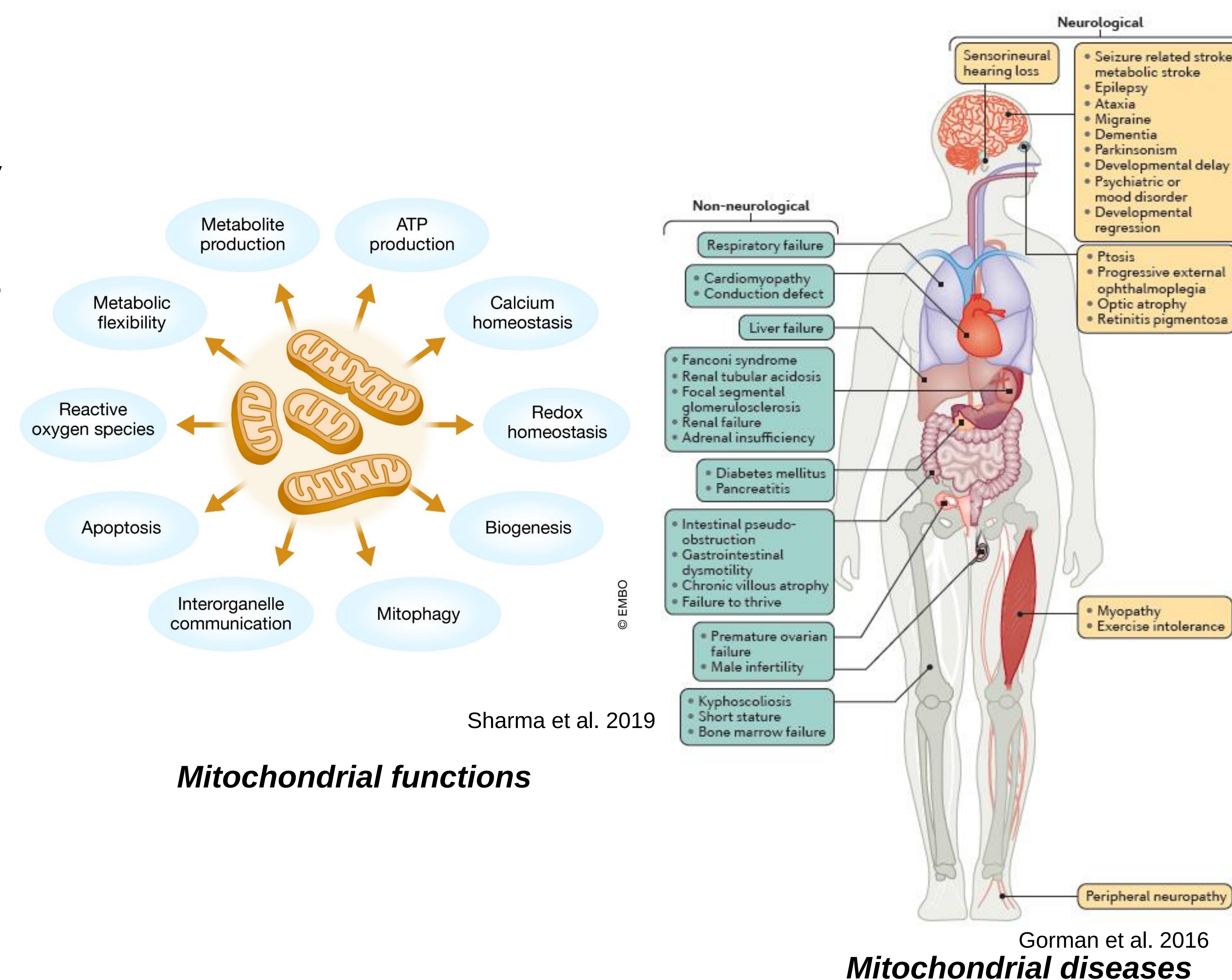




Research focus 研究方向

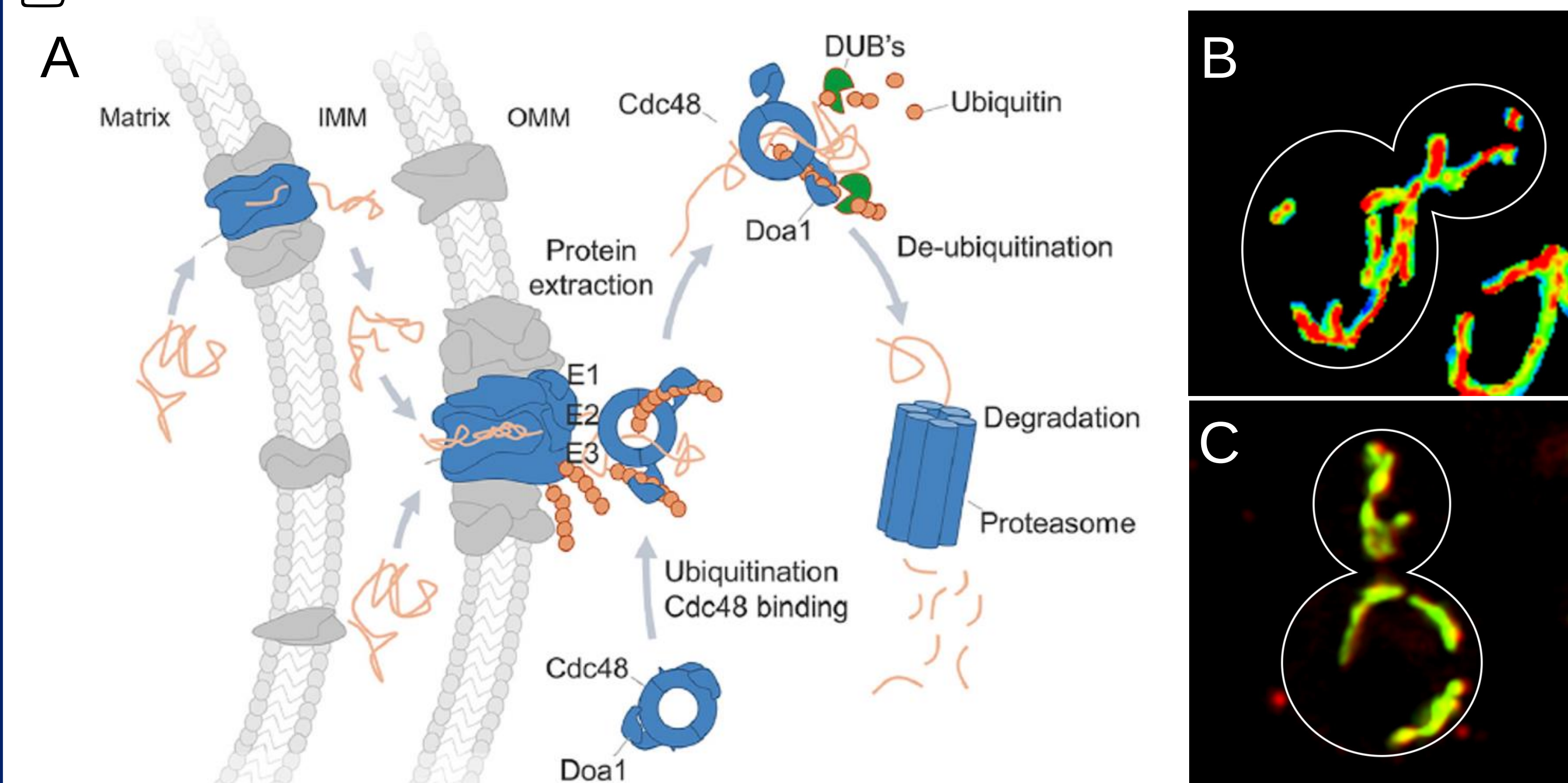
Mitochondria perform several functions essential for health. Dysfunction mitochondria induce both non-neurological and neurological diseases, cancer, and aging. The PCLiao lab is interested in mitochondrial quality control, and the role of this process in healthspan, stress resistance, and neurodegenerative diseases. We investigate the underlying mechanisms of mitochondrial quality control, including mitochondrial proteostasis, mitochondrial dynamics, and the interactions between mitochondria and other organelles using *Drosophila melanogaster* (fruit fly) and *Saccharomyces cerevisiae* (budding yeast) as our model systems. Our goal is to develop new therapies for diseases and improve healthspan by regulating mitochondrial quality.

粒線體是生物體內一項重要的胞器。粒線體功能失調會引起許多疾病，且與癌症與老化有關。我們的研究方向主要探討粒線體的品質在老化，抗壓，以及神經退化疾病所扮演的角色。我們使用果蠅以及酵母菌作為模式生物研究粒線體品質的調控，包括粒線體的蛋白調控，粒線體的動態平衡，以及不同胞器之間的交互作用，並希望藉由調控粒線體品質來治療疾病以及延緩老化。

The mitochondria-associated degradation
(MAD) pathway
粒線體相關降解路徑

MAD, one of the mitochondrial quality control pathways, is involved in turnover of proteins not only on mitochondrial outer membrane but also within mitochondria. We will further elucidate the detailed mechanism of MAD pathway and the role of MAD in mitochondrial quality and healthspan. We will develop novel methods to visualize mitochondrial quality control pathways during the aging process, and determine the relative contributions of mitochondrial quality control during aging.

粒線體相關降解路徑(MAD)為粒線體品質調控的其中一環，主要可以降解粒線體內以及外膜上摺疊錯誤的蛋白質。我們將會著重於了解MAD的詳細機制，並且探討此路徑在粒線體品質以及壽命中所扮演的角色。此外，我們將會發展新的實驗技術來探討不同粒線體品質調控的路徑在老化過程中所扮演的不同角色。

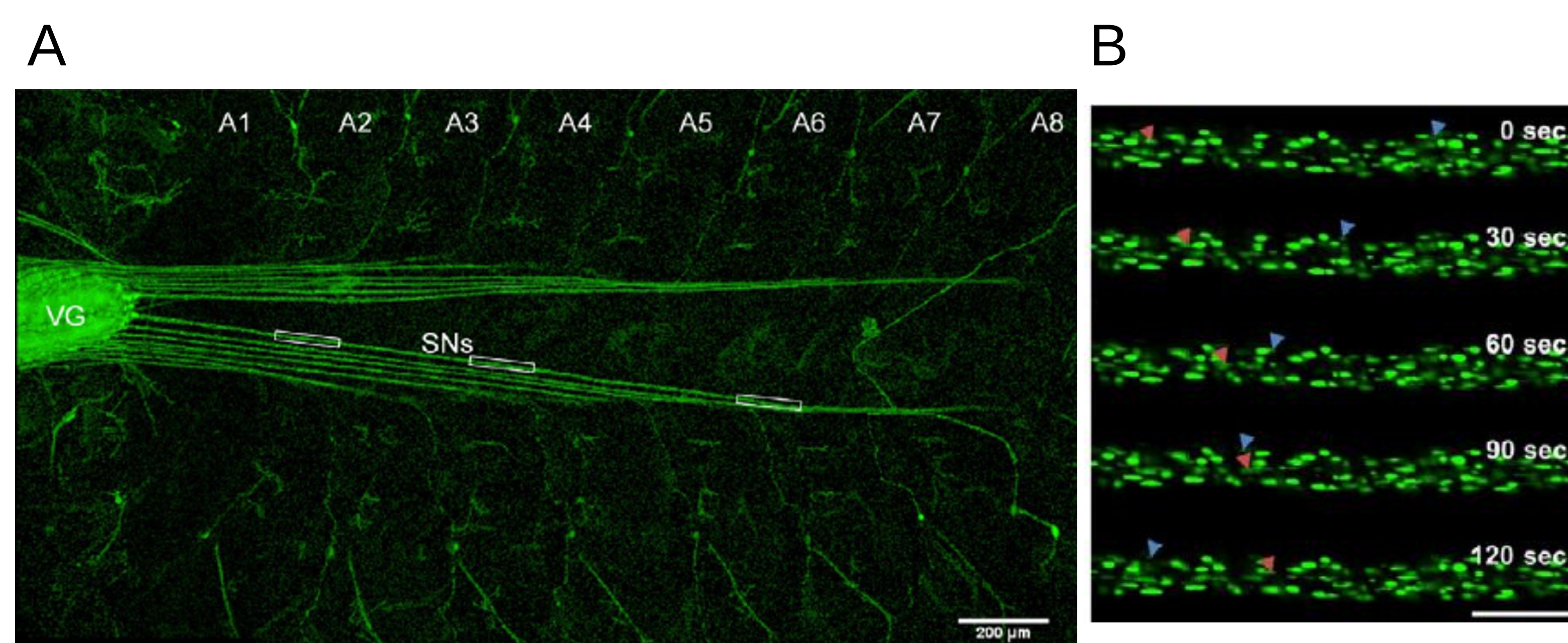


(A) Mitochondria-associated degradation (MAD). (B) Mitochondrial redox state in yeast. Warmer and cooler colors represent more reducing and oxidizing environments, respectively. (C) Mitochondrial ROS in yeast stained by DHE staining (red) are colocalized with mitochondria (green).

The crosstalk of mitochondrial proteostasis
and dynamics
粒線體蛋白質恆定與動態平衡的交互作用

Different mitochondrial quality control pathways, including mitochondrial fission-fusion, movement, and mitophagy interact with each other. We use *Drosophila* as one of the model systems to directly visualize mitochondrial dynamics in intact neurons. We will focus on how mitochondrial proteostasis interacts with mitochondrial dynamics, and the roles of the interaction of different mitochondrial pathways in aging and stress resistance.

不同的粒線體調控路徑，像是粒線體的分裂融合，粒線體的移動，以及粒線體吞噬等有交互作用會互相影響。我們利用果蠅直接觀察粒線體在神經上的運輸，來了解粒線體蛋白質恆定與粒線體動態平衡的交互作用，並且探討此交互作用在老化以及抗壓中所扮演的角色。



(A) Mitochondria in motor neurons in the segmental nerves in *Drosophila* larvae. (B) Mitochondrial transport at 30s intervals. Anterogradely and retrogradely moving mitochondria are shown in pink and blue arrowheads, respectively.

Contact 聯絡資訊

If anyone is interested in mitochondrial quality control, welcome to contact Pin-Chao!

歡迎對粒線體品質調控有興趣的學生或研究人員加入我們的團隊!

Email: packliao@gmail.com Lab website: <https://pcliaolab.wixsite.com/pcliaolab>

