Seminar/Talk

Spatiotemporal organization of glucose metabolism and cell signalling in astrocytes

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Host: Martin Loose

Astrocytes are the most abundant cell type in human brain. One of their main functions is metabolic support of neurons, which they achieve despite having a very high metabolic turnover themselves. In recent years we have discovered new mechanisms of regulation and self organization of astrocytic glucose metabolism, which constitutes the main source of both astrocytic ATP and substrates provided to neurons.
Astrocytic glycogen, the cellular storage form of glucose, constitutes a highly dynamic molecule, serving as a source of metabolic energy as well as contributing to neurotransmitter synthesis. Our data suggests a new role for astrocytic glycogen, in energetically supporting ER Ca2+-homeostasis. Furthermore, our results indicate that the two astrocytic isoforms of the glycogen degrading enzyme glycogen phosphorylase are differentially regulated, facilitating a glycogenolytic response to distinct metabolic demands.
Glucose-6-Phosphatase (G6PC) is an ER luminal enzyme that in glucose-releasing cells catalyses the dephosphorylation of glucose-6-phosphate, allowing glucose to be released by the cell. G6PC3 is the ubiquitous isoform of G6PC, expressed throughout most cell types and tissues, yet its role in non glucose-releasing cells remains unknown. However, mutations in the G6PC3 gene cause severe congenital neutropenia and about half of the patients suffer from developmental brain defects. We have investigated the function of G6PC3 in astrocytes, using both human cells and rodent tissue. Our results suggest a previously unknown pathway for astrocytic glucose metabolism.

Monday, May 29, 2017 10:30am - 11:30am
Mondi Seminar Room 3, Central Building

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