



Conversion of 2-Dimensional Electrospun Membrane into 3-Dimensional Nanofibrous Scaffold with Desired Shape

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Clinical Image

Electrospun membranes that are structurally/morphologically similar to natural Extra Cellular Matrix (ECM) are potential for tissue engineering [1]. However, their sheet like two-dimensional structure with densely packed fibers hinders cellular infiltration and growth during the tissue regeneration. Therefore, transformation of 2-D membrane into porous 3-D scaffold is potential for tissue engineering application [2,3]. Herein, we have developed a facile post electro spinning technique to convert 2-D electrospun membrane into layered 3-D porous nanofibrous scaffold using a gas foaming process (Figure 1). Interestingly, it is found that one can manually change the conventional 2-D electrospun membrane into the desired shape and size 3-D scaffold during the conversion process (treatment of electrospun membrane with aqueous NaBH₄ solution) as shown in Figure 2. We look forward to see the use of this technique to develop desired shape scaffold for varieties of human organs in the near future.

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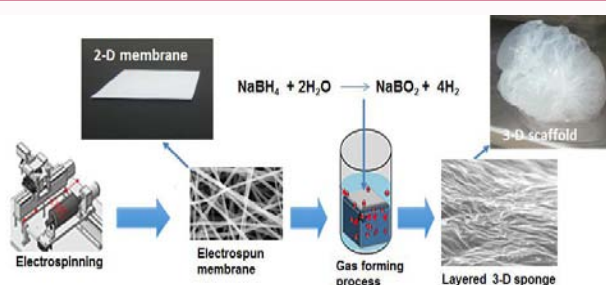


Figure 1: Illustration for the formation of layered 3-D porous scaffold from the conventional 2-D electrospun membrane.

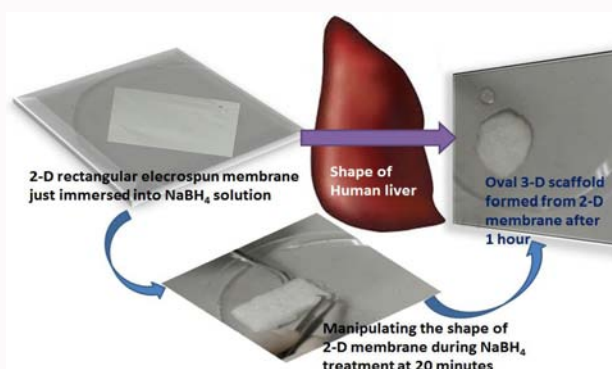


Figure 2: Manual conversion of 2-D electrospun membrane into desired shape 3-D spongy scaffold using forceps during the gas foaming process where liver-like structure can be fabricated.

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