

Abstract Submitted
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Single molecule study of ClpP enzymatic activity AMIR MAZOUCHI, University of Toronto, Department of Physics, ANGELA YU, WALID HOURY, University of Toronto, Department of Biochemistry, CLAUDIU GRADINARU, University of Toronto, Department of Physics, GRADINARU TEAM, HOURY TEAM — Elementary processes that form the basis of biological activities pass through a number of short-lived intermediate states while progressing from initial state to final state. Single-molecule techniques, unlike ensemble averaging measurements, are often able to resolve these transient states. ClpP, a known target of antibacterial drugs like acydepsipeptides (ADEPs), is a classical representative of serine proteases, enzymes that cleave peptide bonds in proteins. We performed single-molecule fluorescence measurements including burst spectroscopy and fluorescence correlation spectroscopy (FCS) to address unknown aspects of this degradation process. Our study reveals important molecular details of protein degradation, such as the enzyme-substrate binding rate, the lifetime distribution of the conjugated state and the probability of substrate cleavage upon conjugation.

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