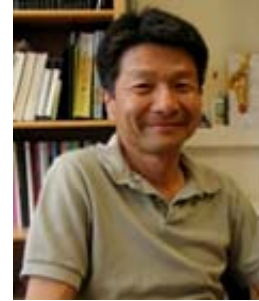




John Y Kuwada Ph.D.

Professor
Department of Molecular, Cellular and Developmental
Biology
3113 Natural Science Building 1048
Ann Arbor, MI 48109
(734) 936-2842
kuwada@umich.edu



 [Download](#) this page

Research Interests

Dr. Kuwada is interested in genes that regulate the development and function of neural circuits and the behaviors they subserve. The lab uses zebrafish since they are transparent, accessible and manipulable at all stages of development, and are vertebrates in which genes can be manipulated by mutagenesis and by the generation of transgenic animals. The main project involves the generation, phenotypic analysis and molecular identification of behavioral mutations. The phenotype of the nervous system mutants are characterized by electrophysiology, Ca²⁺ imaging, and imaging of fluorescently labeled proteins important for neural circuit function in living zebrafish in addition to other cellular and molecular genetic methods. The genes responsible for the mutant phenotypes are then identified by genetic mapping and using the genomic tools and genome sequencing information for zebrafish. Once the genes are identified, the biological function of their products are examined by taking advantage of the accessibility, transparency, manipulability and genetics of zebrafish. Mutations being examined include ones that affect the localization of neurotransmitter receptors and regulation of signaling within the CNS. Recently the lab identified genes for several zebrafish behavioral mutations that in humans cause diseases that lead to hyperexcitability of the CNS and hypercontractions of muscles. Another mutation is in a gene that is a target for anti-psychotic drugs.

Selected References

Hirata, H., Watanabe, T., Hatakeyama, J., Sprague, S.M., Saint-Amant, L., Nagashima, A., Cui, W.W., Zhou, W., and Kuwada, J.Y. (2007) Zebrafish relatively-relaxed mutants have a ryanodine receptor defect, exhibit slow swimming



and provide a model of multi-minicore disease., Development, in press.

Sato-Maeda, M., Tawarayama, H., Obinata, M., Kuwada, J.Y. and Shoji, W. (2006) *Sema3A1* guides spinal motor axons in a cell and stage specific manner in zebrafish., Development, 133: 937-947.

Zhou, W., Saint-Amant, S., Hirata, H., Cui, W.W., Sprague, S.M. and Kuwada, J.Y. (2006) Non-sense mutations in the dihydropyridine receptor $\alpha 1$ gene, *CACNB1*, paralyze zebrafish relaxed mutants., Cell Calcium, 39: 227-236.

Cui, W.W., Low, S., Hirata, H. Geisler, R., Hume, R.I. and Kuwada, J.Y. (2005) The zebrafish *sho* gene encodes a glycine transporter and is essential for the function of early neural circuits in the CNS., J. Neurosci., 25: 6610-6620.

Hirata, H., Saint-Amant, L., Downes, G.B., Cui, W.W., Zhou, W., Granato, M., and Kuwada, J.Y. (2005) Zebrafish bandoneon mutants display behavioral defects due to a mutation in the glycine receptor subunit. Proc. Natl. Acad. Sci., 102: 8345-8350.

Li, Q., Shirabe, K., Thisse, C., Thisse, B., Okamoto, H., Masai, I., and Kuwada, J.Y. (2005) Chemokine signaling guides axons within the retina in zebrafish., J Neurosci., 25:1711-1717.

Hirata, H., Saint-Amant, L., Waterbury, J., Cui, W., Zhou, W., Li, Q., Goldman, D.J., Granato, M. and Kuwada, J.Y. (2004). "accordion, a zebrafish behavioral mutant, has a muscle relaxation defect due to a mutation in the ATPase calcium pump *SERCA1*." Development, 131:5457-5468.

Song, M.H., Brown, N.L. and Kuwada, J.Y. (2004). "The curly fry mutation deregulates cell divisions in a stage-dependent manner in zebrafish embryos." Dev. Biol., 276: 194-206.

Cui, W., Saint-Amant, L. and Kuwada, J.Y. (2004). "The shocked Gene is Required for the Function of a Premotor Network in the Zebrafish CNS." J. Neurophysiol. 92: 2898-2908.

Liu, Y., Berndt, B., Su, F., Tawarayama, H., Shoji, W., Kuwada, J.Y. and Halloran, M.C. Semaphorin3D guides retinal axons along the dorsalventral axis of the tectum. J. Neurosci., 24 310-318, 2004.

Find more publications by [Dr. John Kuwada](#)

Last updated 5/30/2007 Click here to [update](#)

01251