

Mechanobiology: a rapidly growing field with forceful implications

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Mechanobiology is a rapidly growing field which explores the underpinning mechanisms by which mechanical forces and other physical factors can tune a large diversity of functions, from those of single molecules to the nuclear functions of cells, all the way to the tissue level. Forces are thereby emerging as an additional dimension of functional regulation, as they play central roles in tissue growth and regenerative processes, but also if misbalanced, in the onset and progression of various diseases. Macrophage biology has been at the centre stage of immunology and in clinical research, and more recently in regenerative medicine and bioengineering to learn how to improve on tissue healing processes. Far less is known though about the mechanobiology of macrophages and how to perhaps use physical factors to regulate their epigenetic profiles and functional outputs. Also major transformations of extracellular matrix (ECM) composition, architecture as well as of its mechanical properties accompany inflammatory diseases, including musculoskeletal diseases. Novel insights into the mechanobiology of pro-inflammatory macrophages and the ECM mechanobiology at the cell and tissue level will be discussed.