



Fig. S1

### The metal stresses induce cytoplasmic acidification

Growth curves generated using a Bioscreen C growth analyser indicate that the growth profiles under different metal stresses (A) are altered under other conditions (B-G).

The basic pH (B), spermidine (D) and arginine (E and F) supplementations suppressed, while the acidic pH (C) aggravate the metal-induced growth defects (A) of WT *E. coli*.

The  $\Delta nhaA$  strain of *E. coli* (G) also suppressed the metal-induced growth defects (A).