Supplementary Information

Alginate-lavender nanofibers with antibacterial and anti-inflammatory activity to effectively promote burn healing

Hadi Hajiali [*,a,b], *Maria Summa* [c], *Debora Russo* [c], *Andrea Armirotti* [c], *Virgilio Brunetti* [d], *Rosalia Bertorelli* [c], *Athanassia Athanassiou*[*,a], *Elisa Mele*[*,a,e]

[a] Smart Materials, Istituto Italiano di Tecnologia, via Morego 30, 16163 Genoa, Italy.

[b] DIBRIS, University of Genoa, via Opera Pia 13, 16145, Genoa, Italy.

[c] PharmaChemistry, Drug Discovery and Development, Istituto Italiano di Tecnologia, Via Morego 30, 16163, Genoa, Italy.

[d] Center for Biomolecular Nanotechnologies, Istituto Italiano di Tecnologia @UniLe, Via Barsanti, 73010 Arnesano, Lecce, Italy

* Corresponding authors:

Hadi.Hajiali@iit.it

Athanassia.Athanassiou@iit.it

E.Mele2@lboro.ac.uk

[e] Current Address: Department of Materials, Loughborough University, Loughborough, LE11 3TU, United Kingdom

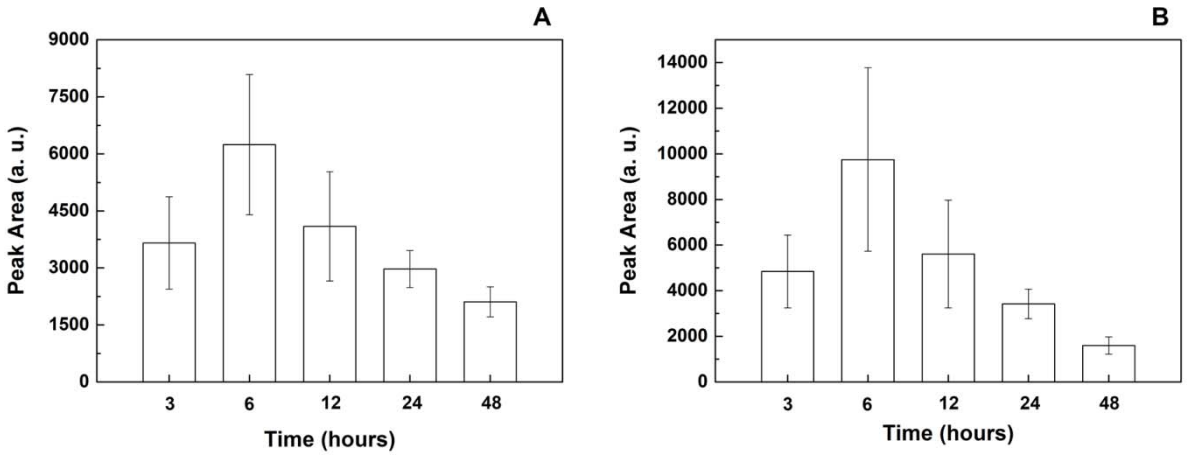

Figure S1. Release profile of caryophillene (A) and caryophillene oxide (B) from SA-PEO/LO nanofibers at 3, 6, 12, 24, and 48 hours.

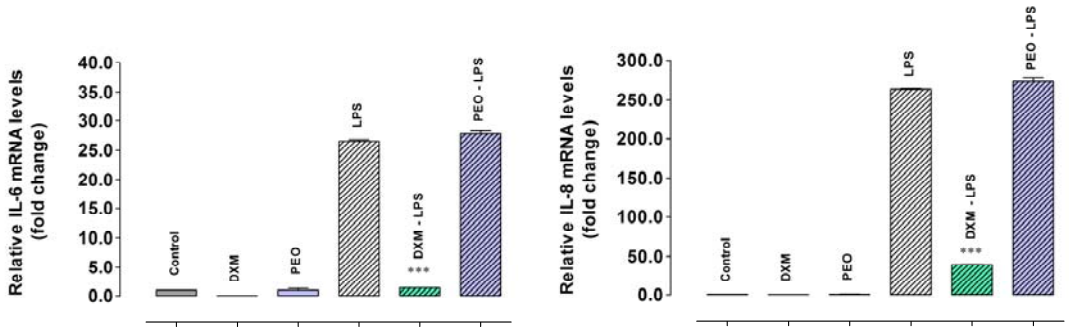

Figure S2. Histograms showing the mean values of mRNA levels of IL-6 and IL-8 for HFF-1 cells treated with pure PEO nanofibers. The first 3 bars in each panel are the control samples. Data are expressed as average ± S.E.M. (*** $p<0.001$ vs. LPS group). The graphs are representative of three independent experiments, each performed in three technical replicates.

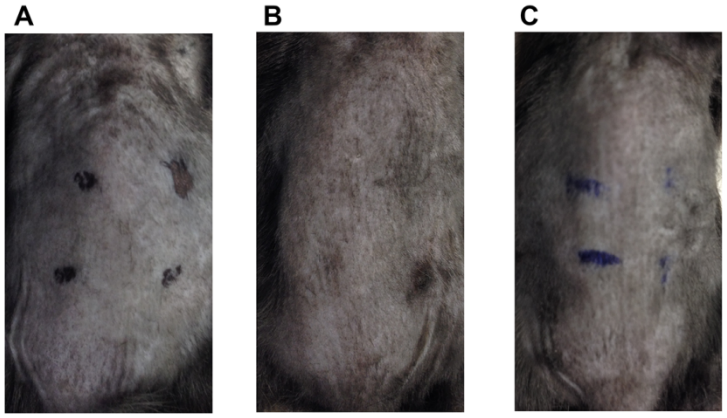

Figure S3: Representative photographs of the skin of mice immediately after the UVB exposure (0 h): untreated (A), and before the treatment with the alginate-based dressings without (B) and with lavender oil (C).

Table S1: *In-vivo* experiments on the expression of IL-6 for animals treated without any cutaneous treatment, SA-PEO and SA-PEO/LO nanofibers, and Tegaderm dressing after 6, 24, 32, 48, and 96 hours from the UVB burn. Data are expressed as mean ± S.E.M. *** $p <$ 0.001 vs. UVB irradiated group

	IL-6(pg/mg protein)			
Time point (hour)	**UV-B / No dressing**	**UV-B / SA-PEO nanofibers**	**UV-B / SA-PEO/LO nanofibers**	**UV-B / Tegaderm dressing**
6	41.3 ± 4.4	50.8 ± 10.4	22.7 ± 4.1	82.5 ± 7.6
24	118.2 ± 27.1	45.3 ± 4.8	39.8 ± 6.3	55.8 ± 5.6
32	194.0 ± 42.7	19.6 ± 3.9	29.6 ± 5.3	52.1 ± 7.3
48	714.3 ± 81.2	121.0 ± 30.9***	99.5 ± 7.5***	77.1 ± 4.1***
96	94.4 ± 45.5	37.7 ± 4.9	30.4 ± 4.6	46.3 ± 10.0

Table S2: *In-vivo* experiments on the expression of IL-1β for animals treated without any cutaneous treatment, SA-PEO and SA-PEO/LO nanofibers, and Tegaderm dressing after 6, 24, 32, 48, and 96 hours from the UVB burn. Data are expressed as mean ± S.E.M. * $p < 0.05$; ** $p < 0.01$ and *** $p < 0.001$ vs. UVB irradiated group

	IL-1β(pg/mg protein)			
Time point (hour)	**UV-B / No dressing**	**UV-B / SA-PEO nanofibers**	**UV-B / SA-PEO/LO nanofibers**	**UV-B / Tegaderm dressing**
6	9.6 ± 4.4	22.6 ± 10.4	12.8 ± 5.1	72.0 ± 8.7
24	104.1 ± 39.4	10.8 ± 7.1**	22.4 ± 10.9*	50.3 ± 23.6*
32	109.0 ± 10.5	18.1 ± 9.2**	27.6 ± 11.4**	87.1 ± 15.4
48	461.6 ± 54.1	26.8 ± 13.6***	18.6 ± 10.1***	79.8 ± 16.7***
96	87.6 ± 28.8	7.4 ± 3.2**	24.9 ± 10.6*	38.9 ± 18.9

Table S3: *In-vivo* experiments on the expression of TNF-α for animals treated without any cutaneous treatment, SA-PEO and SA-PEO/LO nanofibers, and Tegaderm dressing after 6, 24, 32, 48, and 96 hours from the UVB burn. Data are expressed as mean ± S.E.M. *** $p < 0.001$ vs. UVB irradiated group

	TNF-α(pg/mg protein)			
Time point (hour)	**UV-B / No dressing**	**UV-B / SA-PEO nanofibers**	**UV-B / SA-PEO/LO nanofibers**	**UV-B / Tegaderm dressing**
6	1.5 ± 0.2	0.8 ± 0.1	0.8 ± 0.3	1.6 ± 0.3
24	33.7 ± 14.8	4.4 ± 2.5	10.1 ± 4.3	0.6 ± 0.3
32	3.2 ± 1.1	0.4 ± 0.1	2.1 ± 1.0	3.0 ± 0.4
48	113.4 ± 35.3	5.8 ± 4.9***	7.6 ± 3.1***	2.3 ± 0.6***
96	7.1 ± 2.0	2.7 ± 0.7	5.8 ± 1.0	5.7 ± 1.5