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Structure of the Translocation Unit of a Bacterial Autotransporter. Piet Gros, Clasien J. Oomen, Peter van Ulsen^{*}, Patrick van Gelder[#], Maya Feijen^{*}, Jan Tommassen^{*}, Dept. Crystal & Structural Chemistry & ^{*}Dept. Molecular Microbiology, Utrecht Univ., Utrecht, The Netherlands, [#]Dept. Molecular & ^{*}Cellular Interactions, Free Univ. Brussels, Belgium.

Autotransporters are virulence-related proteins of Gram-negative bacteria that are secreted via self-mediated translocation across the outer membrane. The secreted "passenger" domain exerts its function on the outside of the cell, and may either stay attached or may be cleaved (auto)proteolytically from its "translocator" domain. To gain insight into the translocation molecular mechanism, we determined the structure of the translocator domain of neisserial autotransporter lipoprotein (NalP). The structure reveals a 12-stranded β -barrel with a hydrophilic pore that is filled by a 30-residue α -helix positioning the N-terminus at the extracellular side, consistent with the final stage of translocation. Our data is consistent with the passenger domain passing through the monomeric, narrow hydrophilic pore in an unfolded state. An alternative model of translocation, which may explain translocation of disulphide-bonded loops, involves the Omp85 complex, which has recently been identified as essential machinery for membrane insertion of outer-membrane proteins.