

Università degli Studi di Trieste

Dipartimento di Fisica

Seminario

Marco Lazzarino

CNR-IOM Area science Park, Basovizza, TRIESTE

May 5, 4.00 PM - Lecture room A, F building, Dip. di Fisica – via Valerio 2 – Trieste

Mechano-biology: the force awakens.



The transformation of a single fertilized egg into a complex animal is a marvel and a mystery. For decades our attention was focused on the molecular mechanisms that regulate the embryo development as well as any other known process in life. But that was not enough. When gazing at the stages from embryo to adult, it is clear that many physical processes such as cell migrations, compressions, extensions, and intercalation are at play. What generates and regulates the forces that drive that marvelous organization that is a living being?

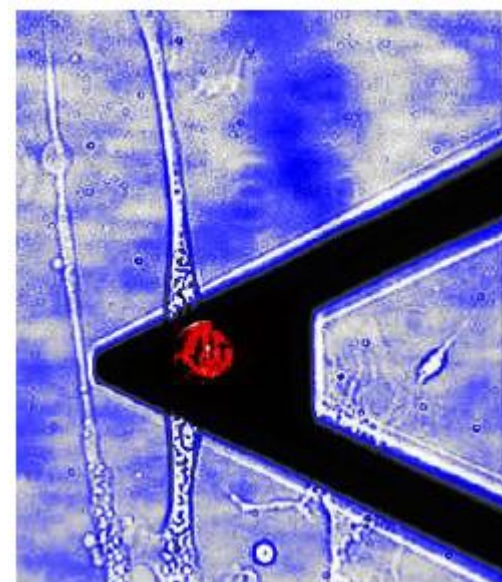
We live in a world dominated by mechanical forces, and we adapted so well that we do not feel them: we do not realize how strong atmospheric pressure and gravity are; but our cells do. Indeed, after a couple of weeks at zero gravity, the bones of astronauts change dramatically their structure. Nonetheless the role

played by mechanical forces in biology was for long time neglected.

In recent year the role played by mechanical forces at different levels received, finally, a proper attention, and mechanobiology, the discipline that studies the principle in sensing and generation of physical force in biology, was born.

Thus it was found that cancer cells decrease their stiffness in order to migrate through the thinnest blood vessels to reach their final destination where they recover the high rigidity of metastatic cells. Stem cells sense the elasticity of the environment in which they grow so that they can differentiate in the proper way. Neurons organize their membrane in order to tune the sense of touch at the right balance between insensitivity and pain.

In my talk I will review the basic concepts of mechanobiology with the help of selected examples taken from recent literature and our activities here in Trieste.



Organizzazione a cura di: E. Milotti, E. Vesselli

dipartimento di
TRIESTE **fisica**



UNIVERSITÀ
DEGLI STUDI DI TRIESTE



Everyone interested in the topic is welcome to attend

Informazioni: seminari@ts.infn.it