P024 Imaging iron influx and iron-induced toxicity in neurons and astrocytes

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Iron is essential for many cellular functions, but a derangement of its homeostasis is toxic and may contribute to neurodegeneration. By combining videomicroscopy approaches (calcium imaging and Total Internal Reflection Microscopy), we investigated the effects of intracellular iron misregulation in cultured primary neurons and astrocytes, as well as the mechanisms of iron-induced toxicity. We set up a protocol to monitor at the single cell level, by fluorescent probes, ionophore-mediated iron entry and iron oxidative status, ROS formation and cell death. In hippocampal neurons and astrocytes we found a different sensitivity to acute iron overload, which inversely correlates with glutathione content. By employing our experimental set up we also studied the effects of iron influx in the absence of the ionophore, i.e. under physiological conditions. We are currently investigating the mechanisms that mediate iron influx, with particular attention to the involvement of the divalent metal transporter 1 (DMT1). We are also evaluating the role of high calcium elevation (i.e. upon depolarization or NMDA receptor stimulation) in modulating iron entry and ensuing neuronal toxicity.