

COMPUTATIONAL MODELLING AND EXPERIMENTS OF CELLULAR SYSTEMS: FROM SUBCELLULAR SCALE TO COLLECTIVE CELL RESPONSE

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Diverse mathematical modelling and simulation methods are being applied to understand the complex behaviour of individual and collective cells in multiple biological processes. This complexity mainly resides in the hierarchical and adaptive structures that biological tissues present from the macroscale (organs, tissues) to the microscale (cells), to the subcellular scale (cytoskeleton components), to the nanoscale (individual proteins). Therefore, the development of adequate mathematical models to simulate this complexity is also a challenge from a computational point of view, involving multiphysics and multiscale analysis, providing novel and original computational strategies.

This mini symposium aims to provide an overview of the state-of-the-art for modelling cell behaviour in order to advance in the new understanding of the role of mechanical factors in biology at different scale levels: tissue – cell - molecules. For this purpose, we aim to bring together engineers, mathematicians and biologists that can use mathematical models as a potential tool to investigate how the microenvironmental conditions can regulate individual and collective cell behaviour at different scales.