

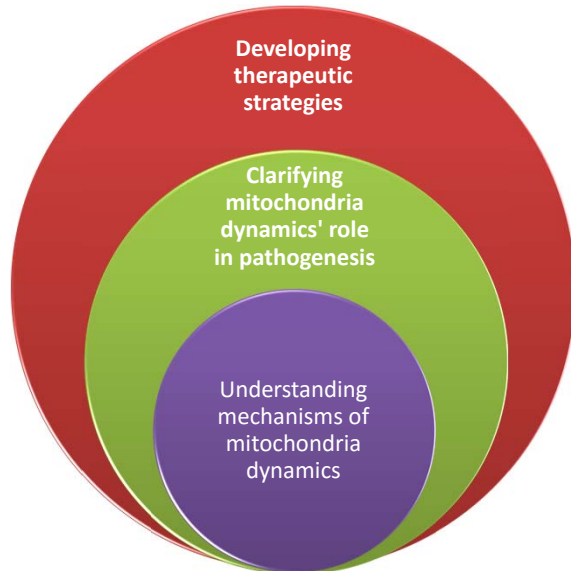
# 粒線體動態調控與相關疾病致病機轉

## Mitochondria Dynamics and Pathogenesis

國立清華大學生物科技研究所 張壯榮實驗室

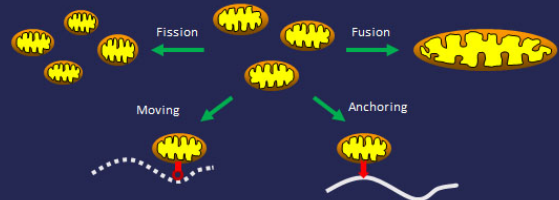


### Our research interests



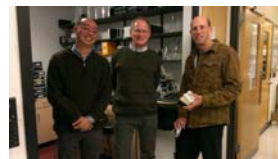
Mitochondria are the organelles that provide energy for cellular activities. In addition, they are important for redox and metabolic regulation, calcium homeostasis maintenance, and fatty acid oxidation. Mitochondria dynamically fuse and divide with each other. The balance of two opposite processes is required for maintaining proper mitochondrial morphology, distribution, and function. Disrupting mitochondrial fusion and fission balance affects a wide variety of cellular processes such as cell division, chemotaxis, apoptosis, autophagy and dendrite development. Several evidences indicated that mitochondria dynamics is closely associated with Huntington's, Parkinson's and Alzheimer's diseases. Elucidating regulatory mechanisms of mitochondria dynamics is thus critical for understanding these diseases. The major research aim in our lab is focus on understanding the regulatory pathways of mitochondrial fission and fusion. In addition to the molecular mechanisms of the two processes, their role in critical cellular events, pathogenesis and senescence are under extensive investigation. We apply genetics, cell biology and biochemistry approaches to dissect related issues. Our long-term goal is to understand the mitochondria dynamics and its role in different disorders, such as cancer, neurodegeneration and abnormal aging. The information gained from our research will benefit the development of novel therapeutic strategies.

### Mitochondria are dynamic organelles



### Related publications

1. Lo MC, Chen MH, Lee WS, Lu CI, **Chang CR**, Kao SH, Lee HM. (2015) Ne-(carboxymethyl) lysine-induced mitochondrial fission and mitophagy causes decreased insulin secretion from beta cells. *Am J Physiol Endocrinol Metab*. 2015 Sep 22 [Epub ahead of print]
2. Chien L, Chen WK, Liu ST, **Chang CR**, Kao MC, Chen KW, Chiu SC, Hsu ML, Hsiang IC, Chen YJ, Chen L. (2015) Low-dose ionizing radiation induces mitochondrial fusion and increases expression of mitochondrial complexes I and III in hippocampal neurons. *Oncotarget*. 2015 Sep 22. [Epub ahead of print]
3. Kuo YY, Jim WT, Su LC, Chung CJ, Lin CY, Huo C, Tseng JC, Huang SH, Lai CJ, Chen BC, Wang BJ, Chan TM, Lin HP, Chang WW, **Chang CR**, Chuu CP. (2015) Caffeic acid phenethyl ester is a potential therapeutic agent for oral. *Int J Mol Sci*. (accepted)
4. Wang IH, Chen HY, Wang YH, Chang KW, Chen YC, **Chang CR**.\* (2014). Resveratrol modulates mitochondria dynamics in replicative senescent yeast cells. *PLoS One*, 2014 Aug 6;9(8):e104345.
5. Huang CC, Huang TL, Hsu HC, Chen HC, Lin HC, Chien CY, Fang FM, Chang HW, Tsai NW, Chang WN, Chen SF, Lin TK, Tan TY, **Chang CR**, Wang HC, Lin WC, Lu CH. (2013) Long-term effects of neck irradiation on cardiovascular autonomic function: A study in nasopharyngeal carcinoma patients after radiotherapy. *Muscle & Nerve* 2013 Mar;47(3):344-350
6. Liu CR, **Chang CR**, Chern Y, Wang TH, Hsieh WC, Shen WC, Chang CY, Chu IC, Deng N, Cohen SN, Cheng TH (2012) Spt4 is selectively required for transcription of extended trinucleotide repeats. *Cell*. 2012 Feb 17;148(4):690-701
7. Blackstone C, **Chang CR**. (2011) Mitochondria unite to survive. *Nat Cell Biol*. 2011 May;13(5):521-2.
8. **Chang CR**, Manlandro CM, Arnoult D, Stadler J, Posey AE, Hill RB, Blackstone C. (2010) A lethal de novo mutation in the middle domain of the dynamin-related GTPase Drp1 impairs higher-order assembly and mitochondrial division. *J Biol Chem*. 2010 Oct 15;285(42):32494-503. Epub 2010 Aug 9.



Like us on Facebook

