Automated Broad-Spectrum Bacterial Capture from Blood Using Vancomycin and Allantoin-Conjugated Polydopamine-Coated Magnetic Nanoparticles for Sepsis Diagnostics

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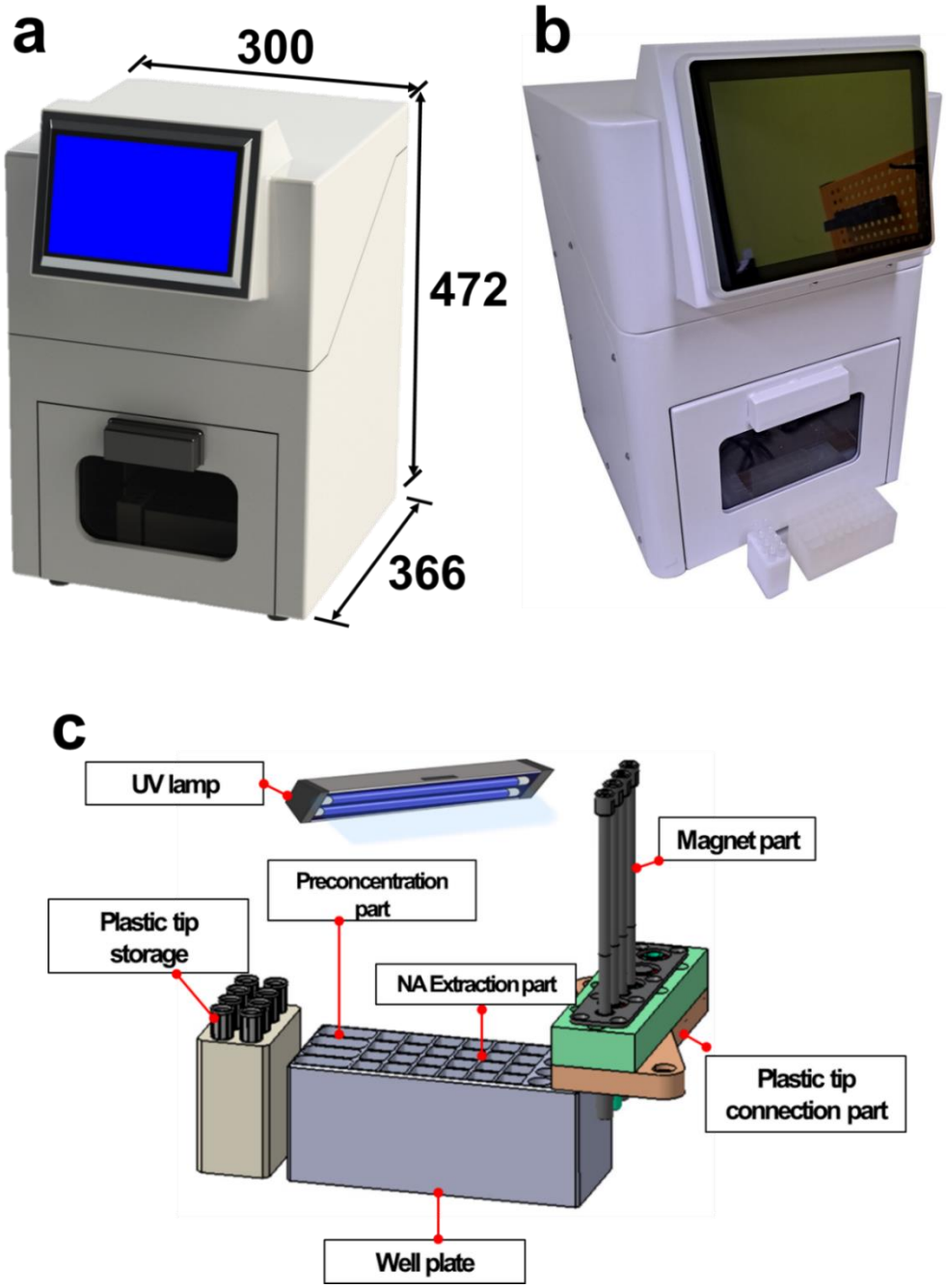

Figure S1. 3D model **(a)** and photographic image **(b)** of the automated system and its complementary components **(c)**. The well plate and plastic tip displayed in figure S1c were produced using Inventor® Professional Student Edition software from Autodesk Inc. located in Seoul, Korea. Both components were fabricated from poly (methyl methacrylate), commonly known as acrylic glass, using CNC machining. The well plate measures 124 × 120 × 47 mm (length × width × height), while the plastic tip has dimensions of 120 ×10 × 2 mm (length × diameter × thickness).

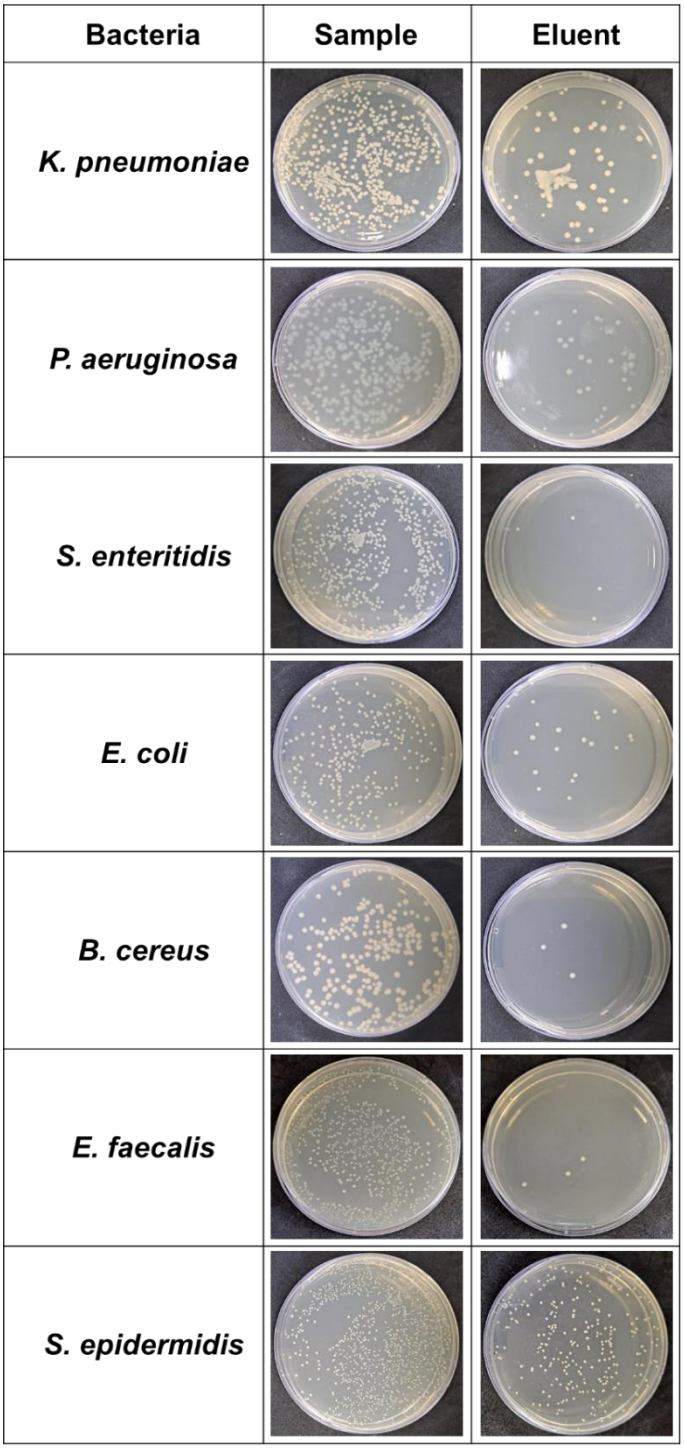

Figure S2. Representative colony counting images illustrating the efficacy of immunomagnetic separation with Van-PDA-MNPs and Al-PDA-MNPs within the automated system, providing visual evidence of successful pathogen isolation and capture.

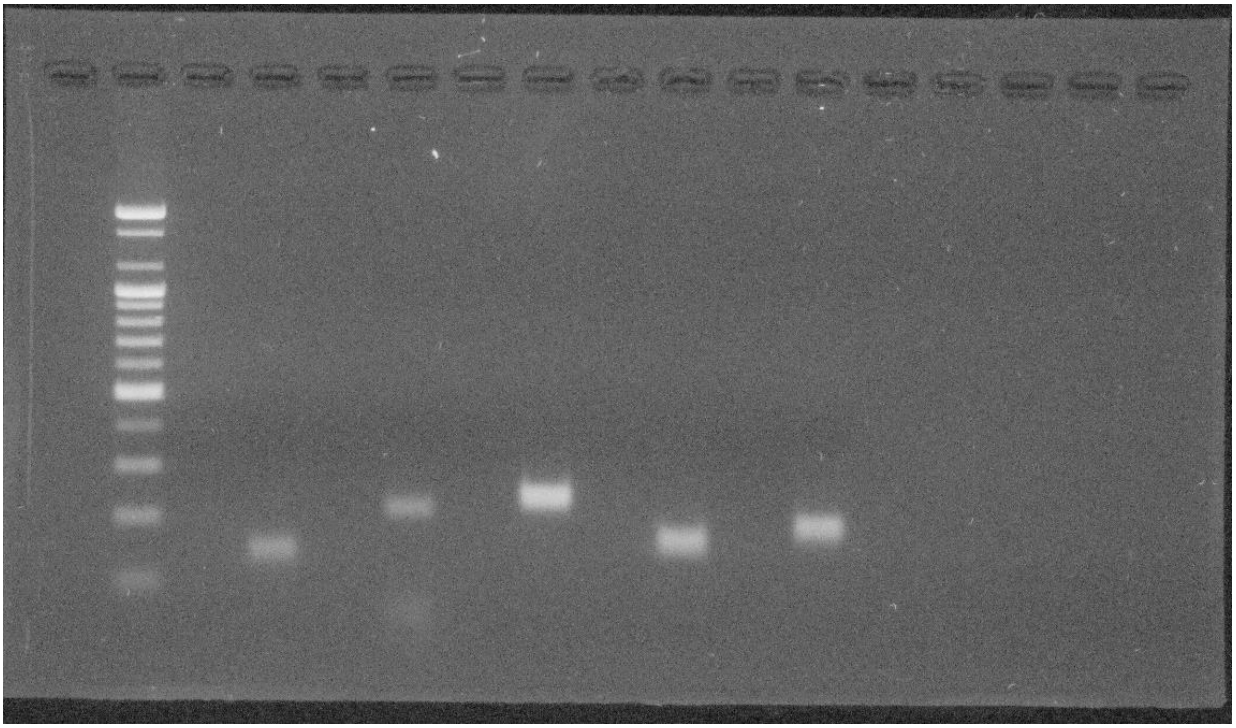

Figure S3. The gel electrophoresis image showcases DNA samples from MRSA, *S. aureus*, *B. cereus*, *E. coli* O157:H7, and *K. pneumoniae*. Following PCR amplification, the products were resolved on a 2% TAE agarose gel at 100 V for a span of 30 minutes. For visualization, the UNOK-8000 gel documentation system by Korea Biotech (Daejeon, Korea) was employed.

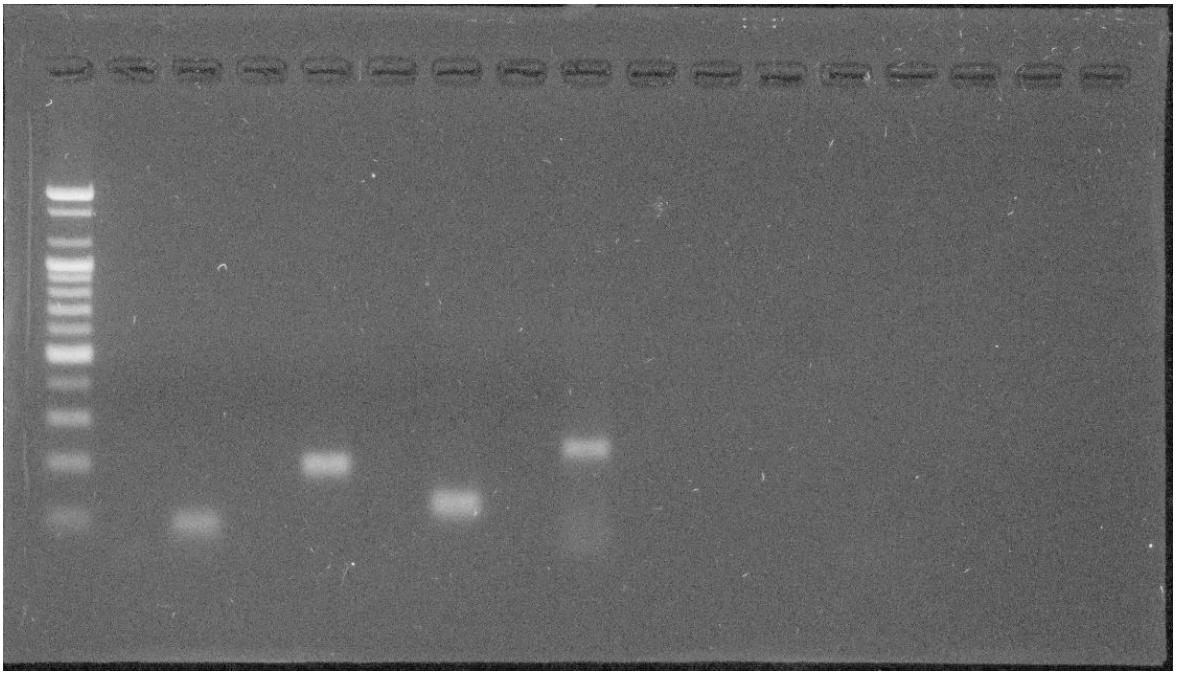

Figure S4. The gel electrophoresis image displays the DNA samples of *E. faecalis*, *S. epidermis*, *S. enteritidis*, and *P. aeruginosa*. PCR products underwent electrophoresis in a 2% TAE agarose gel at 100 V for a duration of 30 minutes. The gel was visualized using the UNOK-8000 gel documentation system, sourced from Korea Biotech.