**Structural bioinformatics Project – Assignment 1: Understanding protein function.**

To answer the following questions, choose one member of the protein family you are working with. You will focus part of your project in this particular protein. Please, check that this protein has an available structure in the protein data bank.

<https://www.rcsb.org/structure/8H9J>

<https://www.uniprot.org/uniprotkb/P00846/entry>

1. What is the function of your protein? Is the same for the whole protein family?

Generates ATP from ADP by using the protons from the electrochemical gradient produced by the electron transport chain. ATP is used to store energy for later use in the cell.

The function of this protein is the same across all the family. But you can find variations in the structure and some subunits of ATP synthase between different organisms

2. How is able to carry out this function?

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3. Does your protein require the interaction with other proteins or molecules to carry out this function?

4. What is the fold of your protein? Is this the same fold for the other proteins of the family? (You need to do practice 1, the one about BLAST, to answer this question)

5. Are there available structures for your protein family? What are their PDB IDs?

6. Does your protein have a region that is essential for its function? What is this region? Why is it essential to its function? Is this region also essential for the other proteins of the family?

7. Use the UniProt database to choose a mutation that affects your protein. Try to find an interesting case, for example a mutation that causes a disease. Describe the effects of this mutation at a molecular and phenotypical level.