

Supplementary Information

Enhancement of extracellular matrix proteins on retinoic acid loaded electrospun scaffolds

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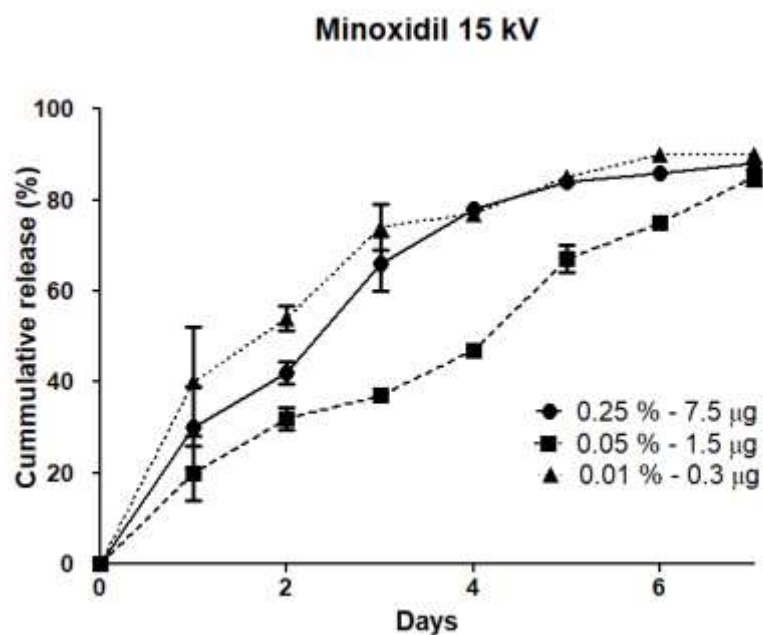
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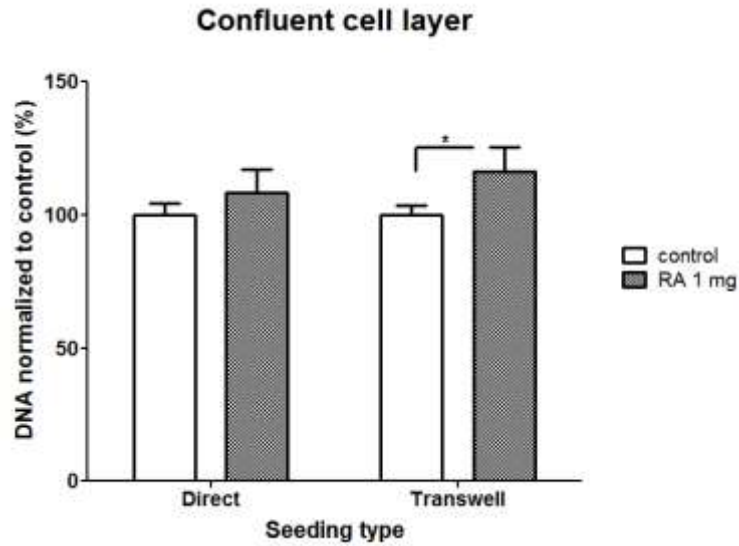
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Supplementary Table 1. Fibre diameter quantification.

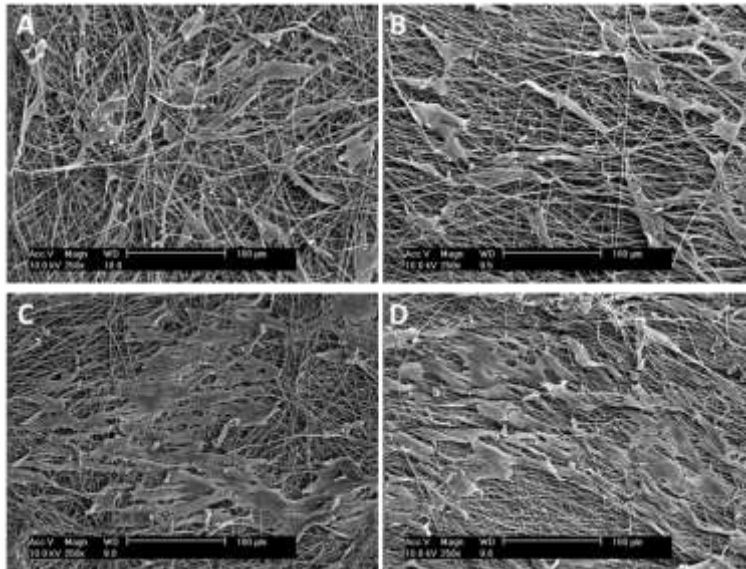
Electrospun scaffold	15 kV	30 kV
PCL	0.94 ± 0.51 μm	0.125 ± 0.047 μm
PCL + Retinoic acid	0.85 ± 0.43 μm	0.108 ± 0.033 μm
PCL + minoxidil	1.04 ± 0.39 μm	0.133 ± 0.028 μm



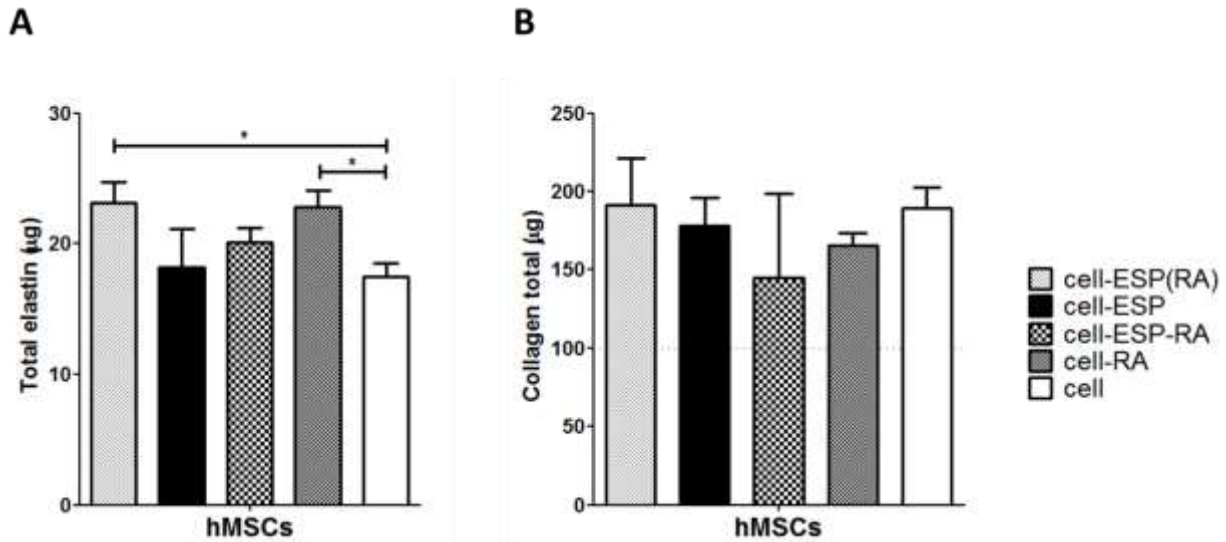
Supplementary Figure 1. Release rate profile of Mn at 15 kV. Mn release was measured up to day 7 for Mn-loaded PCL electrospun scaffolds at different concentration (%) and loading capacity (mg). Release profile showed a sustainable controlled release similar to RA-loaded PCL electrospun at 15 kV. Data are shown as mean ± s.d. (n = 3).



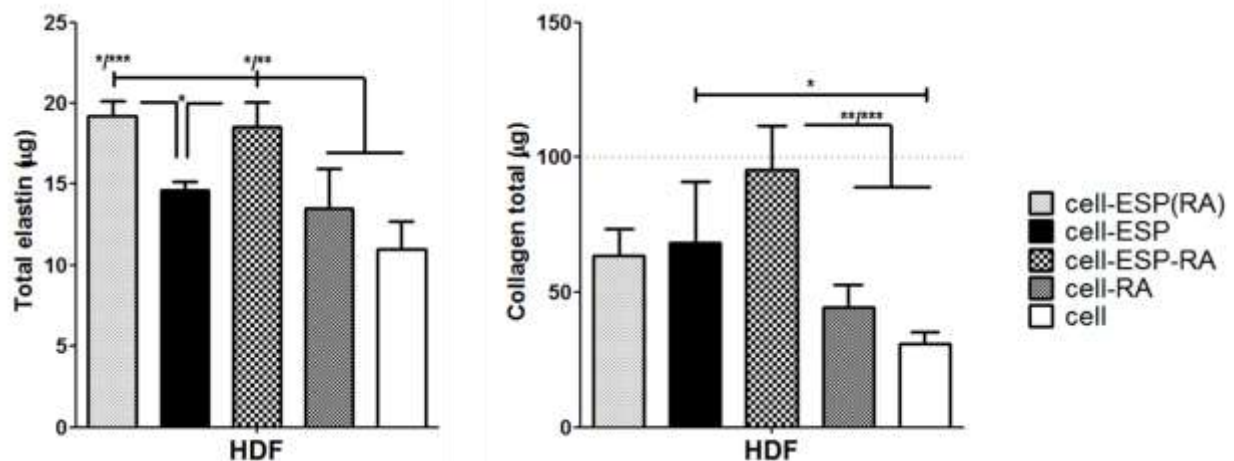
Supplementary Figure 2. Growth analysis of confluent cell layer exposed in contact or non-contact to RA 0.05%-1mg scaffolds. Direct seeding provided a slight increase in cell amount, while release of RA provided a significantly higher cell content. Black stars (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$) evaluate statistical differences between the different electrospun scaffold.



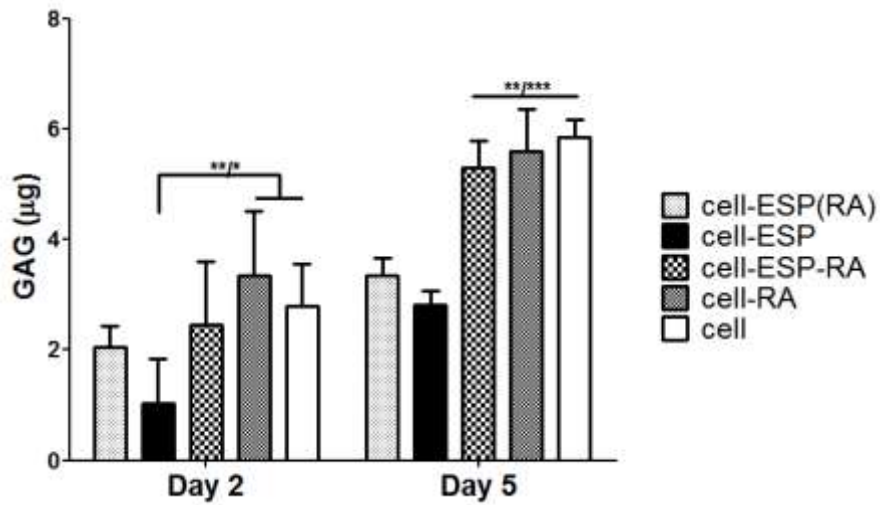
Supplementary Figure 3. SEM images of HDF seeded directly to (a, c)PCL and (b, d) RA 0.05%-1mg electrospun scaffolds. In (a-b) less confluent and (c-d) more confluent cell population, HDF were seen to be more flat in PCL electrospun scaffolds compared to RA 0.05%-1mg electrospun scaffolds.



Supplementary Figure 4. Total elastin and collagen analysis of hMSC culture at day 5. Different seeding setups are represented by the different bar patterns. Data are shown as mean \pm s.d. ($n = 3$). (a) Total elastin analysis displayed a significant increase in total elastin production in cell-ESP(RA) and cell-RA compared to cell control. (b) Overall, total collagen content in hMSCs cultured with exposure to RA 0.05%-1mg scaffold exhibit a decrease in total collagen synthesis, with exception to cell-ESP(RA). Black stars (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$) indicate statistical significances between the different culture setups.



Supplementary Figure 5. Total elastin and collagen analysis of HDF culture at day 5. Different seeding setups are represented by the different bar patterns. Data are shown as mean \pm s.d. ($n = 3$). (a) Total elastin analysis displayed cell-ESP(RA) and cell-ESP-RA to have a significantly higher total elastin content than all the other cultures. (b) Total collagen analysis showed that cell-ESP cultures provided a significantly higher total collagen production than Cell cultures. Cell-ESP-RA culture was significantly higher in total collagen content than cell-RA and cell cultures. Black stars (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$) indicate statistical significances between the different culture setups.



Supplementary Figure 6. Total GAG analysis of hMSC cultures. Different seeding setups are represented by the different bar patterns. Data are shown as mean \pm s.d. ($n = 3$). At day 2, a significantly higher total GAG content was seen in cell-RA and cell cultures compared to cell-ESP cultures. At day 5, cell-ESP-RA, cell-RA and cell cultures displayed the a significantly higher total GAG content compared to cell-ESP and cell-ESP(RA) cultures. Black stars (* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$) indicate statistical significances between the different culture setups.