Part 1 - UniProt: A Protein Database

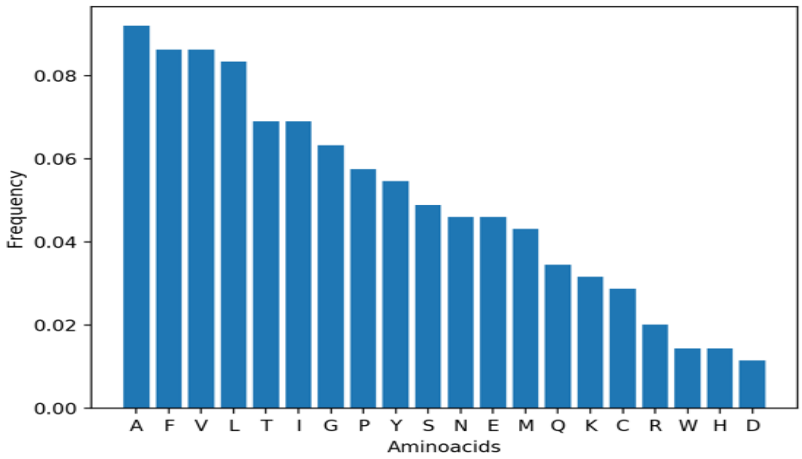
1) 49491
2) Reviewed: 512, Unreviewed: 48979
3) 87
4) Entry: P08100, Length: 348
5) A. It is important for image-forming in low-light

B. It is found in eucaryote cells and the organelle golgi

C. Night blindness, Retinitis pigmentosa 4 (RP4)

Part 2 - Calculating Amino Acid Frequencies

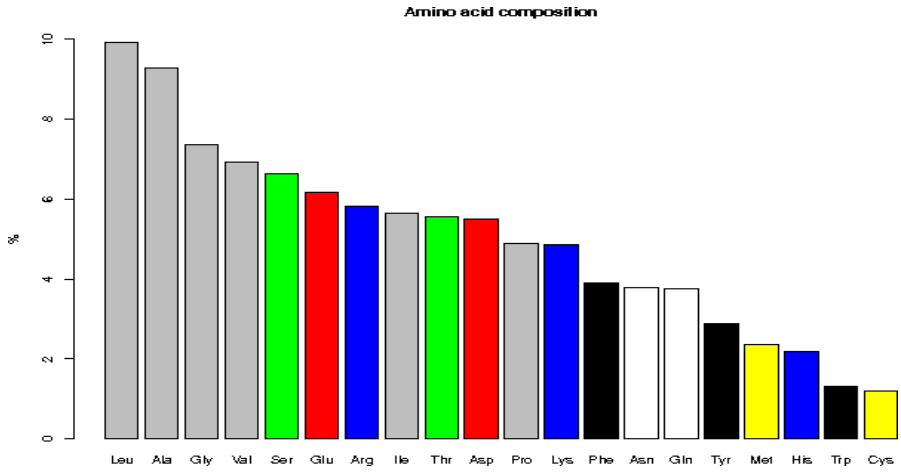
3) Most frequent: Ala(A), Least Common: Asp(D)



AMINO ACID FREQUENCY OF RHODOPSIN

4) Most frequent: Leu(A), Least Common: Cys(C)

Even though the most and least frequent amino acids in the rhodopsin protein and the Uniprot database don't match, the distribution of some amino acids are similar, and some amino acids are different. So it would not be appropriate to make a generalization.

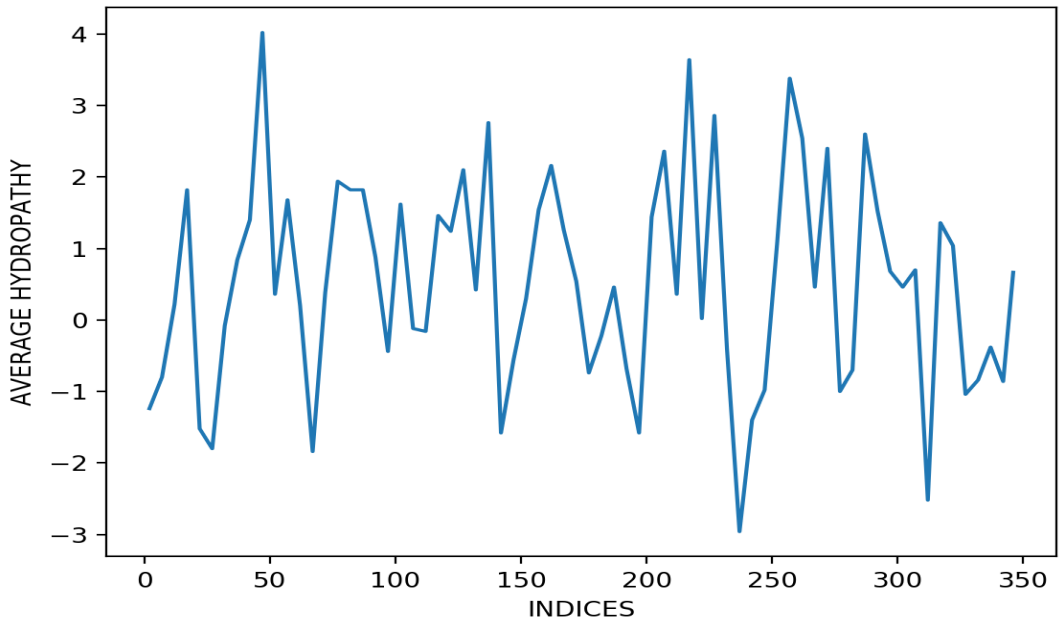


AMINO ACID FREQUENCY (UNIPROT DATABASE)

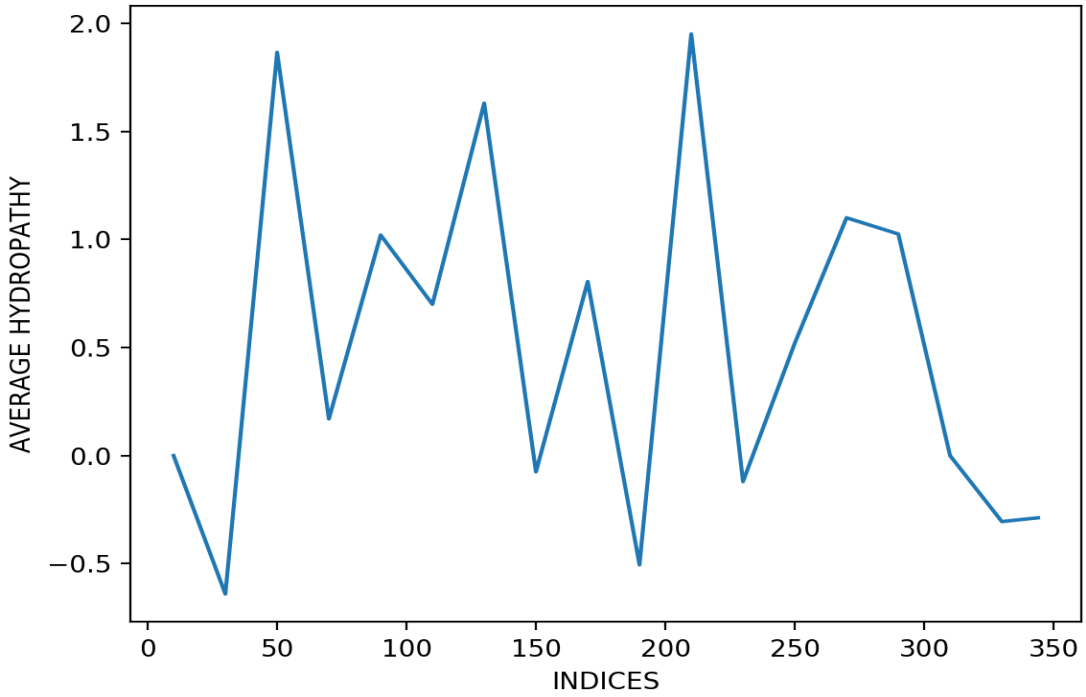
Part 3 - Plotting an Hydropathy Plot

2)

Plot with window size 5



Plot with window size 20



The descents and ascents of the hydropathy values in the plots are more or less similar in shape. The window size, 5, results in more twists on the line since it is a more detailed plot.

3) The parts of my plot where the average hydropathy values increase, have a close correspondence to the positions of the transmembrane helices of rhodopsin. Also in the positions that have relatively low hydropathy values, it is observable from Uniprot that there are no/less transmembrane helices are located. For instance, there is a sharp fall after the position 300 and there are no transmembrane helices located after the position 309. These findings make sense since the membrane-spanning regions of a transmembrane protein must be hydrophobic.