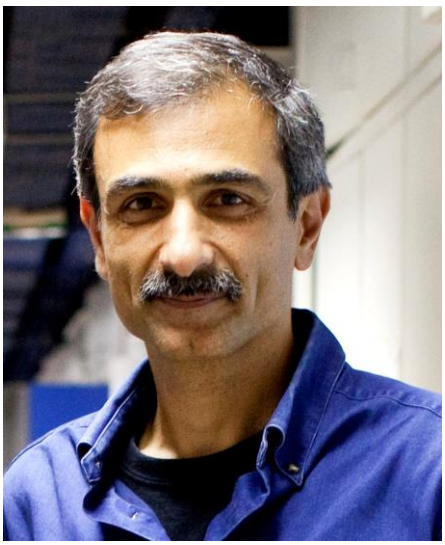
CDB Student Organized SEMINAR



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Monday, October 31, 2016

16:30~ C1F CDB Auditorium

Stem cell heterogeneity and function in development and regeneration

Abstract

Adult skeletal muscles can regenerate after repeated trauma, yet our understanding of how adult satellite cells restore muscle integrity and homeostasis after regeneration is limited. Studies in the last decades have pointed to diverse regulatory networks operating in different locations to establish skeletal muscles during development. We are investigating this underlying diversity to assess how adult stem cells emerge to maintain and reconstitute the tissue and the underlying nature of muscle stem cell heterogeneity.

In the adult mouse, satellite (stem) cells are quiescent and located between the basal lamina, and the myofibre. After injury, they re-enter the cell cycle, proliferate, differentiate and fuse to restore the damaged fibre. A subpopulation of myogenic cells then self-renews for future repair. When satellite cells are activated and leave their niche, they rapidly express the Myod protein and proliferate. We identified Notch/Rbpj as a major regulator of muscle stem cell quiescence. Compromised Rbpj function results in depletion of muscle stem cells from their niche. In addition, the multifunctional adaptor protein Numb that is involved in asymmetric cell divisions, has also been shown to act as an inhibitor of Notch activity in some systems, yet this does not appear to be the case in skeletal muscle.

To understand stem and committed cell interactions, we have used cell ablation strategies in the embryo and adult, and manipulated Notch signalling to assess lineage relationships of progenitor cell populations. These experiments are complemented by single cell analysis where extrinsic cues are modulated using micropattern technologies to manipulate cell fate outcomes.

Host: CDB Students Association (mase@cdb.riken.jp)