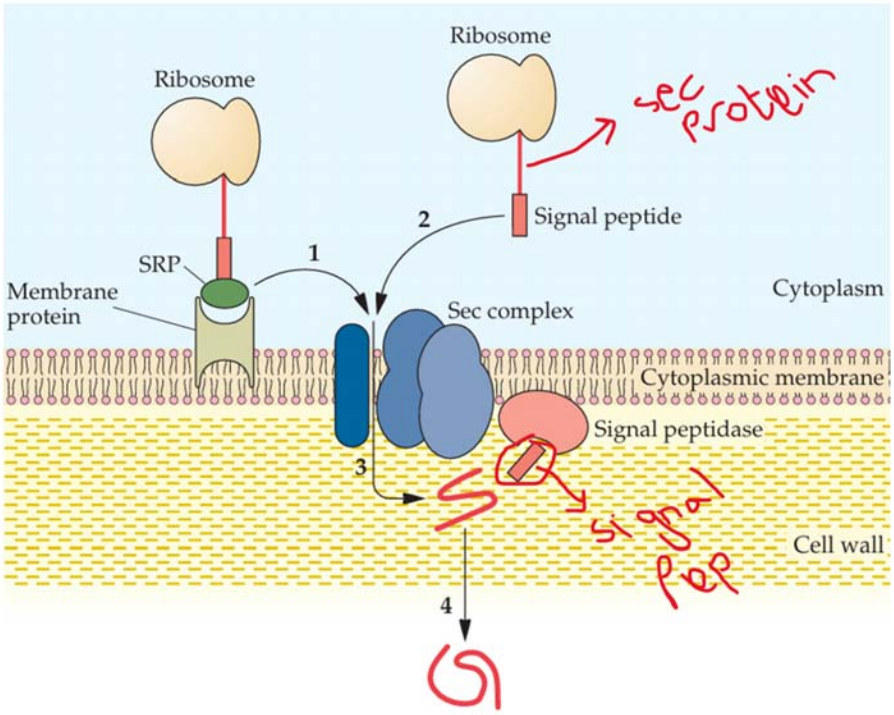
Secretion in gram positive bacteria:

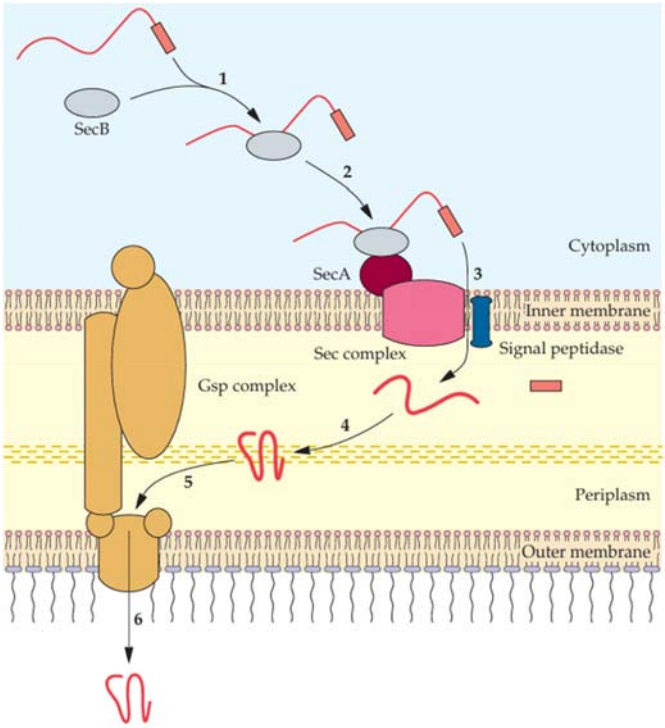
- There are two pathways of secretion, SRP-dependent and SRP-independent.
- SRP: signal recognition particle.
- SRP-dependent pathway: A signal recognition particle (SRP) binds to the signal peptide of a secretory protein, and this complex binds to a membrane protein that directs the secretory protein to the Sec complex.
- SRP-independent pathway: a signal peptide alone makes contact with the Sec complex.
- The secretory protein is translocated through a channel within the Sec complex and the signal peptide is removed by a signal peptidase(s). Proper folding of the secretory protein occurs as it passes through the cell wall.



Secretion in gram negative bacteria (type 2 secretion):

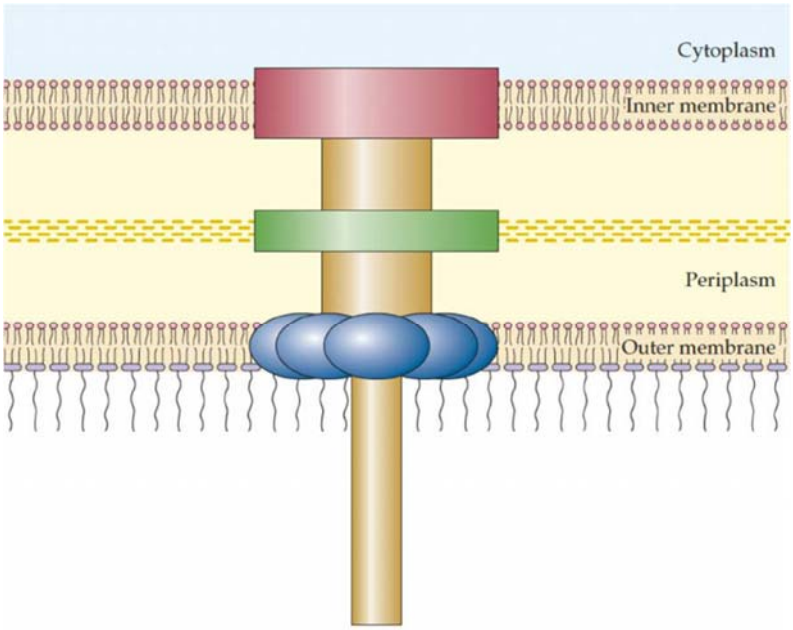
- The Sec B protein binds to a secretory protein in the cytoplasm.
- Sec B attaches to the Sec A protein that is part of the Sec complex of the inner membrane.

- the secretory protein is translocated through the inner membrane.
- A signal peptidase removes the signal peptide.
- the secretory protein is properly folded in the periplasm.
- the secretory protein combines with the Gsp complex and it is translocated to the external environment.



Secretion in gram negative bacteria (type 3 secretion):

- The type III secretion system is made up of about 20 different proteins that form a continuous channel through the inner and outer membranes of gram-negative bacteria.
- The type III secretion system is used by bacterial pathogens to secrete toxins and other proteins into plant and animal host cells. A hollow needle like protein structure extends from the bacterial surface into the host cell.



Secretion pathway in eukaryotes:

- A signal recognition particle (SRP) binds to the signal sequence of a secretory protein.
- The SRP attaches to an SRP receptor on the endoplasmic reticulum (ER) membrane.
- The secretory protein is translocated into the lumen of the ER, and a signal peptidase removes the signal sequence.
- The secretory protein is folded, partially modified, and packaged in a transport vesicle intended for the Golgi network.
- The ER-released vesicle carrying the secretory protein enters the Golgi network at the cis face and passes through the Golgi stack, where it is further modified;
- after it is sorted, a plasma membrane-specific vesicle is formed at the trans face of the Golgi network.
- The secretory transport vesicle fuses with the plasma membrane and releases the secretory protein to the extracellular environment