

Bibliography

- [1]. Arendt, Detlev, et al. "Evolution of neuronal types and families." *Current opinion in neurobiology* 56: 144-152, 2019.
- [2]. Watson, Judy J., Shelley J. Allen, and DrDavid Dawbarn. "Targeting nerve growth factor in pain: what is the therapeutic potential?." *BioDrugs* 22: 349-359, 2008.
- [3]. Singh Jaggi, Amteshwar, and Nirmal Singh. "Therapeutic targets for the management of peripheral nerve injury-induced neuropathic pain." *CNS & Neurological Disorders-Drug Targets (Formerly Current Drug Targets-CNS & Neurological Disorders)* 10.5: 589-609, 2011.
- [4]. London, Michael, and Michael Häusser. "Dendritic computation." *Annu. Rev. Neurosci.* 28.1: 503-532, 2005.
- [5]. Ritter, Gerhard X., and Gonzalo Urcid. "Lattice algebra approach to single-neuron computation." *IEEE Transactions on Neural Networks* 14.2: 282-295, 2003.
- [6]. Walter, Florian, Florian Röhrbein, and Alois Knoll. "Computation by time." *Neural Processing Letters* 44: 103-124, 2016.
- [7]. Akella, Shailaja, et al. "Deciphering neuronal variability across states reveals dynamic sensory encoding." *Nature Communications* 16.: 1768, 2025.
- [8]. Andalman, Aaron S., et al. "Neuronal dynamics regulating brain and behavioral state transitions." *Cell* 177.4: 970-985, 2019.
- [9]. Gerstner, Wulfram, et al. *Neuronal dynamics: From single neurons to networks and models of cognition*. Cambridge University Press, 2014.
- [10]. Scott, Alwyn C. "The electrophysics of a nerve fiber." *Reviews of Modern Physics* 47.2: 487, 1975.
- [11]. Gasser, Herbert S. "The classification of nerve fibers." *Ohio Journal of Science (Ohio Academy of Science)* 41.3, 1941.
- [12]. Sidiropoulou, Kyriaki, Eleftheria Kyriaki Pissadaki, and Panayiota Poirazi. "Inside the brain of a neuron." *EMBO reports* 7.9: 886-892, 2006.
- [13]. Naundorf, Björn, Fred Wolf, and Maxim Volgushev. "Unique features of action potential initiation in cortical neurons." *Nature* 440.7087: 1060-1063, 2006.
- [14]. Lewicki, Michael S. "A review of methods for spike sorting: the detection and classification of neural action potentials." *Network: Computation in Neural Systems* 9.4: R53, 1998.

- [15]. Stuart, Greg, et al. "Action potential initiation and backpropagation in neurons of the mammalian CNS." *Trends in neurosciences* 20.3: 125-131, 1997.
- [16]. Bean, Bruce P. "The action potential in mammalian central neurons." *Nature Reviews Neuroscience* 8.6: 451-465, 2007.
- [17]. Hille, Bertil. "Ionic channels in nerve membranes." *Progress in biophysics and molecular biology* 21: 1-32, 1970.
- [18]. D'Adamo, Maria Cristina, et al. "Ion channels involvement in neurodevelopmental disorders." *Neuroscience* 440: 337-359, 2020.
- [19]. Hubbard, J. I., and W. D. Willis. "Hyperpolarization of mammalian motor nerve terminals." *The Journal of Physiology* 163.1: 115, 1962.
- [20]. Kaji, Maiko, et al. "The origin of hyperpolarization based on the directional conduction of action potential using a model nerve cell system." *Bioelectrochemistry* 128: 155-164, 2019.
- [21]. Hindmarsh, James L., and R. M. Rose. "A model of the nerve impulse using two first-order differential equations." *Nature* 296.5853: 162-164, 1982.
- [22]. Drukarch, Benjamin, et al. "Thinking about the nerve impulse: A critical analysis of the electricity-centered conception of nerve excitability." *Progress in Neurobiology* 169: 172-185, 2018.
- [23]. Bishop, George H. "Natural history of the nerve impulse." *Physiological Reviews* 36.3: 376-399, 1956.
- [24]. Waxman, Stephen G. "Conduction in myelinated, unmyelinated, and demyelinated fibers." *Archives of neurology* 34.10: 585-589, 1977.
- [25]. Varga, Ivan, and Boris Mravec. "Nerve fiber types." *Nerves and nerve injuries*. Academic Press: 107-113, 2015.
- [26]. Schild, John H., and Diana L. Kunze. "Differential distribution of voltage-gated channels in myelinated and unmyelinated baroreceptor afferents." *Autonomic Neuroscience* 172.1-2: 4-12, 2012.
- [27]. Giuliadori, Mauricio J., and Stephen E. DiCarlo. "Myelinated vs. unmyelinated nerve conduction: a novel way of understanding the mechanisms." *Advances in physiology education* 28.2: 80-81, 2004.
- [28]. Ranscht, B., et al. "Development of oligodendrocytes and Schwann cells studied with a monoclonal antibody against galactocerebroside." *Proceedings of the National Academy of Sciences* 79.8: 2709-2713, 1982.

- [29]. Mirsky, Rhona, et al. "Myelin-specific proteins and glycolipids in rat Schwann cells and oligodendrocytes in culture." *The Journal of cell biology* 84.3: 483-494, 1980.
- [30]. Girault, Jean-Antoine, and Elio Peles. "Development of nodes of Ranvier." *Current opinion in neurobiology* 12.5: 476-485, 2002.
- [31]. Rasband, Matthew N., and James S. Trimmer. "Developmental clustering of ion channels at and near the node of Ranvier." *Developmental biology* 236.1: 5-16. 2001.
- [32]. Stämpfli, Robert. "Saltatory conduction in nerve." *Physiological reviews* 34.1: 101-112, 1954.
- [33]. Frankenhaeuser, Bernhard. "The hypothesis of saltatory conduction." *Cold spring harbor symposia on quantitative biology*. Vol. 17. Cold Spring Harbor Laboratory Press, 1952.
- [34]. Cohen, Charles CH, et al. "Saltatory conduction along myelinated axons involves a periaxonal nanocircuit." *Cell* 180.2: 311-322, 2020.
- [35]. Huxley, A. F., and R. Stämpfli. "Evidence for saltatory conduction in peripheral myelinated nerve fibres." *The Journal of physiology* 108.3: 315, 1949.
- [36]. Morell, Pierre, and Richard H. Quarles. "The myelin sheath." *Basic Neurochemistry: Molecular, Cellular and Medical Aspects* 6, 1999.
- [37]. Neverisky, Daniel L., and Geoffrey W. Abbott. "Ion channel–transporter interactions." *Critical reviews in biochemistry and molecular biology* 51.4: 257-267, 2016.
- [38]. Rasband, Matthew N., and Peter Shrager. "Ion channel sequestration in central nervous system axons." *The Journal of Physiology* 525.1: 63-73, 2000.
- [39]. Galligan, J. J. "Ligand-gated ion channels in the enteric nervous system." *Neurogastroenterology & Motility* 14.6: 611-623, 2002.
- [40]. Barry, Peter H., and Joseph W. Lynch. "Ligand-gated channels." *IEEE transactions on nanobioscience* 4.1: 70-80, 2005.
- [41]. Lemoine, Damien, et al. "Ligand-gated ion channels: new insights into neurological disorders and ligand recognition." *Chemical reviews* 112.12: 6285-6318, 2012.
- [42]. Armstrong, Clay M., and Bertil Hille. "Voltage-gated ion channels and electrical excitability." *Neuron* 20.3: 371-380, 1998.
- [43]. Bezanilla, Francisco. "Voltage-gated ion channels." *Biological Membrane Ion Channels: Dynamics, Structure, and Applications*: 81-118, 2007.
- [44]. Pearson, K. G., R. B. Stein, and S. K. Malhotra. "Properties of action potentials from insect motor nerve fibres." *Journal of Experimental Biology* 53.2: 299-316, 1970.

- [45]. Mogyoros, Ilona, Matthew C. Kiernan, and David Burke. "Strength-duration properties of human peripheral nerve." *Brain* 119.2: 439-447, 1996.
- [46]. Rosenblueth, A. "The all-or-none principle and the nerve effector systems." *The Quarterly Review of Biology* 10.3: 334-340, 1935.
- [47]. Olmsted, James Montrose Duncan, and W. P. Warner. "The" all-or-none" Principle Applied to Mammalian Nerves and Reflex-arcs." *American Journal of Physiology-Legacy Content* 61.2: 228-243, 1922.
- [48]. Barnes, T. Cunliffe. "The Validity of the" all-or-none" Law in the Peripheral Nervous System of Crustacea." *American Journal of Physiology-Legacy Content* 107.2: 447-458, 1934.
- [49]. Frank Jr, Robert G. "Instruments, nerve action, and the all-or-none principle." *Osiris* 9 (1994): 208-235, 1994.
- [50]. de Nó, R. Lorente. "The refractory period of the motoneurones." *American Journal of Physiology-Legacy Content* 111.2: 283-288, 1935.
- [51]. Kimura, J., T. Yamada, and R. L. Rodnitzky. "Refractory period of human motor nerve fibres." *Journal of Neurology, Neurosurgery & Psychiatry* 41.9: 784-790, 1978.
- [52]. Tackmann, W., and H. J. Lehmann. "Refractory period in human sensory nerve fibres." *European neurology* 12.5-6 (1974): 277-292, 1974.
- [53]. Davis, R. E., and A. O. Stretton. "Passive membrane properties of motoneurons and their role in long-distance signaling in the nematode *Ascaris*." *Journal of Neuroscience* 9.2: 403-414, 1989.
- [54]. Bloomfield, S. A., J. E. Hamos, and S. M. Sherman. "Passive cable properties and morphological correlates of neurones in the lateral geniculate nucleus of the cat." *The Journal of physiology* 383.1: 653-692, 1987.
- [55]. Takashima, Shiro, and Herman P. Schwan. "Passive electrical properties of squid axon membrane." *The Journal of Membrane Biology* 17.1: 51-68, 1974.
- [56]. Hodgkin, Alan L., and R. D. Keynes. "Active transport of cations in giant axons from *Sepia* and *Loligo*." *The Journal of physiology* 128.1: 28, 1955.
- [57]. Wespi, H. H. "Active transport and passive fluxes of K, Na, and Li in mammalian non-myelinated nerve fibres." *Pflügers Archiv* 306: 262-280, 1969.
- [58]. Syková, Eva, and Charles Nicholson. "Diffusion in brain extracellular space." *Physiological reviews* 88.4: 1277-1340, 2008.
- [59]. Nicholson, Charles, and Sabina Hrabětová. "Brain extracellular space: the final frontier of neuroscience." *Biophysical journal* 113.10: 2133-2142, 2017.

- [60]. Kamali-Zare, Padideh, and Charles Nicholson. "Brain extracellular space: geometry, matrix and physiological importance." *Basic and Clinical Neuroscience* 4.4: 282, 2013.
- [61]. Tønnesen, Jan, VVG Krishna Inavalli, and U. Valentin Nägerl. "Super-resolution imaging of the extracellular space in living brain tissue." *Cell* 172.5: 1108-1121, 2018.
- [62]. Zimmermann, Dieter R., and María T. Dours-Zimmermann. "Extracellular matrix of the central nervous system: from neglect to challenge." *Histochemistry and cell biology* 130: 635-653, 2008.
- [63]. Bédard, Claude, and Alain Destexhe. "Generalized cable theory for neurons in complex and heterogeneous media." *Physical Review E—Statistical, Nonlinear, and Soft Matter Physics* 88.2: 022709, 2013.
- [64]. Hrabetova, Sabina, et al. "Unveiling the extracellular space of the brain: from super-resolved microstructure to in vivo function." *Journal of Neuroscience* 38.44: 9355-9363, 2018.
- [65]. Soria, Federico N., et al. "Current techniques for investigating the brain extracellular space." *Frontiers in Neuroscience* 14: 570750, 2020.
- [66]. HANSEN, ANKER JON, and CARL ERIK OLSEN. "Brain extracellular space during spreading depression and ischemia." *Acta Physiologica Scandinavica* 108.4: 355-365, 1980.
- [67]. Hrabětová, Sabina, and Charles Nicholson. "Contribution of dead-space microdomains to tortuosity of brain extracellular space." *Neurochemistry international* 45.4: 467-477, 2004.
- [68]. Nicholson, Charles, Padideh Kamali-Zare, and Lian Tao. "Brain extracellular space as a diffusion barrier." *Computing and Visualization in Science* 14.7: 309-325, 2011.
- [69]. Zamecnik, Josef. "The extracellular space and matrix of gliomas." *Acta neuropathologica* 110: 435-442, 2005.
- [70]. Long, Katherine R., and Wieland B. Huttner. "How the extracellular matrix shapes neural development." *Royal Society Open Biology* 9.1: 180216, 2019.
- [71]. Herreras, Oscar. "Local field potentials: myths and misunderstandings." *Frontiers in neural circuits* 10: 101, 2016.
- [72]. Kajikawa, Yoshinao, and Charles E. Schroeder. "How local is the local field potential?." *Neuron* 72.5: 847-858, 2011.
- [73]. Frahm, Ken Steffen, et al. "Nerve fiber activation during peripheral nerve field stimulation: importance of electrode orientation and estimation of area of paresthesia." *Neuromodulation: Technology at the Neural Interface* 19.3 : 311-318, 2016.

- [74]. Holt, Gary R., and Christof Koch. "Electrical interactions via the extracellular potential near cell bodies." *Journal of computational neuroscience* 6: 169-184, 1999.
- [75]. Destexhe, Alain, and Claude Bédard. "Local Field Potentials: LFP." *Encyclopedia of computational neuroscience*. New York, NY: Springer New York,. 1903-1914, 2022.
- [76]. Destexhe, Alain, and Joshua A. Goldberg. "LFP analysis: overview." *Encyclopedia of computational neuroscience*: 66-70, 2022.
- [77]. Hagen, Espen, et al. "Multimodal modeling of neural network activity: computing LFP, ECoG, EEG, and MEG signals with LFPy 2.0." *Frontiers in neuroinformatics* 12: 92, 2018.
- [78]. Johnson, Ernest W., and Karl J. Olsen. "Clinical value of motor nerve conduction velocity determination." *Journal of the American Medical Association* 172.18: 2030-2035, 1960.
- [79]. Sebillé, Alain. "Respective importance of different nerve conduction velocities in leprosy." *Journal of the Neurological Sciences* 38.1: 89-95, 1978.
- [80]. Hodgkin, A. L. "A note on conduction velocity." *The Journal of physiology* 125.1: 221, 1954.
- [81]. Etxeberria, Ainhoa, et al. "Dynamic modulation of myelination in response to visual stimuli alters optic nerve conduction velocity." *Journal of Neuroscience* 36.26: 6937-6948, 2016.
- [82]. Hossmann, K-A. "Pathophysiology of vasogenic and cytotoxic brain edema." *Treatment of Cerebral Edema*: 1-10, 1982.
- [83]. Loubinoux, Isabelle, et al. "Spreading of vasogenic edema and cytotoxic edema assessed by quantitative diffusion and T2 magnetic resonance imaging." *Stroke* 28.2: 419-427, 1997.
- [84]. Abbott, N. Joan, et al. "Structure and function of the blood–brain barrier." *Neurobiology of disease* 37.1: 13-25, 2010.
- [85]. Kaur, C., and E. A. Ling. "Blood brain barrier in hypoxic-ischemic conditions." *Current neurovascular research* 5.1: 71-81, 2008.
- [86]. Waxman, Stephen G. "Determinants of conduction velocity in myelinated nerve fibers." *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine* 3.2: 141-150, 1980.
- [87]. Purves, Dale, et al. "Increased conduction velocity as a result of myelination." *Neuroscience* 3: 63-65, 2001.

- [88]. Ikeda, Masayoshi, and Yoshinori Oka. "The relationship between nerve conduction velocity and fiber morphology during peripheral nerve regeneration." *Brain and behavior* 2.4: 382-390, 2012.
- [89]. Hodes, Robert. "Linear relationship between fiber diameter and velocity of conduction in giant axon of squid." *Journal of neurophysiology* 16.2: 145-154, 1953.
- [90]. Rall, Wilfrid. "Core conductor theory and cable properties of neurons." *Comprehensive physiology*: 39-97, 2011.
- [91]. Liu, Ying-Hui, and Xiao-Jing Wang. "Spike-frequency adaptation of a generalized leaky integrate-and-fire model neuron." *Journal of computational neuroscience* 10: 25-45, 2001.
- [92]. Lewis, Timothy J. "Phase-locking in electrically coupled non-leaky integrate-and-fire neurons." *Conference Publications*. Vol. 2003. No. Special. Conference Publications, 2003.
- [93]. Hodgkin and A. F. Huxley, "A quantitative description of membrane current and its application to conduction and excitation in nerve," *J Physiol*, vol. 117, no. 4, p. 500, Aug, doi: 10.1113/JPHYSIOL.1952.SP004764, 1952.
- [94]. Teeter, Corinne, et al. "Generalized leaky integrate-and-fire models classify multiple neuron types." *Nature communications* 9.1: 709, 2018.
- [95]. Naud, Richard, et al. "Firing patterns in the adaptive exponential integrate-and-fire model." *Biological cybernetics* 99: 335-347, 2008.
- [96]. Brette, Romain, and Wulfram Gerstner. "Adaptive exponential integrate-and-fire model as an effective description of neuronal activity." *Journal of neurophysiology* 94.5: 3637-3642, 2005.
- [97]. Larsen, Hilde. *A numerical study of the cable equation in mathematical neuroscience*. MS thesis. Norwegian University of Life Sciences, Ås, 2012.
- [98]. Kole, Maarten HP, et al. "Action potential generation requires a high sodium channel density in the axon initial segment." *Nature neuroscience* 11.2: 178-186, 2008.
- [99]. Bruehlmeier, Matthias, et al. "Measurement of the extracellular space in brain tumors using ⁷⁶Br-bromide and PET." *Journal of Nuclear Medicine* 44.8: 1210-1218, 2003.
- [100]. Rall, Wilfrid. "Theory of physiological properties of dendrites." *Annals of the New York Academy of Sciences* 96.4: 1071-1092, 1962.
- [101]. Godin, Antoine G., et al. "Single-nanotube tracking reveals the nanoscale organization of the extracellular space in the live brain." *Nature nanotechnology* 12.3: 238-243, 2017.

- [102]. BAKAY, LOUIS. "The extracellular space in brain tumours: I. Morphological considerations." *Brain* 93.4: 693-698, 1970.
- [103]. Thorne, Robert G., and Charles Nicholson. "In vivo diffusion analysis with quantum dots and dextrans predicts the width of brain extracellular space." *Proceedings of the National Academy of Sciences* 103.14: 5567-5572, 2006.
- [104]. Rushton, W. A. H. "A theory of the effects of fibre size in medullated nerve." *The Journal of physiology* 115.1: 101, 1951.
- [105]. Hursh, J. B. "Conduction velocity and diameter of nerve fibers." *American Journal of Physiology-Legacy Content* 127.1: 131-139, 1939.
- [106]. Moore, John W., et al. "Simulations of conduction in uniform myelinated fibers. Relative sensitivity to changes in nodal and internodal parameters." *Biophysical journal* 21.2: 147-160, 1978.
- [107]. Goldman, L., and James S. Albus. "Computation of impulse conduction in myelinated fibers; theoretical basis of the velocity-diameter relation." *Biophysical journal* 8.5: 596-607, 1968.
- [108]. De Col, Roberto, Karl Messlinger, and Richard W. Carr. "Conduction velocity is regulated by sodium channel inactivation in unmyelinated axons innervating the rat cranial meninges." *The Journal of physiology* 586.4: 1089-1103, 2008.
- [109]. Smith, RICHARD S., and ZOLY J. Koles. "Myelinated nerve fibers: computed effect of myelin thickness on conduction velocity." *American Journal of Physiology-Legacy Content* 219.5: 1256-1258, 1970.
- [110]. Goldstein, Steven S., and Wilfrid Rall. "Changes of action potential shape and velocity for changing core conductor geometry." *Biophysical journal* 14.10: 731-757, 1974.
- [111]. Castelfranco, Ann M., and Daniel K. Hartline. "Evolution of rapid nerve conduction." *Brain research* 1641: 11-33, 2016.
- [112]. Salzer, J. L., and B. Zalc. "Myelination." *Current Biology* 26.20: R971-R975, 2016.
- [113]. Torre-Fuentes, L., et al. "Experimental models of demyelination and remyelination." *Neurologia (English Edition)* 35.1: 32-39, 2020.
- [114]. Chari, Divya M. "Remyelination in multiple sclerosis." *International review of neurobiology* 79: 589-620, 2007.
- [115]. Franklin, Robin JM, and Charles Ffrench-Constant. "Remyelination in the CNS: from biology to therapy." *Nature Reviews Neuroscience* 9.11: 839-855, 2008.

- [116]. Crawford, A. H., C. Chambers, and R. J. M. Franklin. "Remyelination: the true regeneration of the central nervous system." *Journal of comparative pathology* 149.2-3: 242-254, 2013.
- [117]. Cunniffe, Nick, and Alasdair Coles. "Promoting remyelination in multiple sclerosis." *Journal of neurology* 268.1: 30-44, 2021.
- [118]. Cherchi, Federica, et al. "Ion channels as new attractive targets to improve remyelination processes in the brain." *International journal of molecular sciences* 22.14: 7277, 2021.
- [119]. Cordaro, Marika, Salvatore Cuzzocrea, and Rosanna Di Paola. "Ion channels and neurodegenerative disease aging related." *Ion Transporters-From Basic Properties to Medical Treatment*. IntechOpen, 2022.
- [120]. Ortiz, Fernando C., et al. "Neuronal activity in vivo enhances functional myelin repair." *JCI insight* 4.9, 2019.
- [121]. Bergles, Dwight E., and William D. Richardson. "Oligodendrocyte development and plasticity." *Cold Spring Harbor perspectives in biology* 8.2: a020453, 2016.
- [122]. Demerens, C., et al. "Induction of myelination in the central nervous system by electrical activity." *Proceedings of the National Academy of Sciences* 93.18: 9887-9892, 1996.
- [123]. Miller, Robert H., and Sha Mi. "Dissecting demyelination." *Nature neuroscience* 10.11: 1351-1354, 2007.
- [124]. Lövblad, Karl-Olof, et al. "Retardation of myelination due to dietary vitamin B 12 deficiency: cranial MRI findings." *Pediatric radiology* 27: 155-158, 1997.
- [125]. Nawaz, Ammara, et al. "Deficiency of vitamin B12 and its relation with neurological disorders: a critical review." *The Journal of Basic and Applied Zoology* 81.1: 10, 2020.
- [126]. Miller, Ariel, et al. "Vitamin B12, demyelination, remyelination and repair in multiple sclerosis." *Journal of the neurological sciences* 233.1-2: 93-97, 2005.
- [127]. Scherer, Steven S., and Lawrence Wrabetz. "Molecular mechanisms of inherited demyelinating neuropathies." *Glia* 56.14: 1578-1589, 2008.
- [128]. Nelis, E., et al. "Mutations in GDAP1: autosomal recessive CMT with demyelination and axonopathy." *Neurology* 59.12: 1865-1872, 2002.
- [129]. Zhao, Chao, Wen-Wu Li, and Robin JM Franklin. "Differences in the early inflammatory responses to toxin-induced demyelination are associated with the age-related decline in CNS remyelination." *Neurobiology of aging* 27.9: 1298-1307, 2006.

- [130]. Lindner, Maren, et al. "Chronic toxic demyelination in the central nervous system leads to axonal damage despite remyelination." *Neuroscience letters* 453.2: 120-125, 2009.
- [131]. Rodriguez, Moses, ed. *Advances in multiple sclerosis and experimental demyelinating diseases*. Vol. 318. Springer Science & Business Media, 2007.
- [132]. Brück, Wolfgang. "The pathology of multiple sclerosis is the result of focal inflammatory demyelination with axonal damage." *Journal of neurology* 252: v3-v9, 2005.
- [133]. Peterson, Lisa K., and Robert S. Fujinami. "Inflammation, demyelination, neurodegeneration and neuroprotection in the pathogenesis of multiple sclerosis." *Journal of neuroimmunology* 184.1-2: 37-44, 2007.
- [134]. Stadelmann, Christine, Christiane Wegner, and Wolfgang Brück. "Inflammation, demyelination, and degeneration—recent insights from MS pathology." *Biochimica et Biophysica Acta (BBA)-Molecular Basis of Disease* 1812.2: 275-282, 2011.
- [135]. Boccazzi, Marta, Stefano Raffaele, and Marta Fumagalli. "Not only myelination: the immune-inflammatory functions of oligodendrocytes." *Neural Regeneration Research* 17.12: 2661-2663, 2022.
- [136]. Wang, Jack T., Zachary A. Medress, and Ben A. Barres. "Axon degeneration: molecular mechanisms of a self-destruction pathway." *Journal of Cell Biology* 196.1: 7-18, 2012.
- [137]. Saxena, Smita, and Pico Caroni. "Mechanisms of axon degeneration: from development to disease." *Progress in neurobiology* 83.3: 174-191, 2007.
- [138]. Simkins, Tyrell J., Greg J. Duncan, and Dennis Bourdette. "Chronic demyelination and axonal degeneration in multiple sclerosis: pathogenesis and therapeutic implications." *Current neurology and neuroscience reports* 21: 1-11, 2021.
- [139]. Stiefel, Klaus M., Benjamin Torben-Nielsen, and Jay S. Coggan. "Proposed evolutionary changes in the role of myelin." *Frontiers in Neuroscience* 7: 202, 2013.
- [140]. Yu, Lianchun, and Yuguo Yu. "Energy-efficient neural information processing in individual neurons and neuronal networks." *Journal of Neuroscience Research* 95.11: 2253-2266, 2017.
- [141]. Giesser, Barbara S., ed. *Primer on multiple sclerosis*. Oxford University Press, 2016.
- [142]. Huang, Wei, et al. "Origins and proliferative states of human oligodendrocyte precursor cells." *Cell* 182.3: 594-608, 2020.
- [143]. Levine, Joel M., Richard Reynolds, and James W. Fawcett. "The oligodendrocyte precursor cell in health and disease." *Trends in neurosciences* 24.1: 39-47, 2001.

- [144]. Fex Svenningsen, Åsa, and Lars B. Dahlin. "Repair of the peripheral nerve—remyelination that works." *Brain sciences* 3.3: 1182-1197, 2013.
- [145]. BONNAUD-TOULZE, EVELYNE N., and C. S. Raine. "Remodelling during remyelination in the peripheral nervous system." *Neuropathology and applied neurobiology* 6.4: 279-290, 1980.
- [146]. Zalc, Bernard, and R. Douglas Fields. "Do action potentials regulate myelination?." *The Neuroscientist* 6.1: 5-13, 2000.
- [147]. Chapman, Timothy W., and Robert A. Hill. "Myelin plasticity in adulthood and aging." *Neuroscience letters* 715: 134645, 2020.
- [148]. Hodgkin, A. L., and B. Katz. "The effect of temperature on the electrical activity of the giant axon of the squid." *The Journal of physiology* 109.1-2: 240, 1949.
- [149]. Rutkove, Seward B. "Effects of temperature on neuromuscular electrophysiology." *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine* 24.7: 867-882, 2001.
- [150]. Tan, Ya-Xin, et al. "Exercise-Induced Cognitive Improvement Is Associated with Sodium Channel-Mediated Excitability in APP/PS1 Mice." *Neural Plasticity* 2020.1: 9132720, 2020.
- [151]. Jones, Steven L., and Tatyana M. Svitkina. "Axon initial segment cytoskeleton: architecture, development, and role in neuron polarity." *Neural plasticity* 2016.1: 6808293, 2016.
- [152]. Clark, Brian D., Ethan M. Goldberg, and Bernardo Rudy. "Electrogenic tuning of the axon initial segment." *The Neuroscientist* 15.6: 651-668, 2009.
- [153]. Gentet, Luc J., Greg J. Stuart, and John D. Clements. "Direct measurement of specific membrane capacitance in neurons." *Biophysical journal* 79.1: 314-320, 2000.
- [154]. Yong, Yu, et al. "Advancement in modulation of brain extracellular space and unlocking its potential for intervention of neurological diseases." *Med-X* 2.1: 6, 2024.
- [155]. Keep, R. F., A. V. Andjelkovic, and G. Xi. "Cytotoxic and vasogenic brain edema." *Primer on cerebrovascular diseases*. Academic Press, 145-149, 2017.
- [156]. Lim, Tony KY, et al. "Peripheral nerve injury induces persistent vascular dysfunction and endoneurial hypoxia, contributing to the genesis of neuropathic pain." *Journal of Neuroscience* 35.8: 3346-3359, 2015.
- [157]. Skaper, Stephen D., and Vincenzo Di Marzo. "Endocannabinoids in nervous system health and disease: the big picture in a nutshell." *Philosophical Transactions of the Royal Society B: Biological Sciences* 367.1607: 3193-3200, 2012.

- [158]. Namini, Mojdeh Salehi, et al. "Cell-free therapy based on extracellular vesicles: a promising therapeutic strategy for peripheral nerve injury." *Stem Cell Research & Therapy* 14.1: 254, 2023.
- [159]. Nó, R. Lorente De, and G. A. Condouris. "Decremental conduction in peripheral nerve. Integration of stimuli in the neuron." *Proceedings of the National Academy of Sciences* 45.4: 592-617, 1959.
- [160]. LI, CHOH-LUH. "Decremental conduction in a mammalian peripheral nerve." *Acta Neurologica Scandinavica* 59.1: 31-45, 1979.
- [161]. Sherman, Diane L., and Peter J. Brophy. "Mechanisms of axon ensheathment and myelin growth." *Nature Reviews Neuroscience* 6.9: 683-690, 2005.
- [162]. Ford, Marc C., et al. "Tuning of Ranvier node and internode properties in myelinated axons to adjust action potential timing." *Nature communications* 6.1: 8073, 2015.
- [163]. Arancibia-Cárcamo, I. Lorena, et al. "Node of Ranvier length as a potential regulator of myelinated axon conduction speed." *Elife* 6: e23329, 2017.
- [164]. Hedstrom, Kristian L., and Matthew N. Rasband. "Intrinsic and extrinsic determinants of ion channel localization in neurons." *Journal of neurochemistry* 98.5: 1345-1352, 2006.
- [165]. Jacak, J. E., and W. A. Jacak. "New wave-type mechanism of saltatory conduction in myelinated axons and micro-saltatory conduction in C fibres." *European Biophysics Journal* 49.5: 343-360, 2020.
- [166]. Zhang, Xu, et al. "Mechanism of nerve conduction block induced by high-frequency biphasic electrical currents." *IEEE Transactions on Biomedical Engineering* 53.12: 2445-2454, 2006.
- [167]. Hübel, Niklas, R. David Andrew, and Ghanim Ullah. "Large extracellular space leads to neuronal susceptibility to ischemic injury in a Na⁺/K⁺ pumps-dependent manner." *Journal of computational neuroscience* 40: 177-192, 2016.
- [168]. Teleanu, Daniel Mihai, et al. "An overview of oxidative stress, neuroinflammation, and neurodegenerative diseases." *International journal of molecular sciences* 23.11: 5938, 2022.
- [169]. Facecchia, Katie, et al. "Oxidative toxicity in neurodegenerative diseases: role of mitochondrial dysfunction and therapeutic strategies." *Journal of toxicology* 2011.1: 683728, 2011.
- [170]. Dimitrova-Shumkovska, Jasmina, Ljupcho Krstanoski, and Leo Veenman. "Diagnostic and therapeutic potential of TSPO studies regarding neurodegenerative diseases,

- psychiatric disorders, alcohol use disorders, traumatic brain injury, and stroke: an update." *Cells* 9.4: 870, 2020.
- [171]. Cruz-Haces, Marcela, et al. "Pathological correlations between traumatic brain injury and chronic neurodegenerative diseases." *Translational neurodegeneration* 6: 1-10, 2017.
- [172]. Ding, Qianming, and Ya Jia. "Effects of temperature and ion channel blocks on propagation of action potential in myelinated axons." *Chaos: An Interdisciplinary Journal of Nonlinear Science* 31.5, 2021.
- [173]. Catterall, William A. "Voltage-gated sodium channels at 60: structure, function and pathophysiology." *The Journal of physiology* 590.11: 2577-2589, 2012.
- [174]. Meisler, Miriam H., and Jennifer A. Kearney. "Sodium channel mutations in epilepsy and other neurological disorders." *The Journal of clinical investigation* 115.8: 2010-2017, 2005.
- [175]. Santoro, Bina, and Mala M. Shah. "Hyperpolarization-activated cyclic nucleotide-gated channels as drug targets for neurological disorders." *Annual review of pharmacology and toxicology* 60.1: 109-131, 2020.
- [176]. Brunklaus, Andreas, and Dennis Lal. "Sodium channel epilepsies and neurodevelopmental disorders: from disease mechanisms to clinical application." *Developmental Medicine & Child Neurology* 62.7: 784-792, 2020.
- [177]. Kluckova, Daniela, et al. "A study among the genotype, functional alternations, and phenotype of 9 SCN1A mutations in epilepsy patients." *Scientific reports* 10.1: 10288, 2020.
- [178]. Meisler, Miriam H., Sophie F. Hill, and Wenxi Yu. "Sodium channelopathies in neurodevelopmental disorders." *Nature Reviews Neuroscience* 22.3: 152-166, 2021.
- [179]. Ademuwagun, Ibitayo Abigail, et al. "Voltage gated sodium channel genes in epilepsy: mutations, functional studies, and treatment dimensions." *Frontiers in neurology* 12: 600050, 2021.
- [180]. Martin, Melinda S., et al. "The voltage-gated sodium channel Scn8a is a genetic modifier of severe myoclonic epilepsy of infancy." *Human molecular genetics* 16.23: 2892-2899, 2007.
- [181]. Dravet, Charlotte. "Dravet syndrome history." *Developmental Medicine & Child Neurology* 53: 1-6, 2011.

- [182]. Xu, Changqing, et al. "Channelopathy of Dravet syndrome and potential neuroprotective effects of cannabidiol." *Journal of Central Nervous System Disease* 13: 11795735211048045, 2021.
- [183]. Kessi, Miriam, et al. "Intellectual disability and potassium channelopathies: a systematic review." *Frontiers in genetics* 11: 614, 2020.
- [184]. Corbett, Mark A., et al. "Dominant KCNA2 mutation causes episodic ataxia and pharmacoresponsive epilepsy." *Neurology* 87.19: 1975-1984, 2016.
- [185]. Chen, Haijun, et al. "Functional analysis of a novel potassium channel (KCNA1) mutation in hereditary myokymia." *Neurogenetics* 8: 131-135, 2007.
- [186]. Cintrón-Colón, Alberto F., et al. "GDNF to the rescue: GDNF delivery effects on motor neurons and nerves, and muscle re-innervation after peripheral nerve injuries." *Neural Regeneration Research* 17.4: 748-753, 2022.
- [187]. Li, Jun, et al. "The PMP22 gene and its related diseases." *Molecular neurobiology* 47: 673-698, 2013.
- [188]. Jones, James I., et al. "Failure to upregulate the RNA binding protein ZBP after injury leads to impaired regeneration in a rodent model of diabetic peripheral neuropathy." *Frontiers in Molecular Neuroscience* 14: 728163, 2021.
- [189]. Pietrucha-Dutczak, Marita, et al. "Candidate proteins from predegenerated nerve exert time-specific protection of retinal ganglion cells in glaucoma." *Scientific Reports* 7.1: 14540, 2017.
- [190]. Zaydman, Mark A., Jonathan R. Silva, and Jianmin Cui. "Ion channel associated diseases: overview of molecular mechanisms." *Chemical reviews* 112.12: 6319-6333, 2012.
- [191]. Kass, Robert S. "The channelopathies: novel insights into molecular and genetic mechanisms of human disease." *The Journal of clinical investigation* 115.8: 1986-1989, 2005.
- [192]. Pietrucha-Dutczak, Marita, et al. "Candidate proteins from predegenerated nerve exert time-specific protection of retinal ganglion cells in glaucoma." *Scientific Reports* 7.1: 14540, 2017.
- [193]. Lin, Jia-Ji, et al. "Melatonin suppresses neuropathic pain via MT2-dependent and-independent pathways in dorsal root ganglia neurons of mice." *Theranostics* 7.7: 2015, 2017.
- [194]. Crunkhorn, Sarah. "Protein rescue to treat genetic disorders." *Nature Reviews Drug Discovery* 6.6: 433-433, 2007.

- [195]. Sumadewi, Komang Trisna, Saktivi Harkitasari, and David Christopher Tjandra. "Biomolecular mechanisms of epileptic seizures and epilepsy: a review." *Acta Epileptologica* 5.1: 28, 2023.
- [196]. Li, Ze-Hua, et al. "Cyclic nucleotide signaling in sensory neuron hyperexcitability and chronic pain after nerve injury." *Neurobiology of Pain* 6: 100028, 2019.
- [197]. Ferré, Sergi, et al. "New insights into the neurobiology of restless legs syndrome." *The Neuroscientist* 25.2: 113-125, 2019.
- [198]. Barreto, Lidiane Carine Lima Santos, et al. "Epidemiologic study of Charcot-Marie-Tooth disease: a systematic review." *Neuroepidemiology* 46.3: 157-165, 2016.
- [199]. Nam, Soo Hyun, and Byung-Ok Choi. "Clinical and genetic aspects of Charcot-Marie-Tooth disease subtypes." *Precision and Future Medicine* 3.2: 43-68, 2019.
- [200]. Dimachkie, Mazen M., and Richard J. Barohn. "Guillain-Barré syndrome and variants." *Neurologic clinics* 31.2: 491-510, 2013.
- [201]. Brinkmeier, H., et al. "The acute paralysis in Guillain-Barré syndrome is related to a Na⁺ channel blocking factor in the cerebrospinal fluid." *Pflügers Archiv* 421: 552-557, 1992.
- [202]. Weber, F. R. A. N. K., et al. "A small sodium channel blocking factor in the cerebrospinal fluid is preferentially found in Guillain-Barré syndrome: a combined cell physiological and HPLC study." *Journal of neurology* 246: 955-960, 1999.
- [203]. Meisler, Miriam H., Sophie F. Hill, and Wenxi Yu. "Sodium channelopathies in neurodevelopmental disorders." *Nature Reviews Neuroscience* 22.3: 152-166, 2021.
- [204]. Lampert, Angelika, et al. "Sodium channelopathies and pain." *Pflügers Archiv-European Journal of Physiology* 460: 249-263, 2010.
- [205]. Brouwer, Brigitte A., et al. "Painful neuropathies: the emerging role of sodium channelopathies." *Journal of the Peripheral Nervous System* 19.2: 53-65, 2014.
- [206]. Benatar, M. "Neurological potassium channelopathies." *Qjm* 93.12: 787-797, 2000.
- [207]. Sanguinetti, M. C., and P. S. Spector. "Potassium channelopathies." *Neuropharmacology* 36.6: 755-762, 1997.
- [208]. Arimura, Kimiyoshi, et al. "Isaacs' syndrome as a potassium channelopathy of the nerve." *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine* 25.S11: S55-S58, 2002.
- [209]. Arimura, Kimiyoshi, et al. "Isaacs' syndrome as a potassium channelopathy of the nerve." *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine* 25.S11: S55-S58, 2002.

- [210]. Camfield, Peter, and Carol Camfield. "Febrile seizures and genetic epilepsy with febrile seizures plus (GEFS+)." *Epileptic Disorders* 17.2: 124-133, 2015.
- [211]. Zhang, Yue-Hua, et al. "Genetic epilepsy with febrile seizures plus: refining the spectrum." *Neurology* 89.12: 1210-1219, 2017.
- [212]. Willison, Hugh J., Bart C. Jacobs, and Pieter A. van Doorn. "Guillain-barre syndrome." *The Lancet* 388.10045: 717-727, 2016.
- [213]. Yuki, Nobuhiro, and Hans-Peter Hartung. "Guillain–barré syndrome." *New England Journal of Medicine* 366.24: 2294-2304, 2012.
- [214]. Viera, Anthony J. "Management of carpal tunnel syndrome." *American family physician* 68.2: 265-272, 2003.
- [215]. Werner, Robert A., and Michael Andary. "Electrodiagnostic evaluation of carpal tunnel syndrome." *Muscle & nerve* 44.4: 597-607, 2011.
- [216]. Genova, Alessia, et al. "Carpal tunnel syndrome: a review of literature." *Cureus* 12.3 2020.
- [217]. Mishra, P., and M. D. Stringer. "Sciatic nerve injury from intramuscular injection: a persistent and global problem." *International journal of clinical practice* 64.11: 1573-1579, 2010.
- [218]. Valat, Jean-Pierre, et al. "Sciatica." *Best practice & research Clinical rheumatology* 24.2: 241-252, 2010.
- [219]. Cragg, B. G., and P. K. Thomas. "The relationships between conduction velocity and the diameter and internodal length of peripheral nerve fibres." *The Journal of physiology* 136.3: 606, 1957.
- [220]. Cragg, B. G., and P. K. Thomas. "The conduction velocity of regenerated peripheral nerve fibres." *The Journal of physiology* 171.1: 164, 1964.

Publications based on the Thesis Works

Journals:

1. **Das, B.**, Baruah, S. M. B., Hazarika, U., Roy, S., “Neuronal Activity and its impact on Neuronal Growth”, Science and Technology Journal, Vol. 9, Issue. 1, pp. 21-25, 2021, DOI: 10.22232/stj.2021.09.01.04 (UGC CARE (ISSN: 2321-3388)).
2. **Das, B.**, Baruah, S. M. B., Singh, S., & Roy, S., “Insights into Nerve Signal Propagation: The Effect of Extracellular Space in Governing Neuronal Signal for healthy and injured Nerve Fiber using Modified Cable Model”, Journal name (Journal of Electronics, Electromedical Engineering, and Medical Informatics), Vol. 6, no. 2, pp. 206-218, 2024, DOI: <https://doi.org/10.35882/jeeemi.v6i2.394>. (Scopus (e-ISSN: 2656-8632)).
3. **Das, B.**, Baruah, S. M. B., & Roy, S., “A Modelling and Simulation Framework for Integrating Rescue Protein Mechanism for Neuronal Excitation Recovery”, Journal name (International Journal of Bioinformatics Research and Applications), Inderscience Publishers (Scopus (ISSN: 1744-5485)), (Under Review).
4. **Das, B.**, Baruah, SMB., Bhattacharyya, DK & Roy, S., “An Effective Framework to Study Signal Transmission due to Non-Homogeneous Extracellular Space in Neuron”, Journal name (Journal of Biological Physics), Springer (Scopus, SCIE,), (Under Review).

Book Chapters:

1. Baruah, S. M. B., **Das, B.**, & Roy, S., “Extracellular conductivity and nerve signal propagation: an analytical study”, Book name (Lecture Notes in Electrical Engineering), Vol. 728, pp. 399-406, 2021, Springer Singapore, DOI: https://doi.org/10.1007/978-981-33-4866-0_49 (ISBN: 978-981-33-4866-0).
2. **Das, B.**, Baruah, S. M. B., & Roy, S., “Modeling and Simulation of Successful Signal Transmission Without Information Loss in Axon”, Book name (Lecture Notes in Electrical Engineering), Vol. 1061, pp. 397-409, 2023, Springer Nature Singapore, DOI: https://doi.org/10.1007/978-981-99-4362-3_36 (ISBN: 978-981-99-4361-6).