Electronic Supplementary Material (ESI) for RSC Advances.

An Experiment-Based Model Quantifying Antimicrobial Activity of Silver Nanoparticles on *Escherichia coli*

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Supplementary Information

Table S1. Dissolution of AgNPs in different media.

Solvent	AgNP (μg/mL)	Dissolved Ag ions (μg/L)	% Dissolved
H_2O	5	135.7	2.7
H_2O	10	173.8	1.7
H_2O	20	221.2	1.1
H_2O	40	252.2	0.6
H_2O	80	287.8	0.4
LB	5	70.6	1.4
LB	10	114.9	1.1
LB	20	148.1	0.7
LB	40	169.2	0.4
LB	80	218.4	0.3

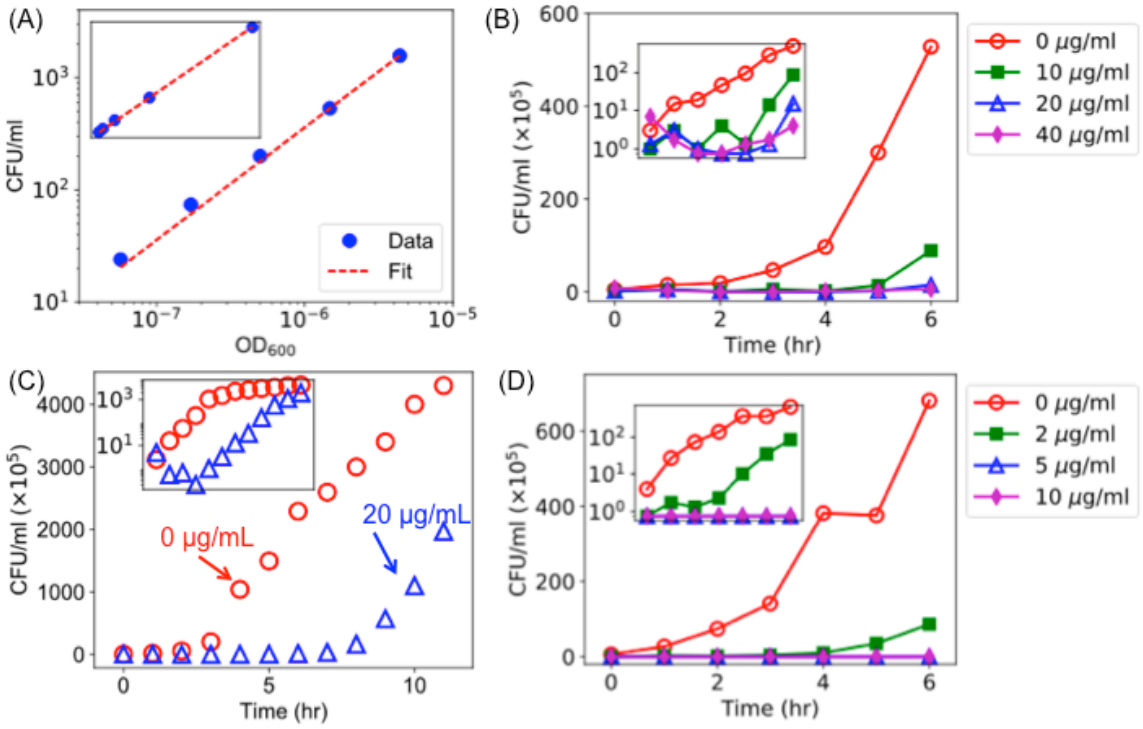

Figure S1. (A) Relation between the CFU counts (per mL) and OD_{600} of (diluted) liquid culture in log-log scale. Inset: the same plot in linear scale. (B) CFU assay on *E. coli* treated with AgNPs at various concentrations. Inset: the same plot in log-linear scale. (C) CFU assay on *E. coli* treated with AgNPs at 20 μg/mL for longer times. Inset: the same plot in log-linear scale. (D) CFU assay on *E. coli* treated with $AgNO_3$ at various concentrations. Inset: the same plot in log-linear scale.

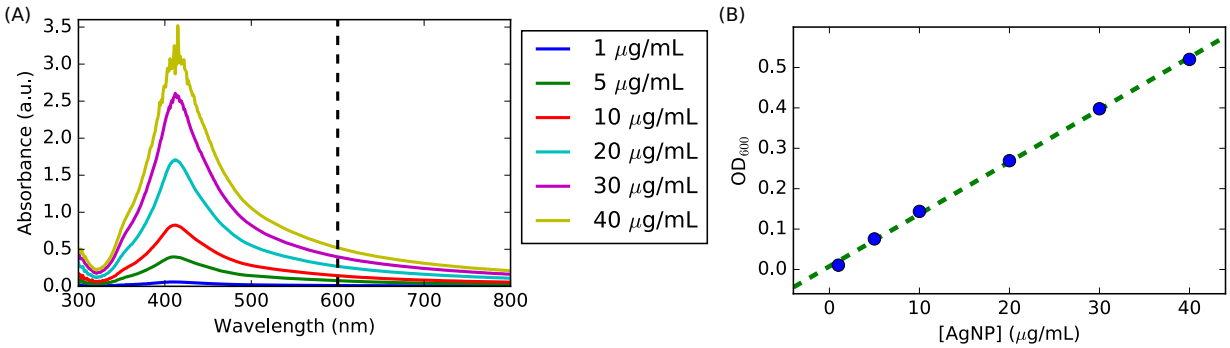

Figure S2. (A) Absorbance spectra of AgNPs at various concentrations in LB growth medium. The vertical dashed black line indicates the wavelength at 600 nm. (B) OD_{600} of AgNPs in LB as a function of concentration.

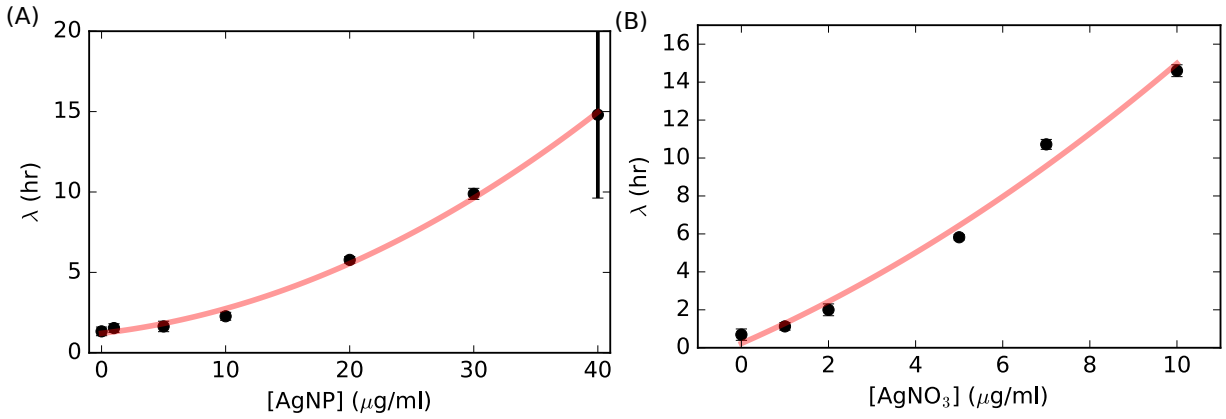

Figure S3. Parabolic dependence of the lag time λ of bacterial growth on the concentration of AgNPs or $AgNO_3$.

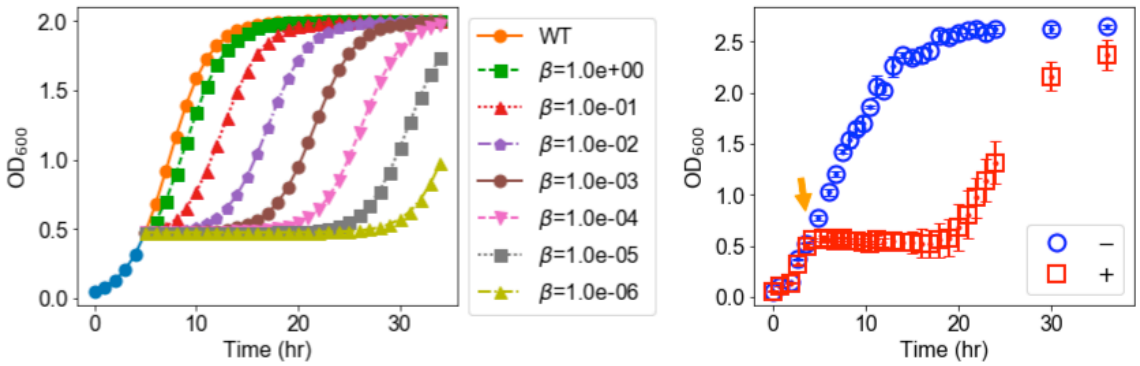

Figure S4. (A) Predicted growth curves of bacteria in the exponential phase from the SAD model. (B) Measured growth curves of bacteria with $AgNO_3$ added at the exponential phase (+: 10 μg/mL $AgNO_3$ added; -: negative control).

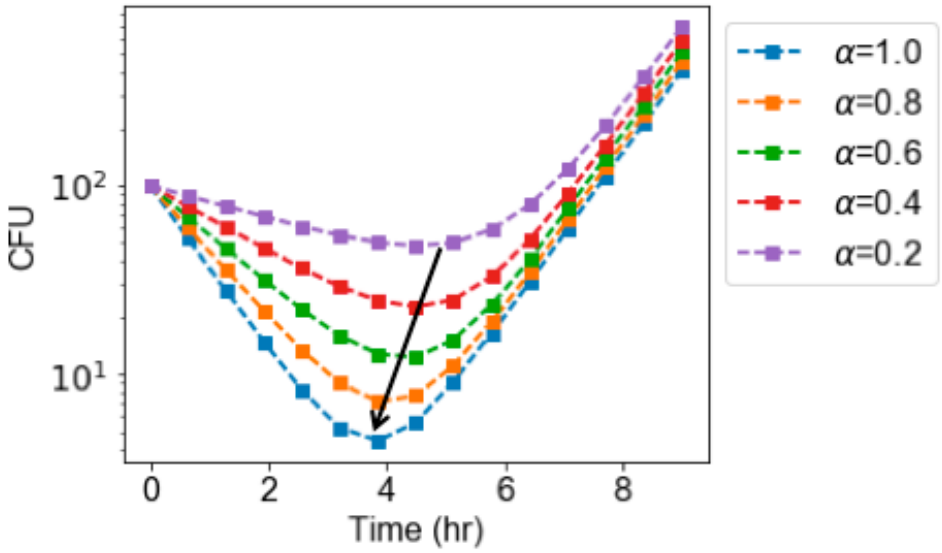

Figure S5. Predicted CFU counts from the SAD model with varying α but constant β.

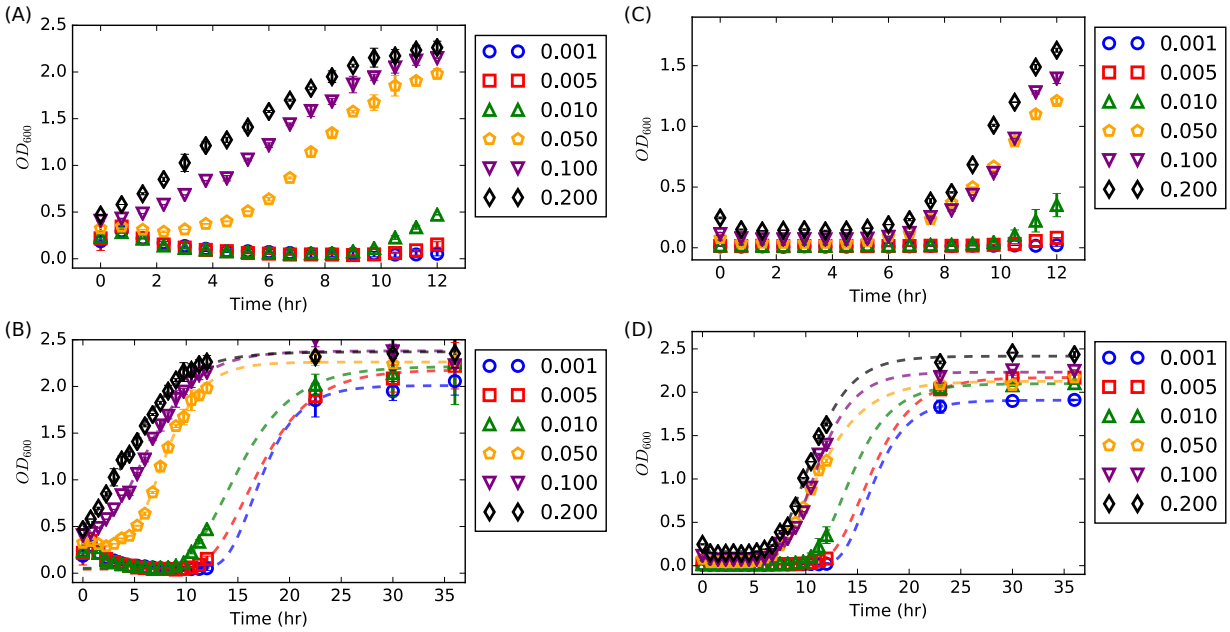

Figure S6. Suppression on the growth of *E. coli* due to (A, B) AgNPs or (C, D) Ag ions at different initial concentration of bacteria (OD_{600}^{0}) when AgNPs or $AgNO_3$ were added.

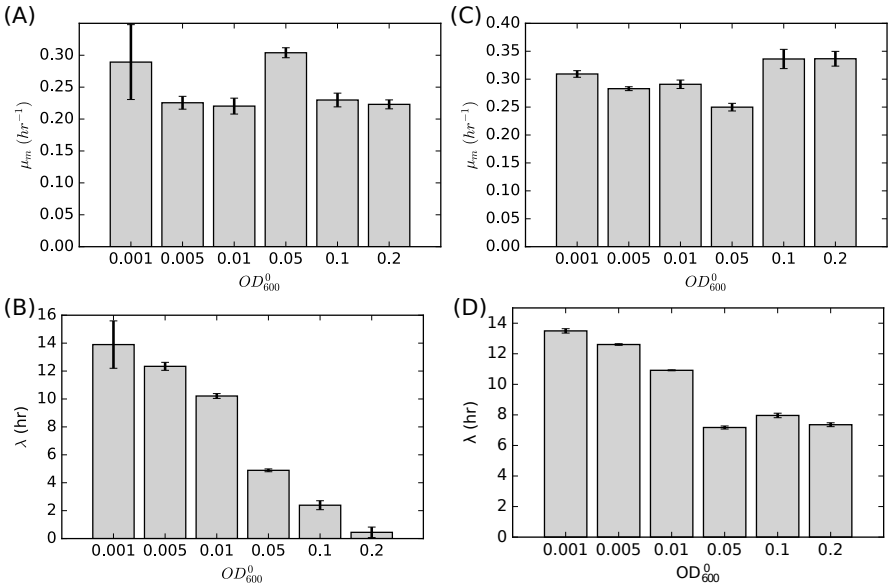

Figure S7. The dependence of the maximum specific growth rate (μ_m) and the lag time (λ) of *E. coli* on the initial concentration of bacteria (OD^0_{600}) when AgNPs (A and B) or $AgNO_3$ (C and D) were added.

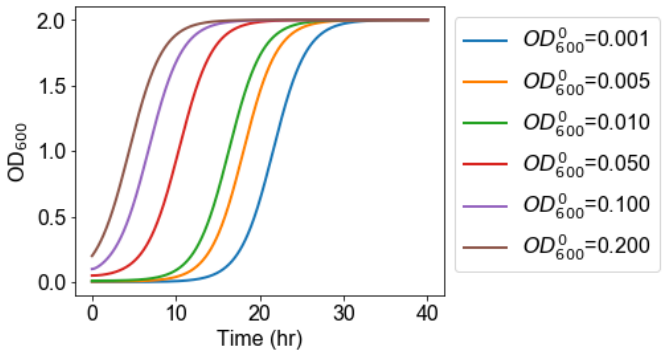

Figure S8. Predicted growth curves from the SAD model with various OD^0_{600}.

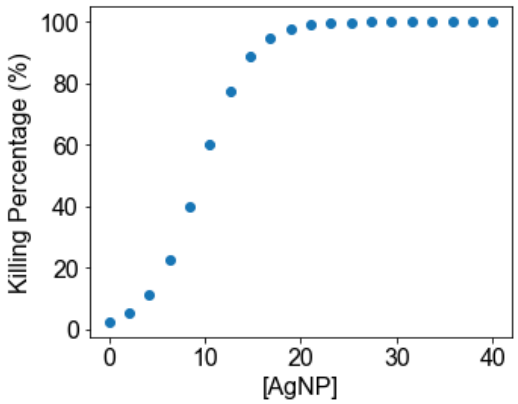

Figure S9. Predicted percentage of killed *E. coli* from the SAD model as a function of the concentration of AgNPs in the growth medium.