# A novel antibacterial cellulose based biomaterial for hernia mesh applications

(**Supporting information**)

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## Zeta Potential Measurement

The surface charge of BCC-H composites was tested in 1 mM KCl electrolyte solution (pH=7.2) by Surpass solid surface Zeta potentiometer (Anton Paar, Austria). In brief, the membranes with the size of 20 mm×10 mm were pressed and fixed on sample stage in parallel to form a 100 μm slit. Then the streaming current of electrolyte was measured (wash time 200 s and test pressure 100-300 mbar). Surface Zeta potential (ξ) was calculated according to the following equation:

$$\xi = \frac{dI}{dP} \times \frac{\eta}{\varepsilon \times \varepsilon_0} \times \frac{L}{A}$$

where $dI/dP$ denotes that the streaming current generated by slit takes the derivative of pressure at the ends of the slit, $\eta$ is the viscosity of the electrolyte, $\varepsilon$ is the dielectric constant of the electrolyte, $\varepsilon_0$ is the vacuum dielectric constant, and $L/A$ represents length of slit to cross sectional area ratio.

## Zeta potential Analysis

The Change of Zeta potential of material surface was measured by streaming potential method, which is shown in figure S1. In KCl electrolyte (PH=7.2), Zeta potential of BCC surface is -27.83 mV. After immersed in HACC solution, the Zeta

potential of BCC surface are all positive value, which increases with the increasing concentration of HACC. The reason may be that, when immersed BCC with negative charge in HACC solution, HACC with quaternary ammonium positive ion is absorbed into cellulose network and material surface, which leads to BCC surface with positive charge in KCl solution. Therefore, the Zeta potential of BCC-H is positively correlated with the concentration of HACC solution, which reflects the content of quaternary ammonium chitosan on material surface.

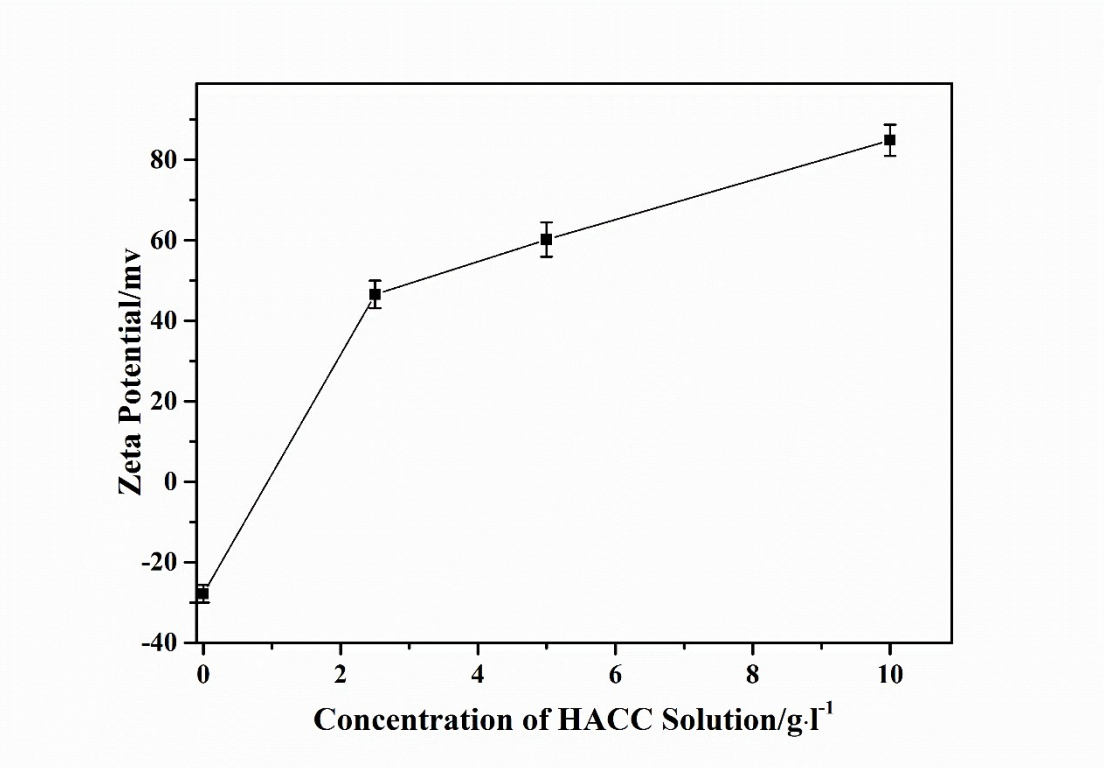


Figure S1. Zeta potential of BCC-H composites with different content of HACC.