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Poster #99: A diverged ubiquitination pathway mediates antiviral defense in bacteria

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Ubiquitination is a central regulatory mechanism in eukaryotic cell biology, governing processes ranging from protein turnover to antiviral defence. In bacteria, conjugation of ubiquitin-like proteins (Ubls) is emerging as a core function of diverse antiviral systems, including systems with evolutionary links to the human antiviral ISG15 pathway. Recent work has uncovered a diverged bacterial ubiquitination system with altered conjugation chemistry, but its biological function has remained unclear. Here, we show that this non-canonical ubiquitination pathway provides robust defence against diverse bacteriophages. Combining genetic, bioinformatic and biochemical analyses, we demonstrate that Ubl modification of phage lateral tail fibres impairs virion assembly and infectivity. Together, our findings establish the immune function of a diverged ubiquitination pathway and reveal covalent remodelling of viral structural proteins as a conserved antiviral strategy deployed across chemically diverse ubiquitination systems and domains of life.

Reference #1

Reference #2

Reference #3

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