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Corrigendum to "Unraveling the mechanobiology of immune cells" [Curr Opin Biotechnol 66 (2020) 236-245]

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Corrigendum

Corrigendum to "Unraveling the mechanobiology of immune cells" [Curr Opin Biotechnol 66 (2020) 236-245]☆

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Table 1

Engineer biophysical factors to modulate immune cells.

Biophysical factors	Cell Types	Application Summary	Ref.
Cell mechanotyping	All	Single-cell mechanotyping enables the characterization of diverse sets of specialized immune cells such as peripheral blood mononuclear cells (PBMCs) and stress-induced macrophages.	[15,46,61]
ECM Stiffness	Macrophage	Human macrophages exhibit a wound healing phenotype on stiffer 3D fibrillar native matrices – collagen I, glycosaminoglycans (GAGs)	[62]
	Macrophage	Compared to unmodified fibrin gel, photoinitiated dityrosine-crosslinked fibrin gel increases cell spreading and motility and enhances inflammatory activation.	[49]
	T lymphocyte	Protein-coated beads made from a soft elastomer - polydimethylsiloxane (PDMS) enhance T cell expansion.	[50]
	T lymphocyte	0.5 kPa – 100 kPa poly-acrylamide hydrogels: stiffer gel increases cytokine production, T cell metabolism and cell cycle progression.	[51]
	T lymphocyte	4kPa – 40 kPa RGD-modified alginate hydrogel: stiffer gel augments T-cell activation as compared to the softer material or 2D culture.	[39]
	T lymphocyte	An artificial T-cell stimulating matrix is engineered using hyaluronic acid-based hydrogel with optimized combination of the ECM environment and conjugated stimulatory signals for antigen-specific CD8 + T cell activation ex vivo.	[53]
Oscillatory forces	Macrophage	Cyclic mechanical compression achieved by biphasic ferrogels reduces fibrosis, M1 macrophage presence and inflammation in severe skeletal muscle injuries.	[55]
	T lymphocyte	Compared to static culture, an oscillatory mechanoenvironment doubles antigenic signal strength for $CD8^+$ T cell expansion.	[41]
Squeezing	T lymphocyte	Squeezing cells through a microfluidic device mechanically disrupts cell membrane for drug delivery and results in minimal aberrant transcriptional responses.	[54]
Microstructure Confinement	Macrophage	Spatial confinement downsizes the inflammatory response of macrophages.	[20]
	Macrophage	Gelatin-based gels with smaller (30 μm) and softer (20 kPa) pores induce proinflammatory macrophages, while larger (80 μm) and stiffer pores (190 kPa) induce anti-inflammatory macrophages.	[52]
Ligand Presentation	Macrophage	Fibrin matrices induce anti-inflammatory macrophages, but the soluble precursor fibrinogen stimulates inflammatory responses. Presence of both abrogate inflammation.	[58]
	T lymphocyte	Mesoporous silica micro-rods wrapped in lipid bilayers to present membrane-bounded T cell activation and co-stimulation signals.	[56,57]
	T lymphocyte	Stimulatory signals conjugated to the engineered matrix can successfully activate $CD8^+$ T cell, whereas soluble signals have much less effects.	[53]
Mechanogenetics	T lymphocyte	By engineering the genetic circuits with a mechanosensor Piezo1 ion channel, T cells are modified to be remotely activated by the mechanical perturbance from ultrasound waves and transduce into transcriptional activation for CAR expression.	[59]
	T lymphocyte	CAR responsiveness to soluble ligands can be fine-tuned by adjusting the mechanical coupling between the CAR's ligand-binding and signaling domains	[60]

The authors regret that a few references were incorrectly cited in Table 1. Reference [51] under "ECM Stiffness" should be replaced with [49]. [49] should be replaced with [50]. [50] should be replaced with [51]. [23] should be replaced with [20]. [51] under "Microstructure Confinement" should be replaced with [52]. The authors would like to apologise for any inconvenience caused.