

Assignment – Web search

- Conditions:
You have to complete at least 60% of the assignment.
- Award:
5 points.
- Deadline:
3rd. lesson (9.3.2017).
- Penalization:
-2 points for each additional week

Mark Craven's Introduction to Bioinformatics

Look at the [PAH gene at NCBI](#)

Nucleotide sequence encoding this gene is shown at the bottom of the page. Additionally you can find description of parts of the gene (exons for example). Item CDS contains coordinates of protein-coding parts of the gene.

1. On which chromosome is the PAH located?
2. Which disease is this gene linked with?
3. How many exons this gene consists of? What is exon?
4. How many nucleotide basis are contained in the non-coding part of the first exon?
5. Name the first three codons and the first three amino acids contained in the first exon?
6. Which stop codon is used for termination?

Look at the [PAH gene at UNIPROT](#)

7. How many amino acids this protein consists of?
8. Name the first three amino acids. Compare this result with the result from question #5?
9. Find coordinates (position in the sequence) of the first two alfa-helices in the secondary structure of this protein.

Look at the description of the PAH gene at the [Protein Data Bank "Molecule of the Month"](#)

10. How many PAH molecules are required to form a functional complex?
11. Briefly describe the function of this protein and how it's mutated form causes disease.

Look at the tetrameric structure of the PAH gene at the [Protein Data Bank](#).

12. What does "tetrameric" mean?

Lastly look at the PAH gene at the [Homologene entry](#). There you will find all the genes which are believed to be homogeneous (genes which have the same evolutionary ancestor) with the PAH gene.

13. What is the degree of similarity (given by sequence alignment) of the sequence (amino acid sequence) of the human PAH gene and the PAH gene of a mouse (*mus musculus*)? Also try to compare human PAH with the PAH gene of a fruit fly (*D. melanogaster*).