Institute of Science and Technology Austria

SLAM Seminar

# Cellular communication by means of electricity


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Cells rely on signalling pathways to transduce signals from the environment to the inside of the cell, generating behaviour and facilitating communication with their neighbours. The activity of signalling pathways — and consequently communication— is normally modulated through ligand binding. The phenomenon of communication by electrical signals is a well-known hallmark of neuronal function and has until recently been largely overlooked in non-neuronal cells. However, the growing body of evidence demonstrates that the electrical potential at the plasma membrane (Vmem) plays an important role in the function of the cell. There are intrinsic differences in the Vmem between different cell types, and its changes modulate the activity of the signalling pathways.

In this talk, we will delve into the mechanisms of intra- and inter-cellular communication by means of electrical signals, in particular the potential differences between healthy and cancerous cells. Using pairs of isogenic cell lines, optogenetic and chemical tools, we measure, manipulate and quantify the electrical potential at the plasma membrane. Simultaneously, we track the activity of ERK, one of the most important signalling pathways and a key player in the development of cancer, and quantify the impact of Vmem modulation on its activity. Finally, we simulate the in-vivo setting by performing the measurements on the co-culture of healthy and cancer cells, and attempt to gain the first insights on cell-to-cell communication through the coupling of electrical signals and ERK activity in a mixed epithelium.

**Thursday, May 11, 2022 11:00 - 12:00**

Big Seminar Room B (big) I23.EG / Sunstone Building

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