



THESIS ASSIGNMENT

Name and Surname: Juraj Vašut
Study programme: Bioinformatics (Joint degree study, bachelor I. deg., full time form)
Field of Study: Computer Science
Biology
Type of Thesis: Bachelor's thesis
Language of Thesis: English
Secondary language: Slovak

Title: An end-to-end pipeline for detection of endolysin proteins from raw sequencing reads

Annotation: Bacteriophages are viruses specialized in infecting bacteria. Their life-cycle consists of a lysogenic and a lytic phase. At the end of the lytic phase, they disintegrate the host's cell wall, effectively killing bacteria. The protein they use to disintegrate the bacteria is called endolysin.

These endolysins have the potential to be used in the treatment of serious bacterial infections, but their identification requires a lot of experiments in the laboratory. The need for an end-to-end bioinformatics pipeline, capable of reducing the search space and therefore the number of experiments, is significant.

This work aims to develop the bioinformatics pipeline, which can assist the discovery of novel endolysins. The input for the pipeline will be in the form of reads from the sequencing experiment. The pipeline will consist of assembling the reads into contigs, identifying the viral sequences, predicting the location of the genes, identifying their function and evaluating the results. The output will be a set of genes with a high likelihood of being endolysins.

The student's tasks will be to study multiple bioinformatics tools for each step of the pipeline and to propose a selection of tools, which will be integrated into the pipeline. The student will create an automatic end-to-end pipeline that can be easily installed and used to detect endolysins and compare the pipeline with existing solutions.

Supervisor: Master of Science Andrej Baláž
Department: FMFI.KAI - Department of Applied Informatics
Head of department: prof. Ing. Igor Farkaš, Dr.

Assigned: 15.10.2021

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Guarantor of Study Programme

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