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Crystal structures of a polypeptide processing and secretion transporter

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Bacteria secrete peptides and proteins to communicate, to poison competitors, and to manipulate host cells. In Gram-positive bacteria, peptidase-containing ABC transporters (PCATs) function both as maturation proteases and as exporters for quorum-sensing or antimicrobial polypeptides. In Gram-negative bacteria, PCATs interact with two other membrane proteins to form the type 1 secretion system. We showed here the first crystal structures of PCAT1 from *Clostridium thermocellum* in two different conformations. These structures, accompanied by biochemical data, show that the translocation pathway is a large α-helical barrel sufficient to accommodate small folded proteins. ATP binding alternates access to the transmembrane pathway and regulates the protease activity, thereby coupling substrate processing to translocation.

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