Supplementary Information (SI) for Lab on a Chip.

A microfluidic skin-on-a-chip enabling *in situ* construction of full-thickness human skin for modeling inflammatory disease

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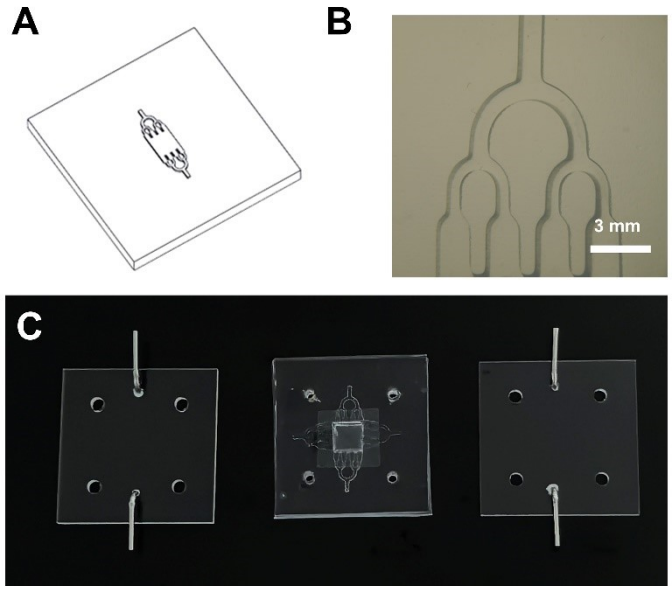

Fig.S1 (A) Design of the 3D-printed mold used for PDMS replica molding. (B) Optical image of the PDMS microstructured layer replicated from the mold after curing. (C) Photographs of the individual components of the microfluidic skin-on-a-chip device.

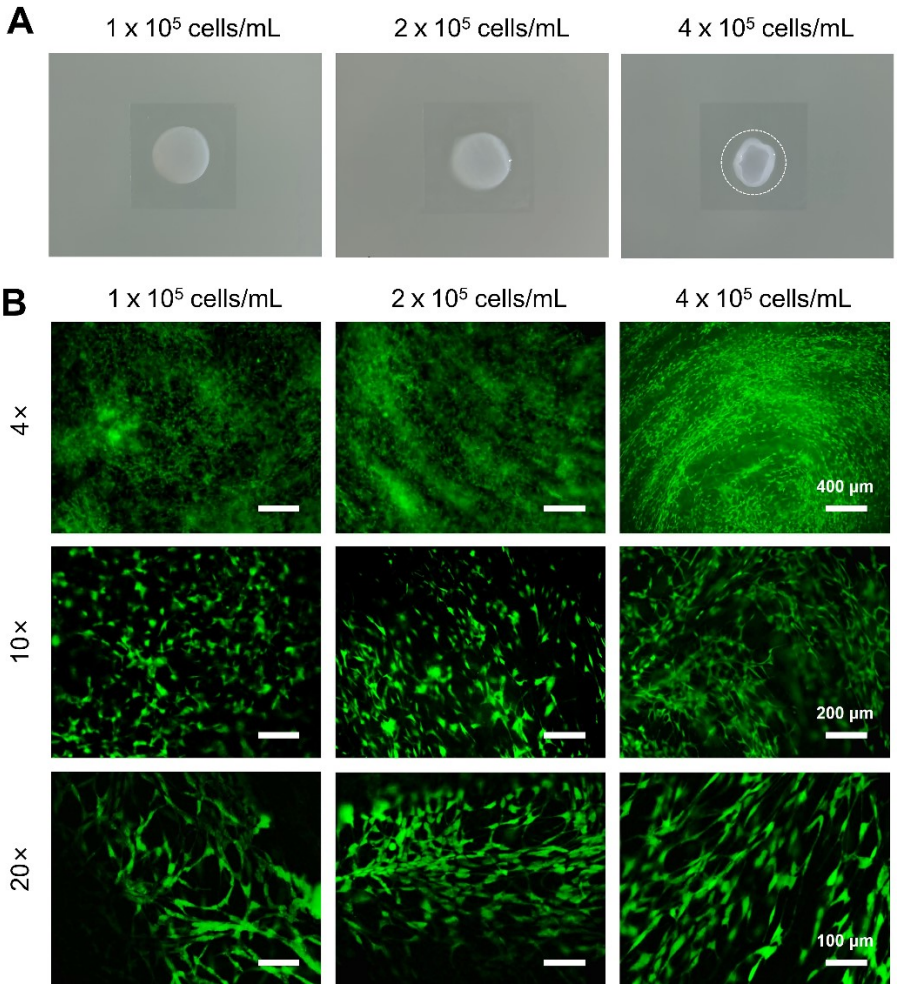

Fig.S2 (A) Morphology of collagen matrices at varying NIH/3T3 cell seeding densities. (B) Cell viability and spatial distribution of NIH/3T3 cells within the matrices.

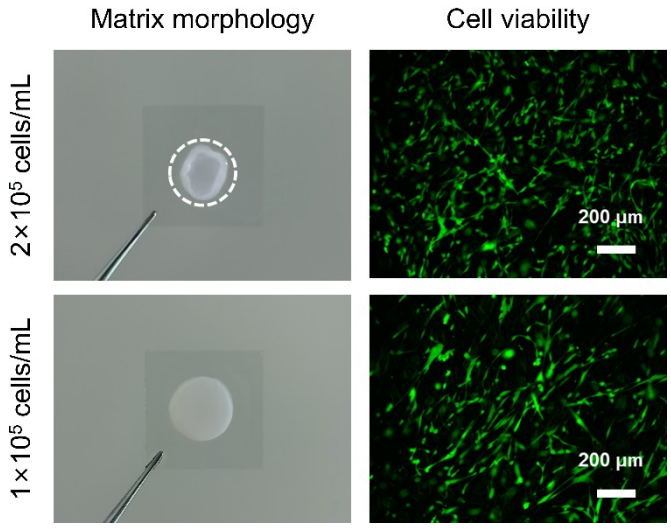

Fig.S3 Morphology of collagen matrices encapsulating HDFs at different seeding densities in Transwell system, together with cell viability and spatial distribution within the matrices.

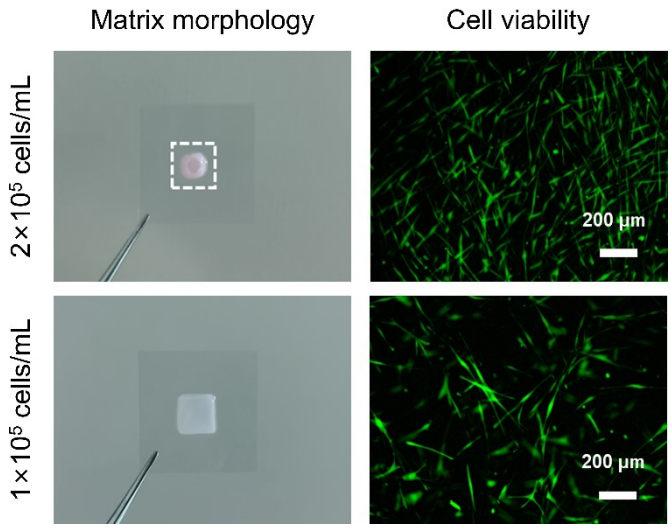

Fig. S4 Morphology of collagen matrices encapsulating HDFs at different seeding densities in a microfluidic chip, together with cell viability and spatial distribution within the matrices.

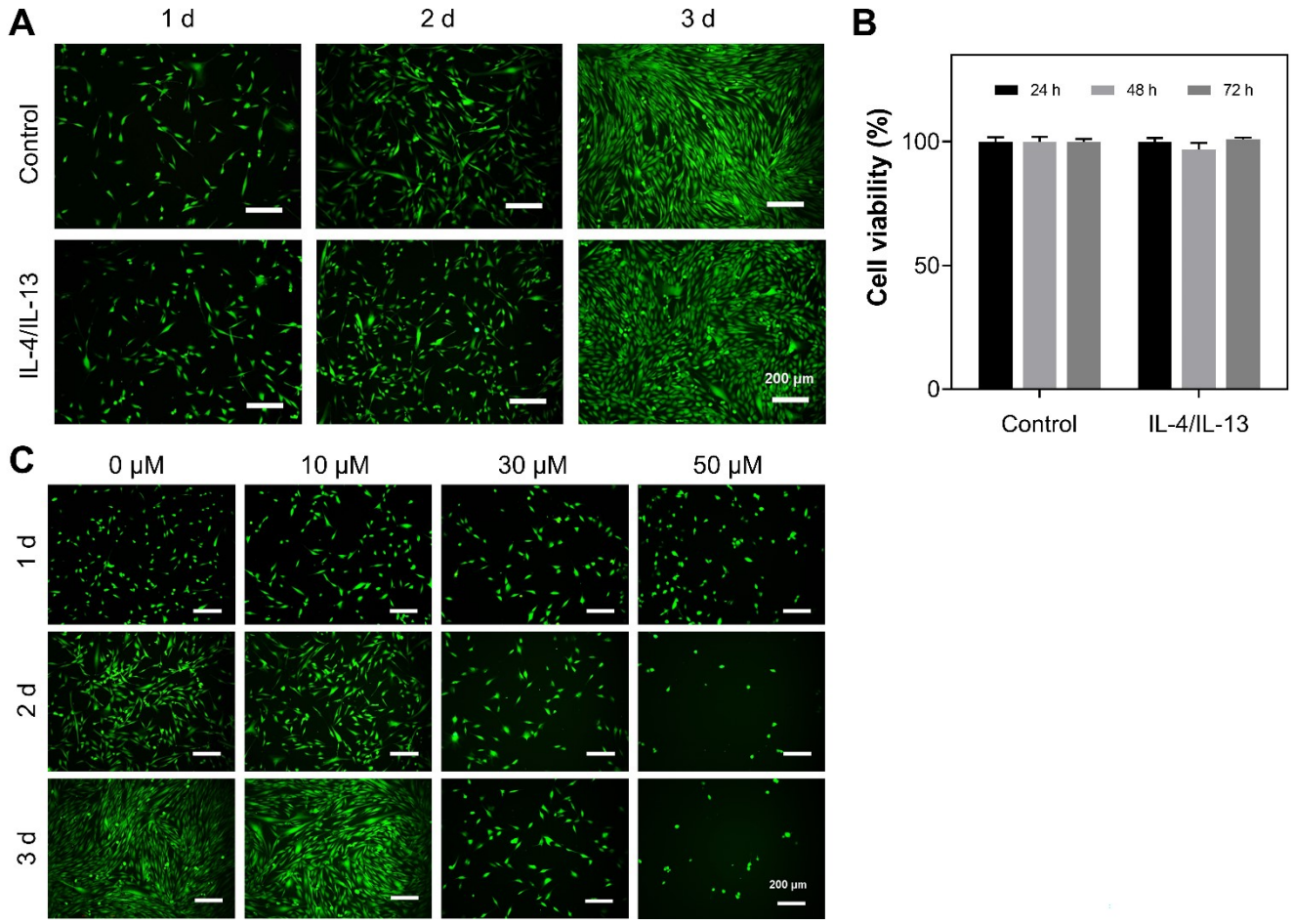

Fig. S5 (A) FDA/PI live–dead fluorescence imaging of HDFs after IL-4/IL-13 co-stimulation for different durations. (B) Viability of HDFs after IL-4/IL-13 co-stimulation for varying durations, measured by CCK-8 assay. (C) FDA/PI fluorescence imaging of HDF viability after treatment with different concentrations of curcumin.

Table S1 UV-curing 3D printing parameters.

Parameter	Value
Layer thickness / mm	0.1
Normal exposure time / s	2
Light-off delay time / s	0.5
Number of bottom layers	3
Z-axis lift height / mm	3
Z-axis lift speed / mm/s	20
Z-axis retract speed / mm/s	20

Table S2 Composition of keratinocyte differentiation medium.

Ingredient	Final concentration	Ingredient	Final concentration
DMEM:Ham'F-12	3:1	L-ascorbic acid	50 μg/mL
Triiodothyronine	2×10^{-9} M	Calcium chloride	1.2 mM
Transferrin	5.5 μg/ml	FBS	10%
Insulin	10 μg/mL	EGF	10 ng/mL
Selenium	6.7 ng/mL	Adenine	0.18 mM
Hydrocortisone	0.4 μg/mL	Penicillin-streptomycin	1%

Table S3 The primer sequence designed for qRT-PCR detection

Name	Sequences（5’–3’）
β-actin-F	GGCACCCAGCACAATGAA
β-actin-R	CTAAGTCATAGTCCGCCTAGAAGCA
FLG-F	GCACTCGTCATGCAGAGACTT
FLG-R	GACCCTCGGTTTCCACTGT
IL6-F	AAATTCGGTACATCCTCGACGGCA
IL6-R	AGTGCCTCTTTGCTGCTTTCACAC
CA2-F	ATCGACACTCATACAGCCAAGT
CA2-R	AAAGCATGACCATTGTTGAGGA