

Webinar

Mechano-Immunology of Macrophage Activation and Human Inflammaging

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Despite the fundamental physiological role of inflammation as a defence mechanism against infections or tissue injury, when inflammation becomes sustained and prolonged it is detrimental to health and leads to tissue degeneration. This phenomenon when it occurs in older people is called ‘inflammaging’ and is attributed in part to chronic macrophage inflammatory activation. The field of biogerontology has paid little attention to the emergent field of mechanobiology – how changes in the biophysical properties of the microenvironment can affect macrophage phenotype and activation. To address this, we have shown that externally applied physical forces can regulate macrophage activation via changes in gene expression, which are coupled with altered nuclear morphology and temporally regulated by mechanomodulating chromatin compaction, epigenetic alterations and transcription factor complex activity. Altogether, our ongoing study provides new multidisciplinary strategies to conduct advanced research into macrophage activation, human ageing and inflammaging, based on the emerging field of mechanobiology.

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