BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
He, Zhigang	Professor
eRA COMMONS USER NAME (credential, e.g., agency login) ZHIGHE	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Nanjing Medical College, China	B.M.	1984	Medicine
Nanjing Medical College, China	M. Sc.	1987	Pathophysiology
University of Toronto, Canada	PhD	1996	Genetics
University of California, San Francisco	Postdoc fellow	1996-1999	Anatomy/Neuroscience

A. Positions and Honors.

Positions and Employment

1990-1992 Research fellow in the Department of Obstetrics and Gynecology, University of Pennsylvania School of Medicine
1992-1996 Ph.D. student in Department of Molecular and Medical Genetics at University of Toronto Advisor: Dr. C. James Ingles
1996-1999 Postdoctoral fellow in HHMI/ Department of Anatomy, University of California, San Francisco Advisor: Dr. Marc Tessier-Lavigne
1999-2005 Assistant Professor, Division of Neuroscience, Harvard Medical School and the Children's Hospital, Boston, MA
2005-2012 Associate Professor, Division of Neuroscience, Harvard Medical School and the Children's Hospital, Boston, MA
2012- Professor, Division of Neuroscience, Harvard Medical School and the Children's Hospital, Boston, MA
2014 Principle Investigator, Harvard Stem Cell Institute

Other Experience and Professional Memberships

2003-2006 NIH study section on NDPR and CNNT (ad hoc member)
2006-2010 NIH-NDPR study section regular member
2006 Chair, symposium on axon growth and regeneration, 7th APSN meeting
2006 Section chair and speaker for a Cold Spring Harbor meeting on Glia
2006 Co-chair for a mini-symposium on Neural Degeneration and Regeneration at 46th meeting of the American Society for Cell Biology
2006 Co-chair of NIH meeting on peripheral neuropathy
2006- Scientific Advisor for Wings for Life (an European-based foundation on spinal cord injury)
2007- Editorial Board of Experimental Neurology
2007-2012 Associate Editor of Journal of Neuroscience
2014- Research Grants Council, Hong Kong, China
2014- Program Committee, Society for Neuroscience

Honors:

1990-1991 Research Fellowship from the Rockefeller Foundation
1992-1994 Connaught Scholarship from the University of Toronto
1994-1995 Medical Research Council of Canada Studentship
1995-1996 Ontario Graduate Scholarship
1996-1999 Postdoctoral Fellowship from Howard Hughes Medical Institute
1999-2002 Career Award from Burroughs Wellcome Fund

1999-2002 Research fellowship from Alfred Sloan Foundation
2000-2003 Klingenstein Fellowship Award in the Neurosciences
2000-2001 A Fellowship from the William Hearst Fund
2001-2005 John Merck Scholar
2001-2004 EJLB Scholarship
2003 McKnight Scholar
2005 Ameritec Prize for significant accomplishment toward a cure for paralysis
2014 Bioscience Symposium and Don Summers Memorial Lecture, University of Utah
2017 Presidential lecture at the 2017 American Society for Neurochemistry

B. Selected peer-reviewed publications (in chronological order).

1. Cai H, He Z, Din Y. Effects of monocyte macrophage stimulation on lipoprotein receptors. Biochimica Biophysica Acta 1988;958(3):334-342.

2. He Z, Cai H, Chen X., Wang N. Modulation of rat Kupffer cells conditioned media on HDL receptors on hepatocytes. Science in China (Series B) 1990;33(5):584-591.

3. He Z, Yamamoto R, Furth EE, Schantz LJ, Naylor SL, George H, Bilheimer JT, Strauss JF. cDNAs encoding members of a family of proteins related to human sterol carrier protein 2 and assignment of the gene to human chromosome 1p21-pter. DNA Cell Biol 1991;10(8):559-569.

4. He Z, Brinton BT, Greenblatt J, Hassell JA, Ingles CJ. The transactivator proteins VP16 and GAL4 bind replication factor A. Cell 1993;73(6):1223-1232.

5. Ohba T, Rennert H, Pfeifer SM, He Z, Yamamoto R, Holt JA, Billheimer JT, Strauss III JF. The structure of the human sterol carrier protein X/sterol carrier protein 2 gene (SCP2). Genomics 1994;24(2):370-374.

6. He Z, Henricksen LA, Wold MS, and Ingles CJ. RPA involvement in the damage-recognition and incision steps of nucleotide excision repair. Nature 1995;374(6522):566-569.

7. He Z, Wong JMS, Maniar HS, Brill SJ, and Ingles CJ. Yeast replication protein A (RPA) is required for nucleotide excision repair in vitro. J Biol Chem 1996;271(45):28243-28249.

8. He Z, Ingles CJ. Isolation of human complexes proficient in nucleotide excision repair. Nucleic Acids Res 1997;25(6):1136-1141.

9. Braun KA, Lao Y, He Z, Ingles CJ, Wold MS. Role of protein-protein interactions in the function of replication protein A (RPA): RPA modulates the activity of DNA polymerase a by multiple mechanisms. Biochemistry 1997;36(28):8443-8454.

10. He Z, Tessier-Lavigne M. Neuropilin is a receptor for the axonal chemorepellent Semaphorin III. Cell 1997;90(4): 739-751.

11. Chen H, Chedotal A, He Z, Goodman CS, Tessier-Lavigne M. Neuropilin-2, a novel member of the neuropilin family, is a high affinity receptor for the semaphorins Sema E and Sema IV but not Sema III. Neuron 1997;19(3), 547-559.

12. Song H-J, Ming G-L, He Z (*The first three authors contributed equally*), Lehmann M, McKerracher L, Tessier-Lavigne M, Poo M-M. Conversion of neuronal growth cone responses from repulsion to attraction by cyclic nucleotides. Science 1998;281:1515-1518.

13. Chedotal A, Del Rio JA, Ruiz M, He Z, Borrell V, de Castro F, Ezan F, Goodman CS, Tessier-Lavigne M, Sotelo C, Soriano E. Semaphorins III and IV repel hippocampal axons via two distinct receptors. Development 1998;125:4313-4323.

14. Chen H, He Z, Bagri A, Tessier-Lavigne M. Semaphorin-neuropilin interactions underlying sympathetic axon responses to class III semaphorins. Neuron 1998;21:1283-1290.

15. Shirvan A, Ziv I, Fleminger G, He Z, Brudo I, Melamed E, Barzilai A. Semaphorins as mediators of neuronal apoptosis. J Neurochem 1999;73:961-971.

16. Tamagnone L, Artigiani S, Chen H, He Z (*These authors contributed equally*), Ming G-L, Song H-J, Chedotal A, Winberg ML, Goodman CS, Poo M-M, Tessier-Lavigne M, Comoglio PM. Plexins are a large family of receptors for transmembrane, secreted and GPI-anchored semaphorins in vertebrates. Cell 1999;99:71-80.

17. Vikis HG, Li W, He Z, Guan K-L. The semaphorin receptor plexin-B1 specifically interacts with active Rac in a ligand dependent manner. PNAS 2000;97;12457-12462.

18. Wang KC, Koprivica V, Kim JA, Sivasankaran R, Guo Y, Neve RL, He Z. Oligodendrocyte-myelin glycoprotein is a Nogo receptor ligand that inhibits neurite outgrowth. Nature 2002;417:941-944.

19. Domeniconi M, Cao Z, Spencer T, Sivasankaran R, Wang KC, Nikulina E, Kimura N, Cai H, Deng K, Gao Y, He Z, Filbin MT. Myelin-Associated Glycoprotein Interacts with the Nogo66 Receptor to Inhibit Neurite Outgrowth. Neuron 2002;35:283-290.

20. Wang KC, Kim JA, Sivasankaran R, Segal R, He Z. p75 interacts with the Nogo receptor as a co-receptor for Nogo, MAG and OMgp. Nature 2002;420:74-78.

21. Sicotte M, Tsatas O, Jeong SY, Cai CQ, He Z, David S. Immunization with myelin or recombinant Nogo-66/MAG in alum promotes axon regeneration and sprouting after corticospinal tract lesions in the spinal cord. Mol Cell Neurosci 2002;23:251-263.

22. He XL, Bazan JF, McDermott G, Park JB, Wang K, Tessier-Lavigne M, He Z, Garcia KC. Structure of the Nogo receptor ectodomain: a recognition module implicated in myelin inhibition. Neuron 2002;38:177-185.

23. Zhai Q, Wang J, Kim A, Liu Q, Watts R, Hoopfer E, Mitchison T, Luo L, He Z. Involvement of the ubiquitin-proteasome system in the early stages of wallerian degeneration. Neuron 2003;39:217-225.

24. Fischer D, He Z, Benowitz LI. Counteracting the Nogo receptor enhances optic nerve regeneration if retinal ganglion cells are in an active growth state. J Neurosci 2004;24:1646-1652.

25. Sivasankaran R, Pei J, Wang KC, Zhang YP, Shields CB, Xu X-M, He Z. PKC mediates inhibitory effects of myelin and chondroitin sulfate proteoglycans on axonal regeneration. Nature Neurosci 2004;7:261-268.

26. Park J, Yiu G, Kaneko S, Wang J, Chang J, He Z. A TNF receptor family member TROY is a co-receptor with Nogo receptor in mediating the inhibitory activity of myelin inhibitors. Neuron 2005;45:345-351.

27. Mi S, Miller RH, Lee X, Scott ML, Shulag-Morskaya S, Shao Z, Chang J, Thill G, Levesque M, Zhang M, Hession C, Sah D, Trapp B, He Z, Jung V, McCoy JM, Pepinsky RB. LINGO-1 negatively regulates myelination by oligodendrocytes. Nat Neurosci 2005;8:745-751.

28. Wang J, Zhai Q, Chen Y, He Z. Mediation of NAD-dependent axon degeneration protection by a local mechanism. J Cell Biol 2005;170(3):349-355.

29. Koprivica V, Cho KS, Park JB, Yiu G, Atwal J, Gore B, Kim JA, Lin E, Tessier-Lavigne M, Chen DF, He Z. EGFR activation mediates inhibition of axon regeneration by myelin and chondroitin sulfate proteoglycans. Science 2005;310:106-110.

30. Kaneko S, Wang J, Kaneko M, Yiu G, Hurrell J, Chitnis T, Khoury SJ, He Z. Protecting Axonal Degeneration by Increasing NAD Levels in Experimental Autoimmune Encephalomyelitis Models. J Neurosci 2006;26(38):9794-9804.

31. Chivatakarn O, Kaneko S, He Z, Tessier-Lavigne M, Giger RJ. The Nogo-66 receptor NgR1 is required only for the acute growth cone-collapsing but not the chronic growth-inhibitory actions of myelin inhibitors. J Neurosci 2007;27(27):7117-7124.

32. Ji B, Case LC, Liu K, Shao Z, Lee X, Yang Z, Wang J, Tian T, Shulga-Morskaya S, Scott M, He Z, Relton JK, Mi S. Assessment of functional recovery and axonal sprouting in oligodendrocyte-myelin glycoprotein (OMgp) null mice after spinal cord injury. Mol Cell Neurosci 2008;39(2):258-267.

33. Harrington AW, Li QM, Tep C, Park JB, He Z, Yoon SO. The role of Kalirin9 in p75/nogo receptor-mediated RhoA activation in cerebellar granule neurons. J Biol Chem 2008;283(36):24690-24697.

34. Park K, Liu K, Hu Y, Smith P, Chen W, Cai B, Xu B, Connolly L, Kramvis I, Sahin M, He Z. Promoting axon regeneration in the adult CNS by modulation of the PTEN/mTOR pathway. Science 2008;322:963-966.

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36. Smith PD, Sun F, Park K, Cai B, Wang C, Kuwako K, Martinez-Carrasco I, Connolly L, He Z. SOCS3 deletion promotes optic nerve regeneration in vivo. Neuron 2009;64(5):617-623. PMCID: 2796263.

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38. Miyamichi K, Amat F, Mousavi F, Wang C, Wickersham I, Wall N, Taniguchi H, Huang ZJ, He, Z., Callaway, E. M., Horowitz, M. A., and L. Luo. Cortical representation of olfactory bulb input revealed by retrograde mono-transsynaptic labeling. Nature 472, 191-196, 2011. PMID: 21179085

39. Sun F, Park KK, Belin S, Wang D, Lu T, Chen G, Zhang K, Yeung C, Feng G, Yankner BA, He Z. Sustained axon regeneration induced by co-deletion of PTEN and SOCS3. Nature 2011 480, 372-375, 2011.

40. Hu, Y., Park, K.K., Yang, L., Wei, X., Yang, Q, Thielen, P., Lee, A-H., Cartoni, R., Glimcher, L. H., Chen, D.F., and He, Z. Differential Effects of Unfolded Protein Response Pathways on Axon Injury-induced Death of Retinal Ganglion Cells. Neuron 73: 445-452, 2012.

41. Zukor, K., Belin, S., Wang, C., Keelan, N., Wang, X., and He, Z. Short hairpin RNA against PTEN enhances intrinsic growth of corticospinal tract axons after spinal cord injury. J. Neurosci. 33, 15350-15261, 2013.

42. O'Donovan KJ, Ma K, Guo H, Wang C, Sun F, Han SB, Kim H, Wong JK, Charron J, Zou H, Son YJ, He Z, Zhong J. B-RAF kinase drives developmental axon growth and promotes axon regeneration in the injured mature CNS. J Exp Med. 211, 801-814, 2014.

43. Ni, Y, Nawabi, H., Liu, X., Yang, L., Miyamichi, K., Tedeschi, A., Xu, B., Wall, N. R., Callaway, E. M., and He, Z. Characterization of long-descending pre-motor propriospinal neurons in the spinal cord. J. Neurosci. 34, 9404-9417, 2014.

44. Duan, X., Qiao, M, Bei, F., Kim, I-J., He, Z* and Sanes, J.R.* (*co-senior authors). Subtype-specific regeneration of retinal ganglion cells following axotomy: effects of osteopontin and mTOR signaling. Neuron 85, 1244-1256, 2015.

45. Belin, S., Nawabi, H., Wang, C., Warren, P., Latremoliere, A., Schorle, H., Uncu, C., Wool, C., He, Z* and Steen, J* (*co-senior authors). Injury induced decline of intrinsic regenerative ability revealed by quantitative proteomics. Neuron 86, 1000-1014, 2015.

46. Geoffroy, C.G., Lorenzana, A.O., Kwan, J.P., Lin, K., Ghassemi, O., Ma, A., Xu, N., Greger, D., He, Z., and Zheng, B. Effects of PTEN and Nogo codeletion on corticospinal axon sprouting and regeneration in mice. J. Neurosci. 35, 6413-6428 (2015).

47. Omura T, Omura K, Tedeschi A, Riva P, Painter MW, Rojas L, Martin J, Lisi V, Huebner EA, Latremoliere A, Yin Y, Barrett LB, Singh B, Lee S, Crisman T, Gao F, Li S, Kapur K, Geschwind DH, Kosik KS, Coppola G, **He Z**, Carmichael ST, Benowitz LI, Costigan M, Woolf CJ. Robust Axonal Regeneration Occurs in the Injured CAST/Ei Mouse CNS. Neuron 86, 1215-1227, 2015.

48. Jin, D., Liu, Y., Sun, F., Wang X., Liu, X., and **He, Z**. Restoration of skilled locomotion by sprouting corticospinal axons induced by co-deletion of PTEN and SOCS3. Nature Commun. 2015 Nov 24;6:8074.

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Reviews, chapters, monographs and editorials

1. Wong JM, He Z, Ingles CJ. Nucleotide excision repair in Saccharomyces cerevisiae whole-cell extracts. Methods Mol Biol 1999;113:317-326.

2. Chen H, He Z, Tessier-Lavigne M. Axon guidance mechanisms: semaphorins as simultaneous repellents and anti-repellents. Nat Neurosci 1998;1:436-439.

3. He Z. Crossed wires: L1 and neuropilin interactions. Neuron 2000;27:191-193, 2000.

4. He Z, Wang KC, Koprivica V, Ming G, Song HJ. Knowing how to navigate: mechanisms of semaphorin signaling in the nervous system. Sci STKE 2002;12;2002(119):RE1.

5. Yiu G, He Z. Signaling mechanisms of myelin inhibitors of axon regeneration. Curr Opin Neurobiol 2003;13:545-551.

6. He Z, Koprivica V. The Nogo Signaling Pathway for Regeneration Block. Ann Review Neurosci 2004;27:341-368.

7. Yiu G, He Z. Glial inhibition of CNS axon regeneration. Nature Rev Neurosci 2006;7:617-627.

8. Park KK, Liu K, Hu Y, Kanter JL, He Z. PTEN/mTOR and axon regeneration. Experimental Neurol 2010;223:45.

9. Sun F, He Z. Neuronal intrinsic barriers for axon regeneration in the adult CNS. Curr Opin Neurobiol 2010;20(4):510-518.

10. Tedeschi A He Z. Axon regeneration: electrical silencing is a condition for regrowth. Curr Biol. 2010;20(17):R713-R714.

11. Liu K, Tedeschi K, Park, He Z. Intrinsic controls of axon regeneration. Ann Rev Neurosci 34, 131-152, 2011.

12. Zukor K, He Z. Regenerative medicine: drawing breath after spinal injury. Nature 13;475:177-1778, 2011.

13. Nawabi, H, Zukor, K, and He, Z. No simpler than mammals: axon and dendrite regeneration in Drosophila. Genes Dev. 26:1509-1514, 2012.

14. L. Lu and He, Z. Molecular mechanisms of intrinsic growth ability. Curr Opin Neurobiol 27C: 135-142, 2014.

15. Belin S, Norsworthy M, He Z. Independent control of aging and axon regeneration. Cell Metabolism 19, 354-356, 2014.

16. Liu X, Williams PR, He Z. SOCS3: a common target for neuronal protection and axon regeneration after spinal cord injury. Exp Neurol. 2015 Jan;263:364-7. doi: 10.1016/j.expneurol.2014.10.024.

17. **Z. He** and Y. Jin. Intrinsic Control of Axon Regeneration. Neuron (in press).