Title:	Structures and functions of the membrane-damaging pore-forming proteins.
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Abstract:	Pore-forming proteins (PFPs) of the diverse life forms have emerged as the potent cell-killing entities owing to their specialized membrane-damaging properties. PFPs have the unique ability to perforate the plasma membranes of their target cells, and they exert this functionality by creating oligomeric pores in the membrane lipid bilayer. Pathogenic bacteria employ PFPs as toxins to execute their virulence mechanisms, whereas in the higher vertebrates PFPs are deployed as the part of the immune system and to generate inflammatory responses. PFPs are the unique dimorphic proteins that are generally synthesized as water-soluble molecules, and transform into membrane-inserted oligomeric pore assemblies upon interacting with the target membranes. In spite of sharing very little sequence similarity, PFPs from diverse organisms display incredible structural similarity. Yet, at the same time, structure-function mechanisms of the PFPs document remarkable versatility. Such notions establish PFPs as the fascinating model system to explore variety of unsolved issues pertaining to the structure-function paradigm of the proteins that interact and act in the membrane environment. In this article, we discuss our current understanding regarding the structural basis of the pore-forming functions of the diverse class of PFPs. We attempt to highlight the similarities and differences in their structures, membrane pore-formation mechanisms, and their implications for the various biological processes, ranging from the bacterial virulence mechanisms to the inflammatory immune response generation in the higher animals.
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