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# A novel signaling system originating from a core metabolic enzyme

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Bacteria employ diverse antiphage systems that produce second messengers in response to infection, activating effector proteins to block phage propagation. In several defense systems, enzymes originally discovered in cellular processes have been repurposed to synthesize signaling molecules.
Here, we discovered and characterized a two-gene system where the signaling enzyme is derived from ubiquitous housekeeping proteins involved in riboflavin biosynthesis. This enzyme constitutively produces a precursor of the second messenger which is likely matured into the final product by phage proteins during infection. Our results suggest that this molecule is then recognized by a transmembrane effector, thereby promoting oligomerization and subsequent pore formation, leading to cell death to prevent phage replication. Together, these findings reveal another unexpected example of the evolutionary transition of a core metabolic enzyme into a component of bacterial immunity.

## Reference #1

## Reference #2

## Reference #3

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