Contribution ID : **44** Type : **not specified**

Hands-on activities

Tuesday, 16 September 2025 11:00 (6:30)

Content

Hands-on C The role of mechanical forces in inhibiting cancer cell proliferation in the heart. Serena Zacchigna (ICGEB) Both primary and secondary cardiac cancer are extremely rare. While the low incidence of primary tumors is expected, due to the low proliferation rate of cardiomyocytes, the low incidence of metastasis is enigmatic, considering that the heart is highly vascularized and blood constantly flows through it. We recently demonstrated that cancer cells ectopically implanted into the heart grow less than in any other organ. However, the mechanisms that inhibit cancer cell proliferation in the heart remain elusive. Mechanical forces operating in a beating heart have been proposed to blunt the proliferative potential of cardiomyocytes. We hypothesized that the same forces inhibit cancer cell proliferation in the heart. Consistently, our preliminary data indicate that cancer cells grow massively in mechanically unloaded hearts. In this experiment, cancer cells and primary health fibroblasts will be mechanically stimulated using a custom device able to stretch cells in 3D, to mimic a beating heart, at multiple pressures and frequencies, followed by quantification of cancer cell apoptosis and proliferation. We would like to generate a model to infer the best combination of pressure and frequency to use in order to reduce proliferation and induce apoptosis in cancer cells, while minimally affecting the behavior of healthy cells.

Hands-on D Image-based analysis of drug-induced cell competition dynamics Luca Braga, Giannino del Sal (ICGEB) Cell competition is increasingly recognized as a critical mechanism shaping tissue homeostasis, tumor evolution, and therapeutic response. In the context of cancer, pharmacological pressure can shift the balance between competing cell populations, selectively promoting survival or elimination based on genotype-specific vulnerabilities. Participants will be introduced to the principles and basic techniques of cell-based high-throughput functional screenings. These approaches will be applied to explore how different drugs modulate cell competition dynamics using fluorescence-based quantitative imaging. Participants will quantitatively analyze the interaction between two genetically distinct cell populations exposed to a panel of small molecules, focusing on how drug-induced shifts in proliferation or survival drive clonal dominance. By integrating time-lapse imaging with endpoint assays, the course aims to build a framework for interpreting competitive interactions as a functional and measurable readout of drug responsiveness. The program combines theoretical modules with hands-on activities in imaging, quantification, and data interpretation. Attendees will gain insights into how image-based approaches can be leveraged to investigate cell behavior in complex, heterogeneous systems.

Summary

Session Classification : notitle