

Estudo Orientado em Biologia Celular e Biotecnologia

Estudo Orientado em Biologia Molecular e Genética

Título: Leveraging wastewater virome analyses for public health responses

Enquadramento: In response to the rapid emergence and dissemination of priority pathogens, integrated surveillance systems are being established in the One Health Era. Wastewater analyses enable biomarker monitoring at the sewershed level, offering timely insights into pathogen circulation originating from different compartments (i.e. human, animal, environmental). During one of our projects' rollout, urban wastewater from seven wastewater treatment plants (WWTPs) with different treatment schemes, representing 2,5 million in equivalent population and located in the main urban areas of the country, were sequenced by shotgun metagenomics. In this working plan, we propose to characterize the virome of the sampled WWTPs at different treatment stages.

Plano e Métodos :

Metagenomic assemblies from different treatment stages of the sampled WWTPs will be analysed, with the following aims: (1) to characterize and compare virus taxonomic composition of urban wastewater across different stages of WWTPs with different treatment schemes; (2) to outline longitudinal changes in microbial composition at different sampling time points, (3) to integrate virome findings with quality control parameters of WWTPs operation (e.g. microbial indicators, BOD, COD, TSS), mining predictors of viral removal efficiency and fate across the water cycle.

[TASK 1] Literature review.

[TASK 2] Metagenomic assembly (bioinformatic analyses) and curation of the dataset to be used, including sequences and metadata.

[TASK 3] Virus Taxonomic Identification.

[TASK 4] Literature review on retrieved viruses.

[TASK 5] Data mining to integrate operational parameters of WWTPs with virulome datasets, identifying predictors of interest.

[TASK 6] Preparation of final report.

Nº de alunos: 3

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