

BBB seminar (BMED380)



Thursday, October 19. 14:30 at the BBB, Auditorium 4

The deep evolutionary origin(s) of neurons and nervous systems

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The evolutionary origin of nervous systems remains a fundamental question in biology. A hallmark of nervous systems is that they are composed of discrete cells (neurons) that communicate through synapses. Marine organisms, with and without nervous systems, play a key role in comparative studies into the evolutionary origin(s) of neurons and their connections. The major components of synapses and neurons evolved prior to the emergence of the first neurons and can be found in our single celled ancestors. I will present our latest findings on fast calcium signaling in a neuron-less organism and thus provide exciting insights into the origin of first neuronal circuits. Moreover, our studies on ctenophores, sister group to all animals with nervous systems and marine predators living right outside in the fjords around Bergen, offer an alternative perspective on the evolution of neuronal networks and neurotransmission. We have established neuronal circuits that facilitate ctenophore behavior, and used high-resolution three-dimensional electron microscopy to reveal that nerve-net neurons are not separate entities, but rather are interconnected through continuous neurite plasma membranes without evidence of synapses. Our findings suggest fundamental differences of nerve net architectures between ctenophores and cnidarians or bilaterians and offer a new perspective on neural network organization and neurotransmission.

Chairperson: Nils Halberg <nils.halberg@uib.no>, Dept. of Biomedicine