Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting information

Advanced capability of radially aligned fibrous scaffolds coated with polydopamine for guiding directional migration of human mesenchymal stem cells

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1. Mechanical property of radially aligned fibrous scaffolds

Measurement

Stress-strain curve of the scaffolds were calculated by universal testing machine (AGS-500NJ, Shimadzu, Kyoto, Japan). The specimens were prepared (test area of 12 mm × 3 mm, and 0.05 mm thickness) and vertically fixed to the machine clamps for axial testing. The specimens were stretched at speed of 5 mm/min.

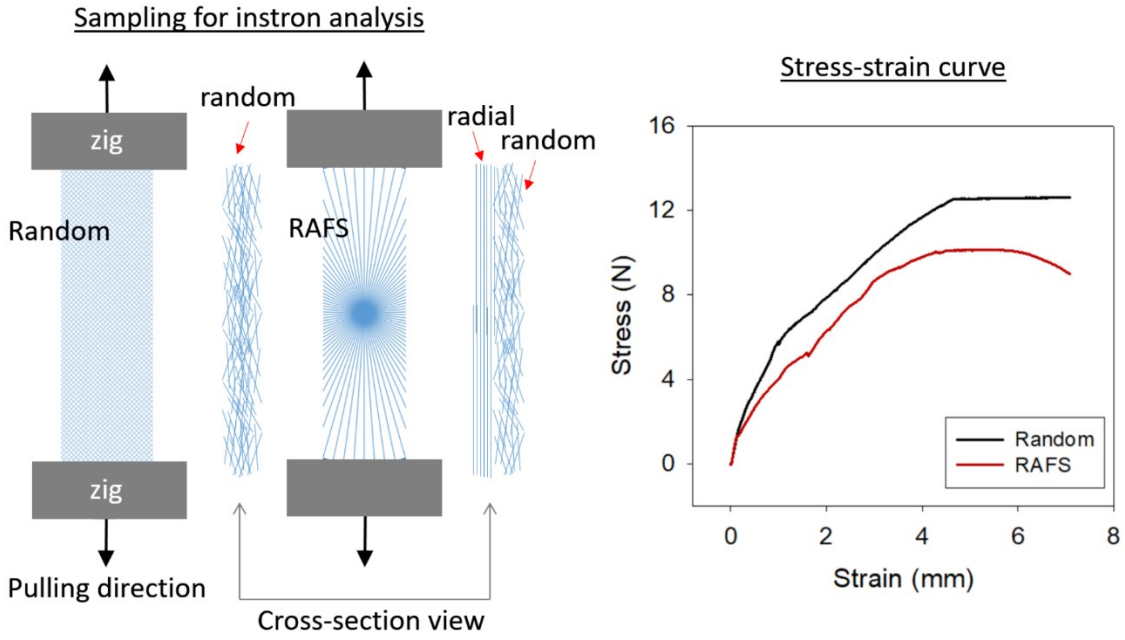

Fig. S1. Sampling for instron and representative stress-strain curve of the scaffolds

As shown in Fig. S1, stress-strain curve of RAFS demonstrated weak mechanical property as compared to that of random scaffold. However, tensile strength was approximately 70-80% of that from the random scaffold. Mechanical property of the RAFS was strong enough to be used in animal model and clinical application as also shown in Fig. 2d.

2. Live cell migration

DiO labelling and cell migration tracing in live

To trace live cell movement from the peripheral region towards the core, hMSCs (50,000 cells cm^{-2}) were seeded and cultured on the scaffolds. Prior to seeding, hMSCs were labelled with Vybrant® DiO solution (Molecular Probes, Oregon, USA) (1:100) diluted in DMEM medium for 1 h at 37 °C incubator, and then washed 2 times with fresh medium. The DiO-labelled cells were seeded on the scaffold at peripheral region between PDMS mount and culture well-wall. After 24 hr of culture, the PDMS was removed and cell movement was traced using a fluorescence microscope (TE2000, Nikon, Japan). To obtain clear cell images, the scaffolds were inverted at every time points and images were quickly captured.

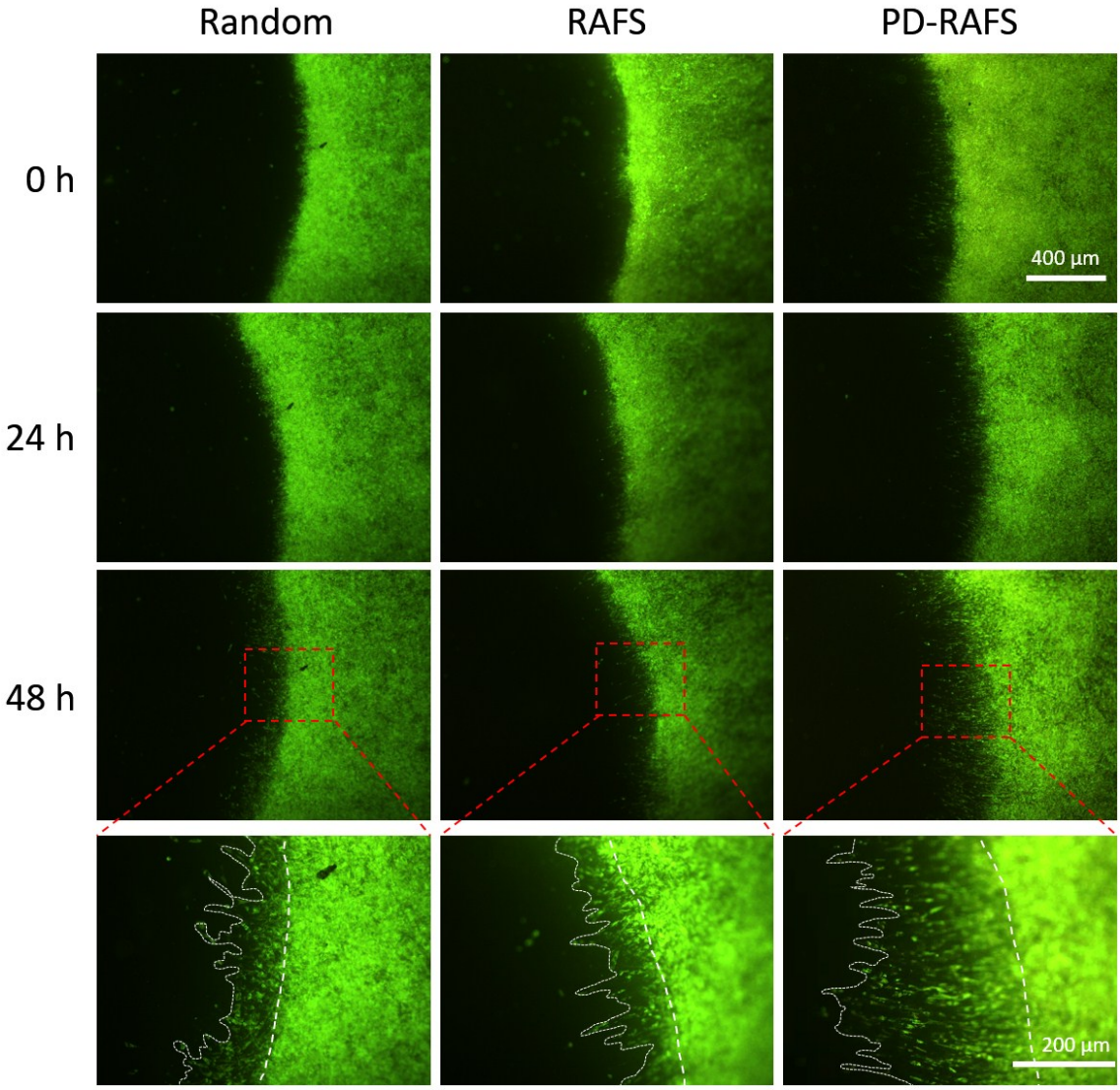

Fig. S2. Live cell migration

As we described in the manuscript, this cell migration model has been design to mimic the native tissue defect. The seeded cells initially have proliferated at the seeded area. When they are confluent, they migrated to cell free area. Thus, we could not find migrated cells in the cell-free area for initial 24 h. However, cells migrated to the cell-free area after 48 h of culture. Distance of migrated cells were higher in PD-RAFS than other groups. This results indicated that higher proliferation rate and cell adhesive surface influenced overall cell migration.