PROJECT FACTSHEET

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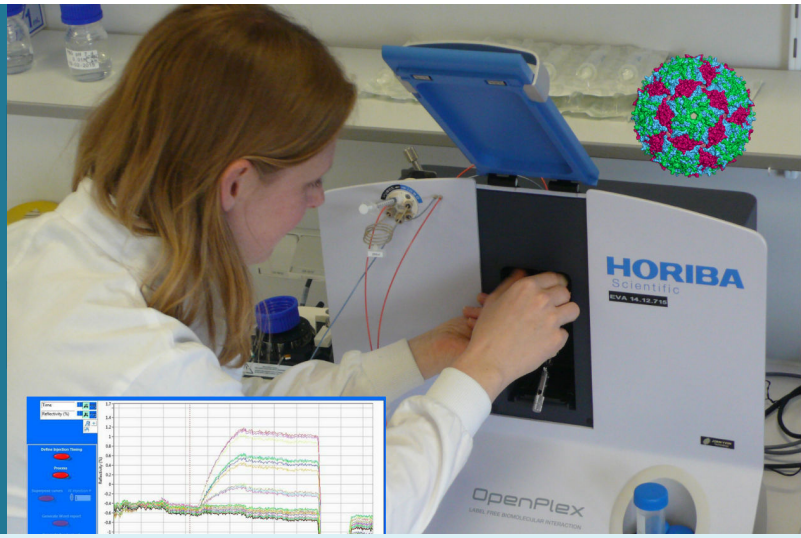
VIROSURF

Designing biosensors for the quantification and characterization of specific waterborne viruses.



Inspiration

One of the current major challenges in the management of water quality is to develop rapid (or even better, real-time) detection systems for pathogens. According to the European Water Supply and Sanitation Technology Platform (www.wsstp.eu): “In [the] future the management of the water cycle will not only be based on [a] prediction of what can happen but also through a change of management based on information obtained by sensor networks”. With waterborne viral pathogens being one of the major threats to water systems, biosensors for their detection are therefore highly desired for the management of water resources.

Innovation

The VIROSURF project aims to design biosensors for the quantification and characterization of specific waterborne viruses using Surface Plasmon Resonance imaging (SPRi) technology. To achieve this goal, two scientific approaches will be followed. The first part of the project will focus on the development and selection of bioreceptor molecules capable of capturing human adenoviruses (pathogenic viruses affecting humans) and F-specific RNA phages (viruses that only infect bacteria). This choice is based on the use of short fragments of nucleic acid (DNA or RNA) that can attach to viral proteins such as aptamers. All methodological aspects and optimizations will be conducted using viral laboratory strains. The focus is on the characterization of the integrity or infectious state of the viral particles, in connection with an evaluation of their risk to public health. In a validation step, viral analysis of environmental waters will be carried out using the SPRi biosensor. These results will then be compared with those obtained using common detection tools, such as real-time PCR (masures the quantity of viral DNA or RNA) and cell culture assays. Running in parallel, the second part of the project will be dedicated to the design of a filtration module for in situ sampling and pre-treatment of water.

Impact

In addition to publication of the results in high-ranking journals, the biorecognition molecules and technical product (in situ filtration device) developed in the VIROSURF project will be used in future projects dedicated to designing low-cost environmental biosensors adapted to user needs in the water resource sector.

Partners

Université de Liège - Centre de Recherche sur les Protéines-Prions (BE) , HORIBA Scientific (JP) , CAPTOOR (FR) , Syndicat des Eaux du Barrage d'Esch-sur-Sûre (LU) , UMI2958 Georgia Tech-CNRS (FR)

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