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MAJOR RESEARCH INTERESTS

My main research interest lies in novel chemical probe development for in vitro and in vivo bioimaging. I recently joined NUS (September 2007), and I have worked at NYU for the last seven years in Chemical Genetics field. During the time, I have developed “diversity oriented fluorescence library approach (DOFLA)” and demonstrated its feasibility in broad range of analytes from macromolecules including DNA, RNA and proteins, to signaling small molecules. Empowered by combinatorial technique in dye field, our dye collection is already bigger than what Invitrogen (the dominating fluorescence company) has prepared for the last 30 years. Using the developed platform, my future research plan will focus on universal fluorescence probe toolbox generation for live cell / animal / patient imaging. The specific aims are as follows:

1. Universal fluorescence probe toolbox generation by diversity-oriented synthesis comprising more than 10,000 compounds which cover all range of visible/near IR wavelength (400-900 nm) and respond to broad biological pH change (pH 4-8)
2. Development of dynamic live cell imaging probes for intracellular organelles and cytoskeletal structures, stem cell maintenance and differentiation, cancer detection and new marker discovery
3. Application of above developed probes into pre-clinical imaging agents and diagnosis system including Alzheimer plaque imaging in live animal brain and target / tissue selective staining in embryo systems

RECENT PUBLICATIONS

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3. Dissection of melanogenesis with small molecules identifies prohibitin as a regulator, Snyder, J. R.; Hall, A.; Ni-Komatsu, L.; Khersonsky, S. M.; Chang, Y. T.; Orlow, S. J. *Chem. Biol.* **2005**, *12*, 477-484. [Highlighted at “Mitochondria give cells a tan, Rosania, G. R. Chem. Biol. 2005, 12, 412-413.”](#)
4. RNA-selective, live cell imaging probes for studying nuclear structure and function., Li, Q., Kim, Y. K., Namm, J., Kulkarni, A., Rosania, G., Ahn, Y. H., Chang, Y. T.* *Chem. Biol.* **2006**, *13*, 615-623. [Previewed at “Styryl molecules light-up RNAs, Dirks, R. W.; Tnake, H. J. Chem. Biol. 2006, 13, 560-561.”](#) [Highlighted at “Styryl dyes image RNA in living cells, Borman, S. C&En News, 2006 \(July 3\), 84 \(27\), p30”](#) & at “RNA dyes for life, Rothman, S. *The Scientist*, **2006**, *20*, 67” & at “Illuminating cellular RNA, Sheppard, T. L. *Nat. Chem. Biol.* **2006**, *2*, 405” & at “Live and let dye, *Biotechniques* **2006**, *41*, 231
5. Combinatorial synthesis of benzimidazolium dyes and its diversity directed application toward GTP-selective fluorescent chemosensors, Wang, S.; Chang, Y. T.* *J. Am. Chem. Soc.* **2006**, *128*, 10380-10381.
6. Colorimetric identification of carbohydrates by a pH indicator/ pH change inducer ensemble, Lee, J. W.; Lee, J. S.; Chang, Y. T.* *Angew. Chem., Int. Ed. Engl.*, **2006**, *45*, 6485-6487. [Highlighted at “Discriminating between carbohydrates, C&En News, 2006 \(September 25\), 84 \(39\), p 90”](#)
7. Forward chemical genetic approach identifies new role for GAPDH in insulin signaling, Min, J. K.; Kim, Y. K.; Cipriani, P. G.; Kang, M.; Khersonsky, S. M.; Walsh, D. P.; Lee, J. Y.; Niessen, S.; Yates, J. R.; Gunsalus, K.; Piano, F.; Chang, Y. T.* *Nat. Chem. Biol.* **2007**, *3*, 55-59. [Highlighted at “New diabetes target, C&En News, 2006 \(December 4\), 84 \(49\), p 63”](#) & “NYU, Scripps Finding Offers New Path For Treatment Of Diabetes, *Medical News Today*, **2006** (November 30)”
8. Combinatorial rosamine library and application to in vivo glutathione probe, Ahn, Y. H.; Lee, J. S.; Chang, Y. T.* *J. Am. Chem. Soc.* **2007**, *129*, 4510-4511.
9. Facilitated forward chemical genetics using tagged library, Ahn, Y. H.; Chang, Y. T.* *Acc. Chem. Res.* **2007**, *40*, 1025-1033.
10. Discovery of heparin chemosensors through diversity oriented fluorescence library approach, Wang, S.; Chang, Y. T.* *Chem. Commun.* **2008**, 1173-1175. [Highlighted at “Blood sensor for safer surgery, *Chemical Biology \(RSC\)*, **2008** \(January 10\)”](#)