

## **Chang, Tien-Hsien 張典顯**

副研究員

### **Education and Positions**

- B.S., Department of Botany, National Taiwan University, 1979
- Ph.D., Molecular Biology, State University of New York at Buffalo, 1986
- Postdoctoral Fellow, California Institute of Technology, 1986-1991
- Assistant Professor through Associate Professor of Molecular Genetics, The Ohio State University, Columbus, Ohio 1992–present

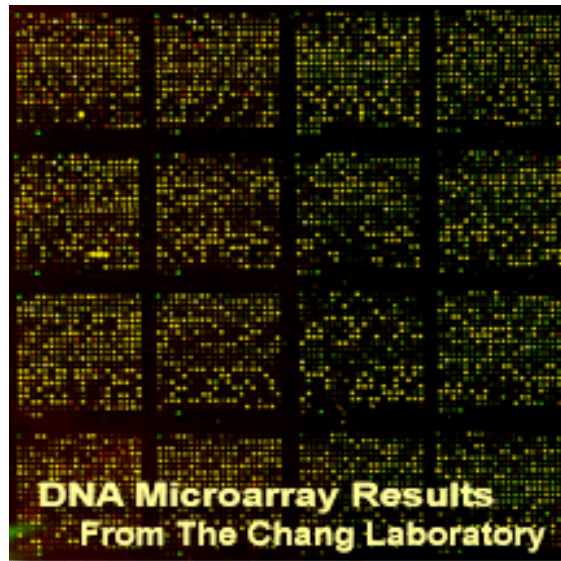
### **Honors**

- Genetic Group Predocotoral Fellowship, 1984-1986
- Merck Sharp & Dohme Laboratories Postdoctoral Fellowship, 1988-1991
- NIH Shannon Award, 1993-1995
- Teaching Award, College of Biological Sciences, Ohio State University, 1999
- Dean's Award for Classroom Teaching, College of Biological Sciences, Ohio State University, 2005
- NIH Postdoctoral Fellowship Study Section on Genes, Genetics, and Genomics, 2003-present

### **Research Interests**

#### **mRNA metabolism**

We have been studying the ubiquitous DExD/H-box proteins that are of central importance to all RNA-related biological processes, such as splicing, mRNA export, translation, RNA turnover, and RNAi. We posit, on the basis of our works, that DExD/H-box proteins function as “RNPsases” to re-configure various ribonucleoprotein (RNP) complexes traveling along the genetic information transfer “highway”. In this view, DExD/H-box proteins govern the fates of RNPs literally from cradle to grave. To illuminate the fascinating roles of these DExD/H-box proteins, we have chosen to use budding yeast as a model system. Yeast provides an unparalleled advantage for us to integrate the powerful tools of molecular genetics, functional genomics, biochemistry, and cell biology. Last, but not least, we are also exploring the possibility that one of the cellular DExD/H-box proteins is required for hepatitis C virus (HCV) replication. Studies of this DExD/H-box protein may provide a critical handle to understand how HCV replicates in the cell.



本實驗室主要在探討 DExD/H-box 蛋白酵素的生理功能。DExD/H-box 酵素充斥於各種生物體中，為維持生命系統所必須，參與所有與核糖核酸有關的生化反應，例如：剪接、轉譯、mRNA 運送、RNA 衰退及 RNAi...等。我們認為 DExD/H-box 酵素具有 RNPase 的功能，用來控制並調節細胞內的核糖核蛋白 (ribonucleoprotein; RNP) 複合體的三度空間結構與功能，使遺傳訊息在細胞訊息網絡中有效的運送。從這個角度看來，DExD/H-box 酵素支配著核糖核蛋白 (RNPs) 由生至死的命運。為了研究這些 DExD/H-box 酵素所扮演的有趣而且極其重要的角色，我們利用出芽酵母菌作為研究它們的模式生物系統。酵母菌可以讓我們充分整合各類現代生物學的研究工具，例如：分子遺傳學、功能基因體學、生物化學和細胞生物學，因此是研究細胞內運作機轉非常優良的一個模式系統。此外，我們亦探索 DExD/H-box 酵素是否為 C 型肝炎病毒複製所必須。這項研究將可幫我們瞭解 C 型肝炎病毒在細胞內的複製過程。

### Selected Publications

Burckin, T., Nagel, R., Mandel-Gutfreund, Y., Shiue, L., Clark, T., Chong, J.-L., Chang, T.-H., Squazzo, S., Hartzog, G., and Ares, M., Jr. "Exploring functional relationships between components of the transcription, splicing, and mRNA export machineries by gene expression phenotype analysis", *Nature Struct. Mol. Biol.* (2005) **12**, 175-182.

Chong, J.-L., Chuang, R.-Y., Tung, L., and Chang, T.-H. "Ded1p, a conserved DExD/H-box translation factor, can promote L-A virus negative-strand RNA synthesis *in vitro*", *Nucl. Acids Res.* (2004) **32**, 2031-2038.

Pryor, A., Tung, L., Yang, L., Kapadia, F., Chang, T.-H., and Johnson, L. F. "Growth-regulated expression and G<sub>0</sub>-specific turnover of the mRNA that encodes URH49, a mammalian DExD/H-box protein that is highly related to the mRNA export protein UAP56", *Nucl. Acids Res.* (2004) **32**, 1857-1865.

Tseng-Rogenski, S. S.-I, Chong, J.-L., Thomas, C. B., Enomoto, S. Berman, J., and Chang, T.-H. "Functional conservation of Dhh1p, a DExD/H-box protein in *Saccharomyces cerevisiae*", *Nucl. Acids Res.* (2003) **31**, 4995-5002.

Chen, J. Y.-F., Stands, L., Staley, J. P., Jackups, Jr., R. R., Latus, L. J., and Chang, T.-H. "Specific alterations of U1-C protein or U1 small nuclear RNA can eliminate the requirement of Prp28p, an essential DEAD-box splicing factor", *Mol. Cell.* (2001) **7**, 227-232.

Tseng, S. S.-I, Weaver, P. L., Liu, Y., Hitomi, M., Tartakoff, A. M., and Chang, T.-H. "A cytosolic RNA helicase required for poly(A)<sup>+</sup> RNA export", *EMBO J.* (1998) **17**, 2651-2662.

Chuang, R.-Y., Weaver, P. L., Liu, Z., and Chang, T.-H. "Requirement of the DEAD-box protein Ded1p for messenger RNA translation", *Science* (1997) **275**, 1468-1471.