Supplementary Information

Machine Learning-Based Label-Free Macrophage Phenotyping in Immune-Material Interactions

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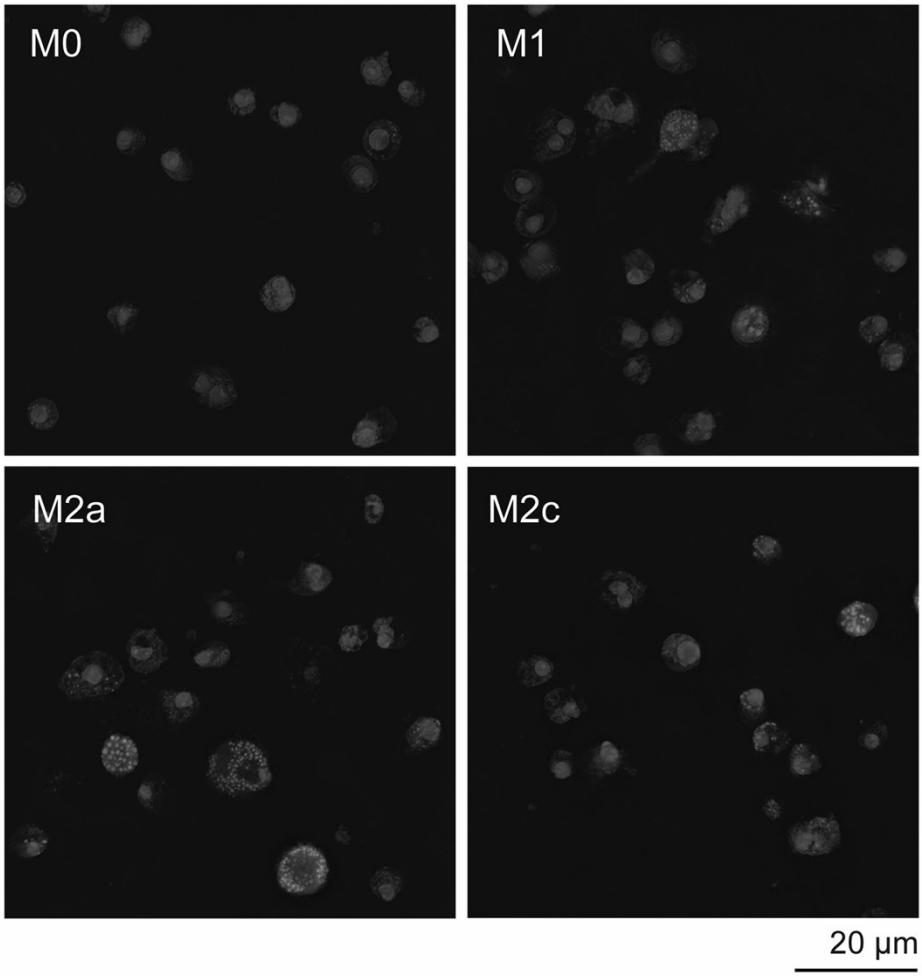
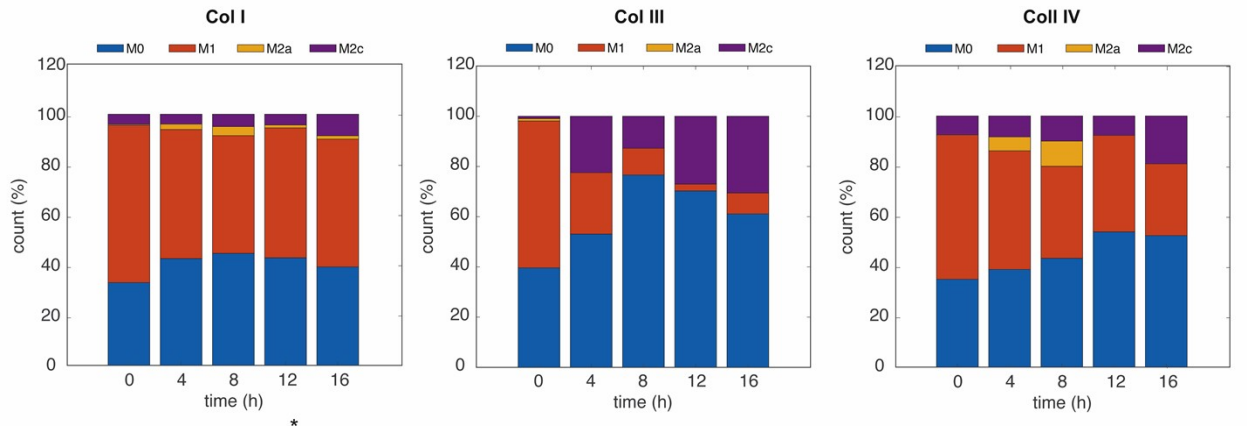
Supplementary Table 1: Antibodies used in the study. All antibodies were purchased from Biolegend.

Marker	Color/Format	Host/Target	Isotype	Clone	Catalog Nr.
CD105	Alexa Fluor 647	Mouse anti-Human	IgG1 κ	43A3	323212
CD163	PE-Cy7	Mouse anti-Human	IgG1 κ	GHI/61	333614
CD206	Brilliant Violet 510	Mouse anti-Human	IgG1 κ	15-2	321138
HLA-DR	Alexa Fluor 488	Mouse anti-Human	IgG2a κ	L243	307656



Supplementary Figure S1. Representative QPI overview images of macrophage phenotypes. Quantitative phase images showing macrophages in four distinct phenotypic states: M0, M1, M2a, and M2c. Each image captures a broader field of view, illustrating the larger number of cells included in the analysis. Scale bar: 20 µm.



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Supplementary Figure S2: Dynamic analysis of macrophage phenotype adaptation on different collagen substrates over time. Dynamic analysis of macrophage phenotype adaptation on different collagen substrates over time. Stacked bar plots represent the relative proportions of macrophage phenotypes (M0 – Blue, M1 – Orange, M2a – Yellow, M2c – Purple) at different time points (0, 4, 8, 12, and 16 hours) on **(A)** Col I, **(B)** Col III, and **(C)** Col IV. The distribution of phenotypes varies depending on the collagen type, highlighting the influence of extracellular matrix composition on macrophage polarization dynamics.