**Supplementary Figures**

**Supplementary Fig. S1** Amplification of *Ace*-CRT gene, bacterial fluid PCR, and recombinant plasmid enzyme-digestion. (A) *Ace*-CRT gene. M, DL2000; lane 1, Full-length gene fragment; lane 2, Gene fragment except signal peptide. (B) bacterial fluid PCR. M, DL2000; lane 1, Monoclonal colonies with full-length gene; lane 2, Monoclonal colonies with gene fragment except signal peptide. (C) Enzyme-digested recombinant plasmid. M, DL5000; lane 1, Enzyme-digested product of pET28a-*Ace*-CRT recombinant plasmid.

**Supplementary Fig. S2.** SDS-PAGE analysis of purified *Ace*-CRT recombinant protein. M, Protein molecular weight marker; lane 1, Uninduced recombinant bacteria; lane 2, Precipitation of induced recombinant bacteria; lane 3, Supernatant of induced recombinant bacteria; lane 4, 0 mM imidazole eluate; lane 5, 2 mM imidazole eluate; lane 6, 10 mM imidazole eluent; lane 7, 50 mM imidazole eluent.

**Supplementary Fig. S3.** Western blot analysis of *Ace*-CRT recombinant protein. (A) Identification of recombinant protein . M, Protein molecular weight marker; lane 1, r*Ace*-CRT reacted with anti-His tag antibody. (B) Antigenic specificity of recombinant protein. M, Protein molecular weight marker; lane 1, The r*Ace*-CRT reacted with positive serum of infected dogs; lane 2, r*Ace*-CRT reacted with negative serum of healthy dogs; lane 3, Negative control.

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