Supporting Information for

A Biomimetic Human Disease Model of Bacterial Keratitis Using a Cornea-on-a-chip System

Section S1. Comparison between chips and Transwell

Type I collagen was used to evaluate the smoothness of gel after gelation in chips and Transwell. In short, 1 mol/L NaOH, 10 × PBS, and Calcein-AM staining solution (Beyotime, C2015S) were sequentially added to type I collagen to prepare 2mg/ml of type I collagen containing cells. 20 μ L of type I collagen was added to the culture chamber of the chip and the Transwell (Corning, Product Number 3421), respectively. Finally, incubated at 37 ° C for 30 minutes, and imaged under a fluorescence microscope.

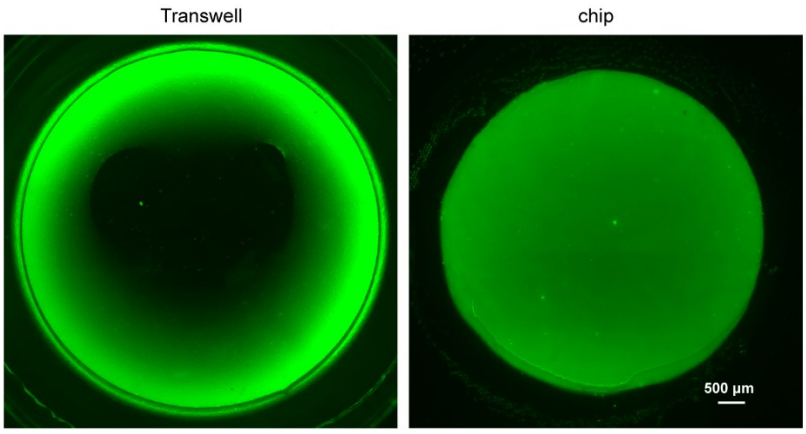

FIGURE S1 The distribution of collagen in Transwell and chip

Section S2. Characteristics of human corneal fibroblasts in corneal-on-chips

The construction of corneal-on-chips was described in the previous section. The procedure for immunostaining of fibroblasts was as follows. The chips were firstly washed with PBS and fixed with 4% PFA for 48 hours. Then the samples were put into an automatic dehydrator for dehydration, embed it in paraffin, and perform antigen repair on the slices after dewaxing treatment. Then, the slices were permeabilized for 30 minutes with 0.25% Triton X-100, blocked by 1% BSA at room temperature for 2 hours, incubated with primary antibodies overnight at 4 ° C, and stained with secondary antibodies in the dark at room temperature for 2 hours. Finally, cells were counterstained with Hoechst for 15 minutes, then washed three times with 1×PBS and imaged under a fluorescence microscope.

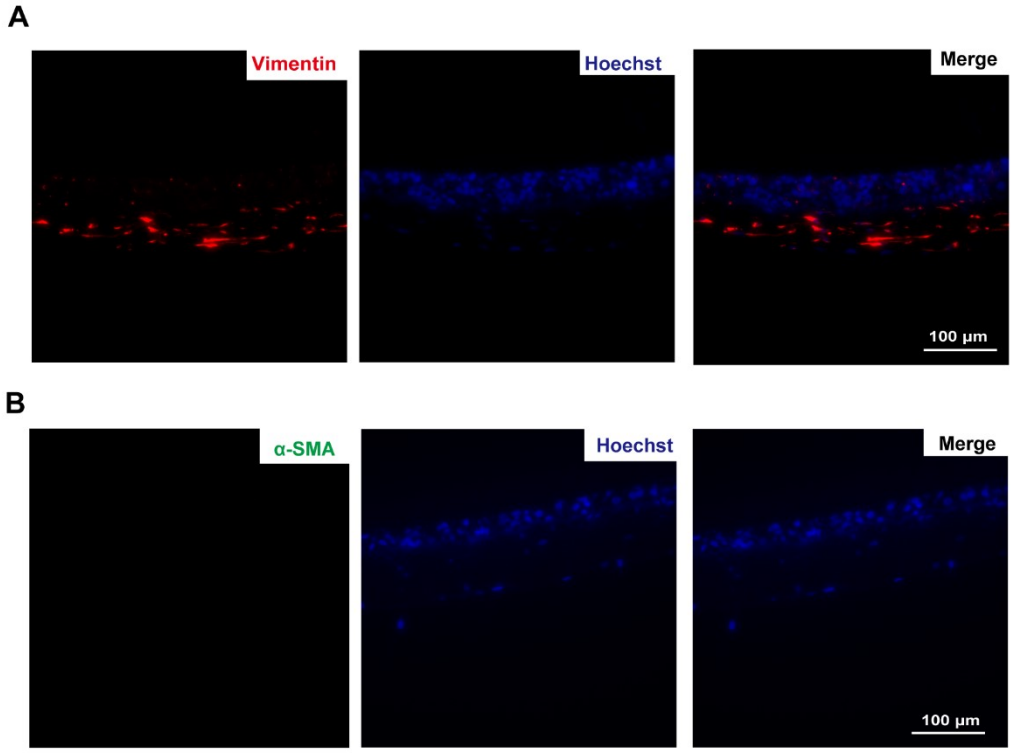

FIGURE S2 HCFs characterization in the cornea-chip. (A) Representative images of Vimentin protein expression through immunofluorometric assay. Red, Vimentin; blue, Hoechst. Scale bar, 100 μm. (B) Representative images of α-SMA protein expression through immunofluorometric assay. Green, α-SMA; blue, Hoechst. Scale bar, 100 μm.