

VISUALIZING MITOCHONDRIAL DYNAMICS TO DISSECT THE METABOLISM OF IMMUNE CELLS USING CONFOCAL MICROSCOPY

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KEY WORDS: Confocal microscopy, Immune cells, Mitochondria, Metabolism

Macrophages, one type of immune cells, almost reside in all tissues and are involved in every disease. They are functionally polarized into M1 and M2 macrophages when exposed to different stimulus. Identification of macrophage polarization will help to grasp their functions and dynamics in homeostasis and pathogenesis. Macrophage polarization is critically supported by metabolic shifts [1]. Briefly, M1 macrophages are characterized by enhanced glycolysis, whereas M2 macrophages are featured by enhanced oxidative phosphorylation (OXPHOS). Recent studies showed that immune cells can control the mitochondrial fission and fusion machinery to shape their metabolism and functions [2].

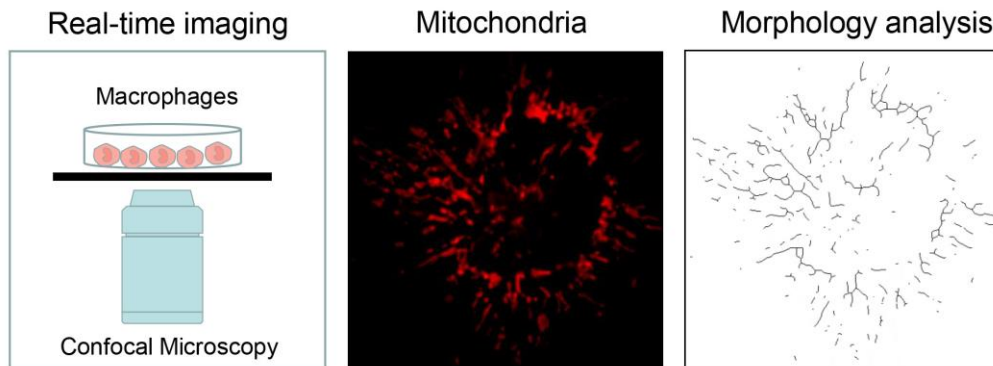


Figure 1: Mitochondrial morphology in MitoTracker labelled macrophages by confocal microscopy

Our work focusses on the comparable analysis of mitochondrial structure in polarized macrophages. Commercial MitoTracker dyes are used to label mitochondria in macrophages, and confocal microscopy is used to capture the mitochondrial dynamics (Figure 1).

We find that there are significant differences in the mitochondrial structure of polarized macrophages. These findings are consistent with the results from extracellular flux analysis. More details will be discussed in the presentation. Together, these advances might provide us with more information to decipher macrophage metabolism, and help to construct a novel way to promote or reverse macrophage polarization.

[1] Langston PK, Shibata M, Horng T. Metabolism Supports Macrophage Activation. *Front Immunol.* 2017; 8:61.

[2] Rambold AS, Pearce EL. Mitochondrial Dynamics at the Interface of Immune Cell Metabolism and Function. *Trends Immunol.* 2018; 39(1):6-18.