SELF-ORGANIZATION IN TISSUES: ACTIVE NEMATIC MATERIALS

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Shaping of tissues determined by the long-term multicellular dynamics. Accumulating experimental evidences show that complex dynamics modes across different cell types are well captured by the theory of hydrodynamic active gels. In our recent papers (Nature Physics 2018, Physical Review Letters 2018) [1, 2] we have shown an existence of different nemato-dynamic modes and estimated multicellular physical properties (e.g. activity, viscosity, friction, Frank elastic constant). I will present spontaneous emergence of collective shear flows in confined environments and mesoscale activity driven turbulence. I will discuss the mechanism behind these phenomena and their effect on cell organization and function.
