XiaoChing Li, Ph.D.
Assistant Professor, Cell Biology and Anatomy, and Neuroscience

Education

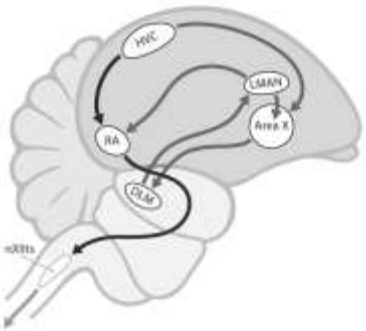
1994 Postdoc, Columbia University
1991 PhD, Princeton University
1982 BS, Beijing Normal University, Beijing, China.

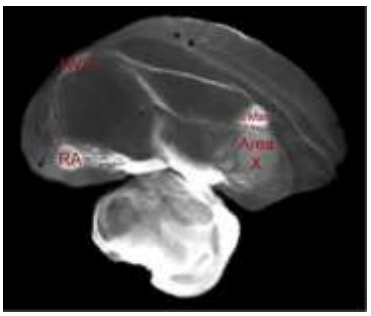
Positions

2008 - present Assistant Professor, Neuroscience Center
1995 - 2008 Research Associate, Rockefeller University

Current Research

Like human language, birdsong is a complex learned behavior used for social communication. Because both song behavior and the underlying neural circuitry are tractable, songbirds provide a unique model system for integrative studies of developmental neural plasticity and vocal learning. As with language learning in human infants, juvenile zebra finches learn to sing from an adult tutor during a developmentally restricted sensitive period. During this time, a series of molecular, cellular, and behavioral events, including gene expression, neurogenesis, neuronal differentiation, circuit formation, and sensory/motor learning, unfold in a well-orchestrated temporal order. The interplay between an innate developmental program and sensory/motor learning experience eventually gives rise to a learned song. We are interested in: 1) the dynamic genomic programs underlying the successive stages of song circuit development in songbirds, 2) how the intrinsic genomic programs interact with learning experience to shape a neural circuit and give rise to its behavior output, and 3) discerning the molecular factors that restrain plasticity when the sensitive period for song learning is closed. A multidisciplinary approach, including genomics and systems biology approach combined with behavioral manipulation of sensory/motor learning experience, is used in our research. Currently, we use the ultra-high throughput sequencing technology to analyze gene expression and miRNA expression in the song control circuits during development and song learning in zebra finches. The results from our experiments will contribute to understanding developmental disorders in human children such as autism, dyslexia, etc.





The diagram and the image depict the neural circuits that control song behavior in the zebra finch brain.

Publications

Li, XC., Biane, J., Jarvis, E., and Nottebohm, F. Sensory-motor experience-driven BDNF expression in a vocal communication system. In Submission.

Li, XC., Wang, XJ., Tannenhauser, J., Podell, S., Mukherjee, P., Hertel, M., Biane, J., Masuda, S., Nottebohm, F., and Gaasterland, T. (2007). Genomic resources for songbird research and their use in characterizing gene expression during brain development. Proc. Natl. Acad. Sci. USA. Vol. 104, 6834-6839.

Lombardino, A., Hertel, M., **Li, XC.**, and Nottebohm, F. (2006). Expression profiling of intermingled long-range projection neurons harvested by laser capture microdissection. J Neurosci Methods. 2006 Oct 30;157(2):195-207.

Lombardino, A., **Li, XC.**, Hertel, M., and Nottebohm, F. (2005). Replaceable neurons and neurodegenerative disease share depressed *UCHL1* levels Proc. Natl. Acad. Sci. USA. Vol. 102, 8036-8041.

Li, XC., Jarvis, E., Alverase, B., and Nottebohm, F. (2000). A relationship between behavior, neurotrophin expression and survival of new neurons. Proc. Natl. Acad. Sci. USA. Vol. 97, 8584-8589.

*Chang, D,-J., ***Li, XC.,** Lou, X. M., Weiss, K. Kaang, B-D., and Kandel, E. R. (2000). Activation of an ectopically expressed octopamine receptor coupled to adenylyl cyclase in Aplysia sensory neurons produces spike broadening and synaptic facilitation. Proc. Natl. Acad. Sci. USA. Vol. 97, 1829-1834. (*co-first authors).

Zhuo, M., **Li, XC.**, Kandel, E. R., and Hawkins, R. (1998). Metabotropic glutamate receptor activation induces long-lasting potentiation by stimulating heme oxygenase and guanylyl cyclase. Learning and Memory 5: 476-480.

Li, XC., Giot, J. F., Kuhl, D., Hen, R., and Kandel, E. R. (1995). Cloning and characterization of two related serotonin receptors from the brain and reproductive system of Aplysia that activate phospholipase C. J. Neurosci. 15 (11): 7585-7591.

Huang, Y. Y., **Li, XC.**, and Kandel, E. R. (1994). cAMP contributes to both the late and early phase of long-term potentiation in the hippocampal mossy fiber pathway**.** Cell 79, 69-79.

Other professional Activities

Ad hoc reviewer for F32 postdoctoral fellowship/NIDCD