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523 Multiphysics Modeling of Cells and Tissues

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Mechanics plays a key role in a number of biological processes in cells and tissues. For example, cell division, embryogenesis, wound healing, cell migration or morphological adaptation to different types of stimuli are tightly related to mechanical and chemical forces. Apart from a large number of experimental proofs of the mechanical and biological regulation in cells and tissues, a large amount of mathematical theories and numerical models have appeared to provide a mechanical rationale to the experimental observations.

The goal of this minisymposium is to foster a vibrant discussion on the theoretical and numerical modelling of the multiple forces acting on cells and tissues. The situation in which forces modify the cells and tissues response covers from physiological conditions (e.g. in embryogenesis) to pathologies. We aim to discuss among other topics:

- Tumor progression.
- Cell migration.
- Morphogenesis and embryogenesis.
- Mechanical characterisation and reorganisation of cells and tissues.
- Electrophysiology of neurons.
- Wound healing.

We aim to bring together researchers interested in the multiphysical aspects of cells and tissues in physiology and disease. In terms of the methodology and the background field of the analysis, we aim to attract the attention of mathematicians, biophysicist and engineers that use theoretical and numerical methods to tackle the biophysical modeling of cells and tissue. Diverse numerical methods to investigate these biological problems are welcome:

- Particle and mesh-less methods.
- Vertex models.
- Finite element methods and coupled electro-chemo-mechanical versions.
- Phase field models.
- Inverse methods for force inference (traction and stress microscopy).