

YbeY is essential for fitness and virulence of *V. cholerae*, keeps RNA household in order

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YbeY is a conserved protein that is present in most bacteria. A study published on June 5th in *PLOS Pathogens* examines the function of YbeY in the cholera bacterium and reveals critical roles in RNA metabolism in this and other pathogenic bacteria.

Graham Walker, from the Massachusetts Institute of Technology, USA, and colleagues previously studied *E. coli* YbeY and found that it acts as an "RNase"—a protein that deliberately and specifically cuts RNA molecules and thereby regulates their availability and activity. Turning to *Vibrio cholerae* to examine the role of YbeY in disease-causing pathogens, they now report that YbeY is essential in this pathogen, critical for cell fitness and general stress tolerance, and involved in the regulation of different classes of RNA targets.

Like in higher organisms, genetic information contained in the DNA of bacteria gets "transcribed" into RNA molecules. Some of these RNAs serve as templates for proteins, others form part of the bacterial protein factories (so-called ribosomes), and yet another group consists of small regulatory RNAs that modulate cellular functions of the bacteria and their hosts. The researchers demonstrate that YbeY is needed in generating the components for functional ribosomes, for their assembly, and for ribosome quality control—eliminating defective [protein factories](#) before they turn out faulty products.

In addition, they find that YbeY targets virulence-associated small regulatory RNAs. Consistent with these functions, reducing the amount

of YbeY makes *V. cholerae* less harmful (or virulent) in a mouse cholera model. The researchers also show that YbeY belongs to a set of conserved RNases that are essential in many different pathogens, including *Streptococcus pneumoniae* and *Mycobacterium tuberculosis*.

They conclude that "although functionally associated with a well-established antibiotic target, the ribosome, YbeY is so far unexploited as a drug target and its use . . . might lead to the discovery of completely novel antibiotic scaffolds" and suggest that "considering YbeY's high level of conservation, its essential nature in many pathogens, and its ability to sensitize [pathogens](#) by disrupting [stress tolerance](#) and virulence, a YbeY-specific antibiotic could have broad-spectrum antimicrobial activity."

More information: Vercruysse M, Köhrer C, Davies BW, Arnold MFF, Mekalanos JJ, et al. (2014) The Highly Conserved Bacterial RNase YbeY Is Essential in *Vibrio cholerae*, Playing a Critical Role in Virulence, Stress Regulation, and RNA Processing. *PLoS Pathog* 10(6): e1004175. [DOI: 10.1371/journal.ppat.1004175](https://doi.org/10.1371/journal.ppat.1004175)

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