//*Biology of Aging and Development*. Springer, 1975: 3-9.
- [556] ARIAS E. United States life tables, 2004[J]. 2007.
- [557] RUBIN E H, STORANDT M, MILLER J P, et al. A prospective study of cognitive function and onset of dementia in cognitively healthy elders[J]. *Archives of neurology*, 1998, 55(3): 395-401.
- [558] PARK D C, SMITH A D, LAUTENSCHLAGER G, et al. Mediators of long-term memory performance across the life span.[J]. *Psychology and aging*, 1996, 11(4): 621.
- [559] HUTTENLOCHER P R. Neural plasticity: The effects of environment on the development of the cerebral cortex [M]. Harvard University Press, 2009.
- [560] HEKIMI S, GUARENTE L. Genetics and the specificity of the aging process[J]. *Science*, 2003, 299(5611): 1351-1354.
- [561] LIN Y J, SEROUDE L, BENZER S. Extended life-span and stress resistance in the *Drosophila* mutant methuselah [J]. *Science*, 1998, 282(5390): 943-946.
- [562] BROWN-BORG H M, BORG K E, MELISKA C J, et al. Dwarf mice and the ageing process[J]. *Nature*, 1996, 384(6604): 33-33.
- [563] ARNOLD S E, HYMAN B T, FLORY J, et al. The topographical and neuroanatomical distribution of neurofibrillary tangles and neuritic plaques in the cerebral cortex of patients with Alzheimer's disease[J]. *Cerebral cortex*, 1991, 1(1): 103-116.
- [564] PERRIN R J, FAGAN A M, HOLTZMAN D M. Multimodal techniques for diagnosis and prognosis of Alzheimer's disease[J]. *Nature*, 2009, 461(7266): 916-922.
- [565] KARCH C M, GOATE A M. Alzheimer's disease risk genes and mechanisms of disease pathogenesis[J]. *Biological psychiatry*, 2015, 77(1): 43-51.
- [566] BRODY D L, HOLTZMAN D M. Active and passive immunotherapy for neurodegenerative disorders[J]. *Annu. Rev. Neurosci.*, 2008, 31: 175-193.
- [567] JANUS C, PEARSON J, MCLAURIN J, et al. A $\beta$  peptide immunization reduces behavioural impairment and plaques in a model of Alzheimer's disease[J]. *Nature*, 2000, 408(6815): 979-982.

- [568] MORRISON E E, COSTANZO R M. Morphology of the human olfactory epithelium[J]. Journal of Comparative Neurology, 1990, 297(1): 1-13.