



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DIPARTIMENTO
DI FARMACIA
E BIOTECNOLOGIE

AVVISO DI SEMINARIO

Il giorno **28 Febbraio 2025**
alle ore **14:00**

Prof. Sanjay Kumar

UC Berkeley Professor and Director of the California Institute of Quantitative
Bioscience at Berkeley
(ospite del nostro Dipartimento)

terrà un seminario in lingua inglese dal titolo:

Regulation of stem cell neurogenesis by the mechanical microenvironment

Area tematica:
Neuroscience, Biophysics

in presenza:

Aula Magna Navile, UE1, Via della Beverara 123/1, Bologna

Collegli e studenti sono cordialmente invitati

ABSTRACT

The self-renewal and differentiation of many stem cells are regulated by biophysical signals encoded in the tissue microenvironment, including the structure and mechanics of the extracellular matrix (ECM). I will discuss our ongoing efforts to understand and control mechanobiological regulation of stem cell lineage commitment, focusing on adult hippocampal neural stem cells as a model system. For example, we have recently shown that the transcription factor and immediate-early gene *Egr1* is a critical regulator of mechanosensitive lineage commitment in three-dimensional ECMs. We have also leveraged DNA nanotechnology to create tunable two- and three-dimensional viscoelastic matrices, which has yielded surprising relationships between ECM viscous (stress-relaxation) properties, intracellular signaling dynamics, and lineage commitment.

BIOGRAPHICAL SKETCH

Sanjay Kumar is the Chancellor's Professor and Director, California Institute for Quantitative Biosciences at UC Berkeley (QB3-Berkeley). The Kumar Lab research team seeks to understand and control biophysical communication between cells and their surroundings. A large portion of their work involves the integration of biomaterials science, single-cell technologies, and advanced imaging to dissect molecular mechanisms through which cells sense, process, generate, and respond to mechanical forces. In addition to investigating fundamental aspects of this problem, they are especially interested in applying their insights to control tumor and stem cell biology, particularly in the central nervous system. For example, they have developed materials to control neurogenesis and deliver stem cells to tissue, and they have created new technological platforms to model the invasion of brain tumors, which may in turn be used to discover new therapies.