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Molecular Mechanoimmunology

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Abstract: The immune response is orchestrated by a variety of immune cells. The function of each cell is determined by the collective signals from various immunoreceptors whose expression and activity depend on the developmental stages of the cell and its environmental context. Recent studies have highlighted the presence of mechanical forces on specific immunoreceptor–ligand bonds, which are transmitted across the cell membrane, potentially inducing mechanotransduction. As mechanobiology intersects with immunology, the interest to explore how immune cells sense, respond and adapt to their mechanical environment is rapidly growing. In this talk, I will review recent advances in the emerging field of mechanoimmunology, using the T cell antigen receptor as a prototypical immunoreceptor. We will discuss the types of forces that immunoreceptors may encounter, the effects of force on ligand bonding, conformational changes and mechanosensing mechanisms, as well as the effects of force on the downstream signal transduction, cell-fate decisions and effector function of immune cells.

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