# Assignment 1 – Bacterial protein SecY

Protein secretion is essential and therefore present in every living cell. Proteins that are secreted to the environment pass through a channel consisting of SecY, SecE and SecG in prokaryotes. Although SecE and SecG are not essential for translocation of proteins, SecY is essential. Proteins that are to be secreted are synthesized with a signal peptide and directed to the Sec-translocon. SecA, a bacterial ATPase, drives the translocation of the protein through repeated hydrolysis of ATP.

Go to the NCBI website (<https://www.ncbi.nlm.nih.gov/>) and download the protein sequence of a bacterial OppA with the accession number **WP\_134592532.1**.

Use this protein sequence to answer the following questions:

**Question 1**: To which bacterium does this protein sequence belong to?

**Question 2**: What is the length (in amino acids) of this protein?

Go to the PubMed website (<https://pubmed.ncbi.nlm.nih.gov/>) and search for the most recent publication on this protein in the *Journal of Bacteriology*. It should be free full text publication and the 4-letter code of the protein should be in the title.

HINT: you can sort on the ‘*Publication date*’ on the top right of the screen.

**Question 3**: What is the PMID of this publication?

# Assignment 2 – Big Data on Diabetes type 2

Type 2 diabetes is characterized by high blood sugar, insulin resistance and a lack of insulin and is in many cases a result of obesity and lack of exercise. Prevention and treatment are based on regular exercise and eating a healthy diet. However, in some cases, insulin injection is required.

Not all type 2 diabetes patients are obese and Indian researchers have collected data on a large group (650 volunteers), including Body Mass Index (BMI), Total Cholesterol (TC) content, Waist Circumference (WC) and Systolic Blood Pressure (SBP). The T2D.txt file contains this data.

Open the file in Excel and use sorting, filters and functions to answer the following questions concerning these data:

**Question 4**: What is the value of the highest Body Mass Index? Give the answer in 1 decimal.

**Question 5**: How many participants have a Waist Circumference (WC) higher than 70 and lower than 85?