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Research Interests

We have been interested in illuciadating the biological functions of RNA editing enzymes during early zebrafish embryogenesis. Adenosine deaminases acting on RNA (ADARs) convert specific adenosines on double-strand RNAs. ADARs postranscriptionally modify RNA with extensive double-stranded structures. Modifications of pre-mRNAs change the genomically encoded sequences of mRNAs and splicing pattern of gene transcripts, resulting increasing genome complexities. Pre-microRNA is another group of RNA molecules modified by ADARs. The maturation of microRNA is affected. MicroRNAs are knwn to modulate gene expression by inhibiting tranlstaion or degrading RNA. Hence, the activities of ADARs have yet another level of influence on the architecture of gene expression. In addition, the activities of ADARs are involved in the cellular defenses against viruses and in many yet to be characterized cellular processes, such as the formation of heterochromatin.

We have been interested in studying ADARs from two related approaches.
1. What are the RNA targets of ADARs? A bioinformatics approach to search highly conserved sequences among animals of vertebrate phylum was taken. Biological approach, such searching for alter gene expression at a global level in ADAR-deficient zebrafish.
2. What processes are perturbed in ADAR-deficient animals? Zebrafish expresses three homologues of mammalian ADARs. The expressions of these 3 genes were individually perturbed by morpholino oligonucletides. Interestingly, the phenotypes of the ADAR1 and ADAR2 morphants differ from their cognate mouse mutants, suggesting that the phenotypic changes may result from alternations of ADAR target RNAs which differ between mammals and teleost.

Recent Publications

1. Chen, Y.-.C., Kuo, S.-C., Chen, Y.-C., Lin, W.-H., Wong, F.-H., and **Chow, W.-Y.** (2008). A real-time PCR method for the quantitative analysis of RNA editing at specific sites. Anal. Biochem. 375, 46-52.
2. Tzeng, D.-W., Lin, M.-H., Chen, B.-Y., Chen, Y.-C., Chang, Y.-C., and **Chow, W.-Y.** (2007). Molecular and functional studies of tilapia (*Oreochromis mossambicus*) NMDA receptor NR1 subunits. Comp. Biochem. Physiol. B 143, 402-411.
3. Chen, Y.-C., Lin, W.-H., Tzeng, D.-W., and **Chow, W.-Y.** (2006). The mutually exclusive flip and flop exons of AMPA receptor genes were derived from an intragenic

duplication in the vertebrate lineage. J. Mol. Evol. 62, 121-131.

4. Hsieh, S.-J., Chun, Y.-L., Liu, N.-H., **Chow**, **W.-Y.**, and Tang, C.-Y. (2006). GeneAlign: a coding exon prediction tool based on phylogenetical comparisons. Nucl. Acid. Res. 34, W280 - W284.
5. Lin, W.-H., Wu, C.-H., Chen, Y.-C., and **Chow, W.-Y**. (2006). Embryonic expression of zebrafish AMPA receptor genes: zygotic *gria2* expression initiates at the midblastula transition. Brain Res. 1110, 46-54.
6. Peng, C.H., Hsu, T.-T., Chung, Y.-S., Lin, Y.-J., **Chow, W.-Y.**, Hsu, D.F., and Tang, C.Y. (2006). Identification of degenerate motifs using position restricted selection and hybrid ranking combination. Nucleic Acids Res. 34 (22), 6379-6391.

專書

羅竹芳，**周姚媛** 2003. 組織培養及基因表現—動物系統。第三章，後基因體時代之生物技術。教育部顧問室「生物技術科技教育改進計畫」。

Conference Presentation (2005-2008)

1. Chen, Y.-C., Chen, Y.-C., Jhan, T.-M., Tzeng, B.-W., and **Chow, W.-Y.** (2006). ADAR2 is required for neurogenesis during zebrafish development. 7th International conference on zebrafish development and genetics. Madison, Wisconsin
2. Chen, Y.-C., Hsu, T.-F., and **Chow, W.-Y.** (2006). Functional studies of the A to I RNA editing enzymes during early zebrafish development. IMB, NanKang, Taipei.
3. Lin, W.-H., Chou, H.-C., Chan, T.-M., Wu, C.-H., Chen, Y.-C., and **Chow, W.-Y.** (2005). The A to I RNA editing activities during early zebrafish development. 4th European Zebrafish Genetics and Development Meeting. Dresden, Germany.