CDB SEMINAR

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16:00~17:00 A7F Seminar Room

Warburg-like metabolism regulates vertebrate somitogenesis

Summary

Vertebrate somitogenesis occurs by the elongation of the embryo from posterior region known as the tail bud and the periodic segmentation of the presomitic mesoderm (PSM) controlled by genetic signaling such as *Fgf*, *Wnt* and *Notch*. It is unknown whether metabolism also regulates this process. In this study, we examined metabolic activity during somitogenesis with metabolome and transcriptome analysis, and found dynamics of energy metabolism, posterior gradients of glycolysis and increase of mitochondira respiration activity during PSM differentiation. Using time-lapse imaging of developing chicken embryo, we found that glycolysis and respiration have different functions. Glycolysis inhibition blocks elongation but not segmentation, whereas respiration inhibition blocks segmentation but not elongation. Strikingly, metabolism in the tail bud shows several features of cancer cells, that we call "Warburg-like metabolic gradient", which allows embryo elongation in cooperation with Fgf and Wnt signaling. These results indicate that metabolism has key functions during development: not only energy and biomass production, but also embryo patterning by modulation of signaling pathways.

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