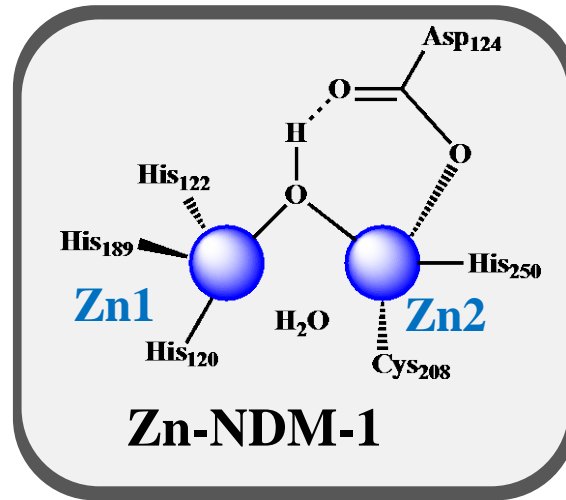


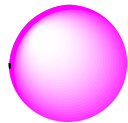
Bismuth-based combination therapy exerts potent antimicrobial performance on NDM-1 superbugs

Combined use of CBS leads to 8-fold decrease in antibiotic MIC

“Wild”NDM-1 superbugs

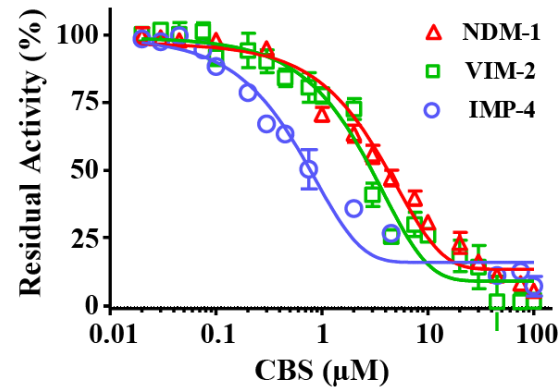
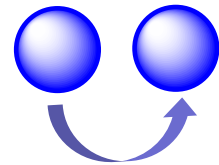


Bi³⁺ ion



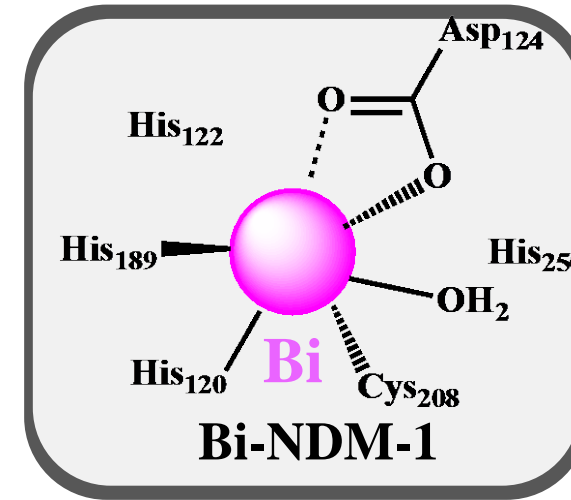
Treated with CBS

Release Zn²⁺ ions

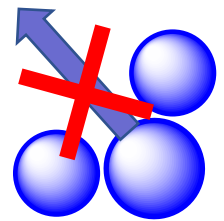


Enzyme activity
> 90%;
cannot be restored

“tamed”NDM-1 superbugs



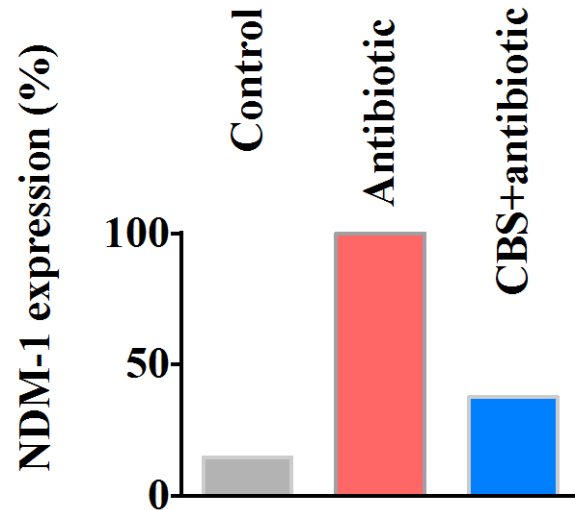
Free Zn²⁺ ions
cannot enter



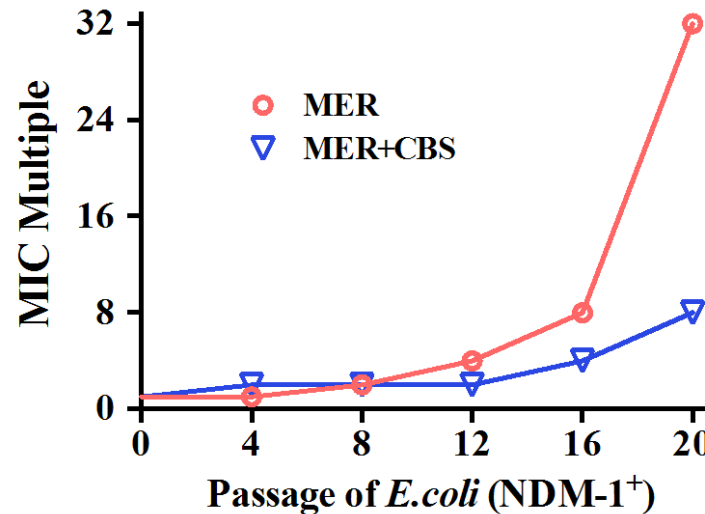
Enzyme stability declines
And likely to be rapidly
degraded by proteinase

Bismuth-based combination therapy slows down resistance development and extends antibiotic lifecycles

Treatment over 20 passages

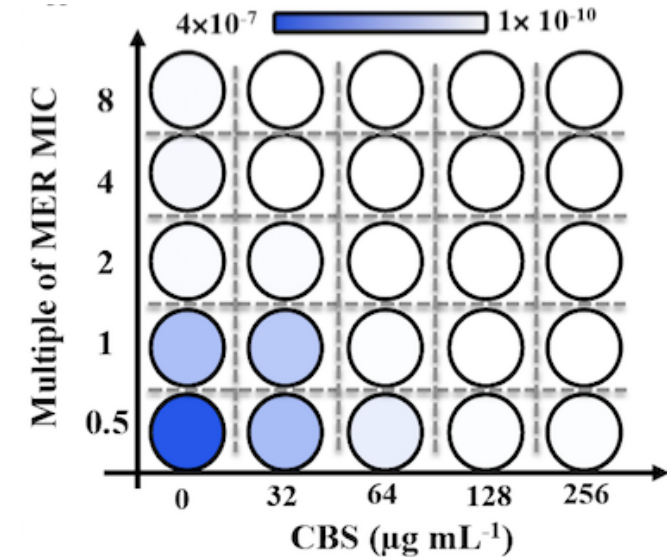


NDM-1 expression decreased by 2.7-fold



Resistance development slowed down by 4-fold

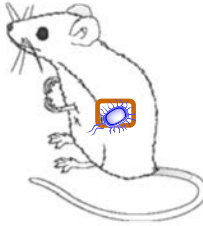
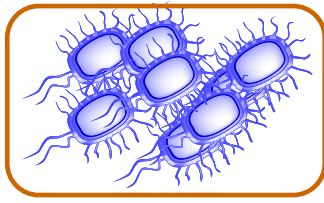
Treatment in mega dose



Mutation frequency Decreased by 133-fold

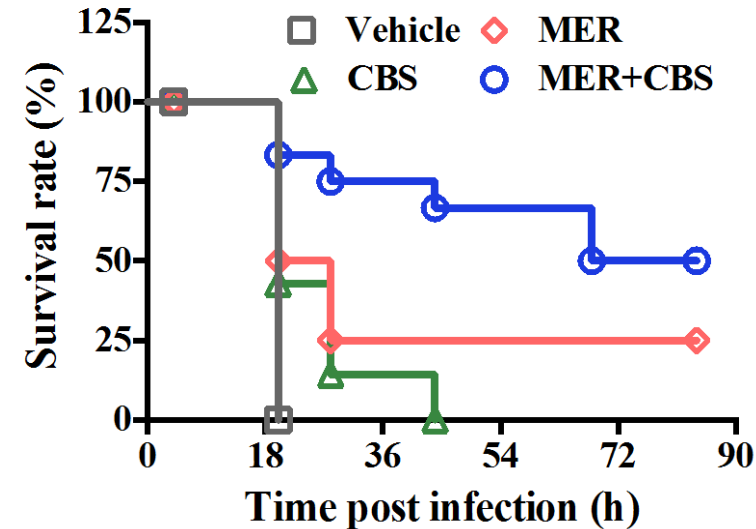
Bismuth-based combination therapy extends the lifespan and raises survival rate of NDM-1 superbugs infected mice

Mouse model of acute peritonitis infection



Mouse i.p. infected by NDM-1 superbugs

Antibiotic monotherapy and
CBS+antibiotic combination
therapy, respectively



1. NDM-1 superbugs is extremely dangerous to kill non-treated mice within 18 hours
2. In comparison to antibiotic monotherapy, CBS-based combination therapy significantly postpones the death of infected mice and raises survival rate by 25%