Supporting Information

A Suspending, Shrinkage-free Electrospun PLGA Nanofibrous Scaffold for Skin Tissue Engineering

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1. Experimental set-up

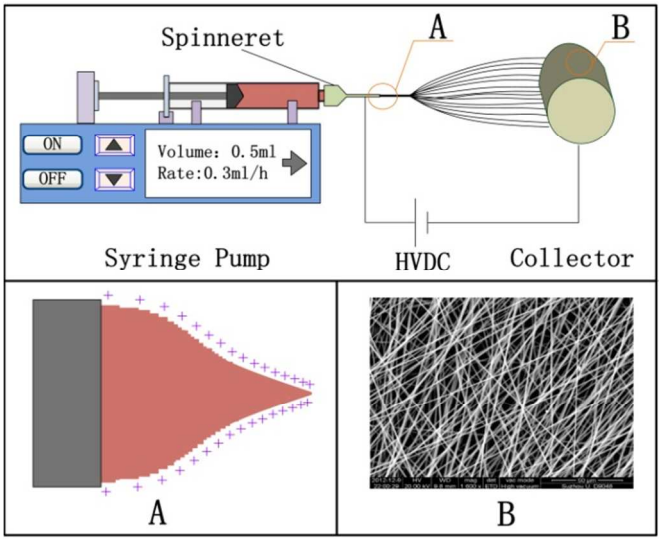

Fig. S1 Schematic diagraph illustrating electrospinning set-up and principle

Electrospinning produces fibers with a thinner diameter than those obtained from conventional spinning processes by using electrostatic forces. The principle is that strong electrical repulsive forces overcome weaker forces of surface tension in the charged polymer liquid. A schematic diagram is shown in Fig. S1. There are four major components in the system set-up, including a high voltage power supply, a syringe pump, a spinneret, and a grounded collector. Solution held by its surface tension at the end of a spinneret is subjected to an electric field, and electric charges are induced on the liquid surface due to this electric field. As the intensity of electric field increases, the hemi-spherical surface of the fluid at the tip of the spinneret elongates to form a conical shape known as the Taylor cone. When the electric field

reaches a critical value, a charged jet is ejected from the tip of the Taylor cone since the repulsive electrostatic force overcomes the surface tension. The jet undergoes an instability and elongation process, which allows the jet to become long and thin. In the meanwhile, the solvent evaporates and leaves behind a polymer fiber deposited on the collector.

2. Suspended scaffolds

Without binding to a PP ring, the fibrous membrane was initially suspended on PBS surface, as shown in Fig. S2(a). However, the membrane sunk to the bottom of the beaker after a few hours due to dimensional shrinkage and increased density (see Fig. S2(b)). For scaffolds consisting of nanoriber assembies fused on a PP ring, the scaffold remained suspended on PBS surface throughout the 15-day testing period (Fig. S2(c)(d)).

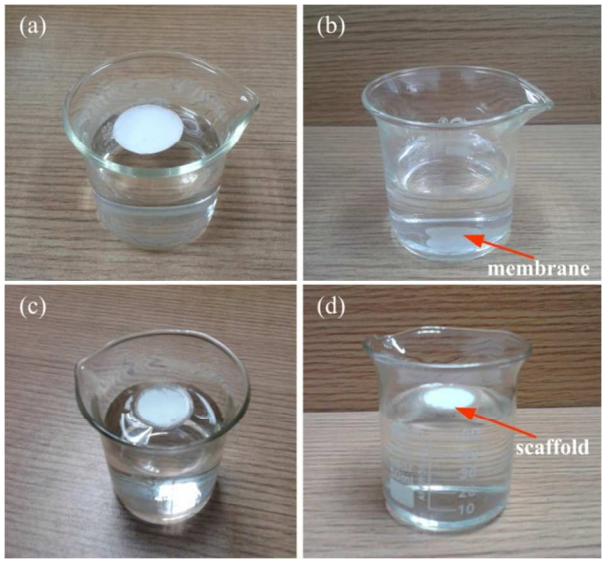

Fig. S2 (a)(b) Without the use of a PP ring, nanofibrous assembly sunk to the beaker bottom after a few hours. (c)(d) Scaffold with nanofibrous assembly fused on a PP ring remained suspended on PBS surface throughout the 15-day testing period.

3. Cell covering area

Cell distribution on the scaffold was analyzed via processing SEM images. Cell spreading percentage (C) was calculated according to

$$C = \frac{P}{P_0} \times 100\%$$

where P is cell covering area on the scaffold, and P_0 is the scaffold area. These quantities were determined by measuring cell contours in SEM images through ImageTool-3.4. Low-magnification images below show the distribution of cells on the scaffold.

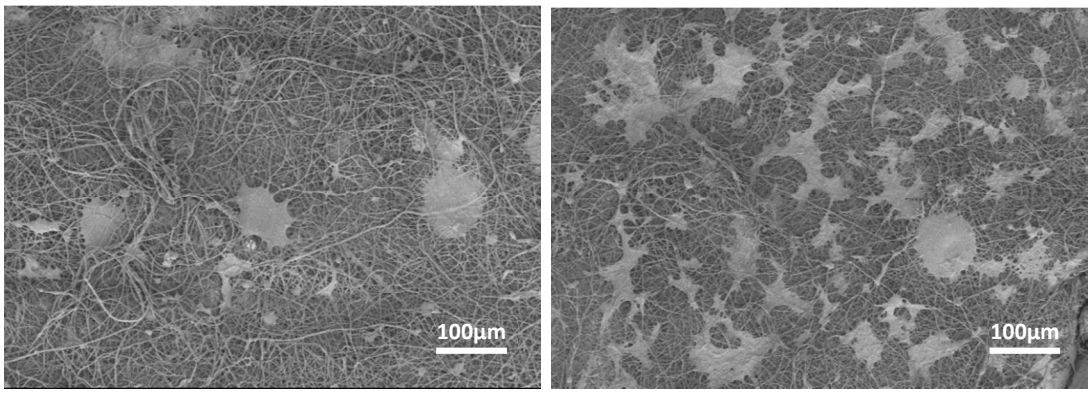

Fig. S3 SEM images of HSK cells grown on PLGA scaffold after incubation for (a) 1 day and (b) 3 days.