

# MTOC guides mitochondria to immune synapse via microtubule in cytotoxic T lymphocytes

## Mitochondria are passively transported to the immunological synapse along with microtubule network reorientation

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At the process of cytotoxic T lymphocytes (CTL) killing, it is required to form a tight junction between the CTL and the target cell, which is termed the immunological synapse (IS). Upon the IS formation, a fundamental reorientation of organelles, including microtubule-organizing center (MTOC), mitochondria, and lytic granules, takes place in the cytotoxic T lymphocytes [1]. To understand how the movements of organelles are orchestrated, we focus on the correlation of transportations between MTOC and mitochondria. We performed live cell imaging to visualize movements of MTOC and mitochondria during IS formation. We found that MTOC velocity increased significantly (from 1.4 to 2.7  $\mu\text{m}/\text{min}$ ) during IS formation compared to control. In addition, we also found that the speed of MTOC was dependent on the distance between MTOC and IS, which is in good agreement with previous study [2]. Meanwhile, our data showed that mitochondria accumulation displayed similar moving pattern as MTOC during IS formation. Furthermore, by labeling tubulin and mitochondria, we observed that mitochondria were translocated towards the IS along with microtubule-network. In summary, MTOC guides mitochondria to immune synapse via microtubule in cytotoxic T lymphocytes.

[1] Schwarz, E.C., B. Qu, and M. Hoth, *Biochim Biophys Acta*, (2013).

[2] Yi, J.S., et al., *Journal of Cell Biology*, (2013).