Wastewater Surveillance for the Identification of the Presence of SARS-CoV-2 and the Observation of Mutations of the Virus Variants

Dumpe, Dora (School: Riga Secondary School No. 64)

Monitoring of the SARS-CoV-2 virus variants prevalence in a specific area is usually done by sequencing data analysis of infected individuals' test samples, however, there is another approach to obtain such information, which is wastewater surveillance. In this research, it was studied how accurately wastewater surveillance reflects the results obtained from sequencing data analysis of infected individuals' test samples in Riga, Latvia. The aim of the work was to compare the frequency of S (spike) protein mutations characteristic of Omicron BA2 and BA4/5 variants in the test samples of infected individuals with the mutations detected in wastewater samples at the corresponding period of time. The hypothesis of the work was that the SARS-CoV-2 S protein mutations detected in infected individuals' test samples in May 2022 will also be found in wastewater samples corresponding to the same time period. The work involved a laboratory study of wastewater samples and sequencing data analysis and statistical processing of both wastewater samples and test samples of infected individuals. The obtained results show that in May 2022 in Riga, Latvia, both in wastewater samples and in the test samples of infected individuals, mutations corresponding to Omicron BA2 and BA4/5 variants were detected and an increase in the frequency of occurrence of the BA4/5 variant was observed. This confirms the hypothesis of a correlation between the variants of the virus detected in the test samples of individuals and the wastewater samples from the same city.

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