ACADÉMIE NATIONALE DE MÉDECINE

Generalize the detection of SARS-CoV-2 in wastewater: an urgent measure at a time of epidemic reflux

Press release of the National Academy of medicine on October 13, 2021

In the current phase of regression of the Covid-19 epidemic, all means must be used to monitor the circulation of the virus in the population and to detect early possible resurgence. Screening tests (antigenic tests and RT-PCR) make it possible to identify infected persons, to trace contact people and to isolate them. These tests help to quantify the daily incidence of SARS-CoV-2 infections in each department thanks to the screening information system (SI-DEP), but with a low degree of anticipation of a possible epidemic resurgence.

In addition to the epidemiological markers of Covid-19, the analysis of wastewater provides a major strategic tool to anticipate a possible epidemic rebound. Implemented in March 2020, the Obépine network was the first to establish a correlation between viral loads in wastewater and classic epidemiological indicators [1].

Indeed, SARS-CoV2 multiplies in the enterocytes of the digestive tract [2] and 30 to 50% of asymptomatic carriers temporarily shed the virus in their stool. Hence the interest of detecting its genome by RT-PCR in wastewater. Each wastewater treatment plant serving several tens to several hundreds of thousands of households can thus become an observatory allowing the circulation of the virus to be monitored throughout the country. As in many countries [3-8], this surveillance has been successfully implemented in France and covers currently a third of the population. It is possible, at low cost, to follow the evolution of the virus by networking different sampling sites serving a city, a district, or homogeneous groups of buildings.

The amount of nucleic acids detected is correlated with the incidence curve of cases: it precedes the onset of the wave, accompanies its rise and decreases with its regression [1,6]. This very specific signal has the major advantage of preceding the detection of the first symptomatic cases of Covid-19 by health systems, making it a very valuable indicator for anticipating any epidemic resurgence. In addition, the use of this tool could be extended to the detection of other seasonal viruses, as influenza viruses, rotaviruses or the respiratory syncytial virus that causes bronchiolitis.

The Obépine project received a lot of scientific support, including that of the French Academy of Medicine since the first decontainment in July 2020 [9]. Likewise, in May 2021, the French COVID-19 Scientific Council estimated that the analysis of wastewater in its treatment plants proved to be an "excellent sentinel of an epidemic relapse when the level of circulation is low, in this case even before the epidemiological indicators such as the number of new daily infections"[10]. In accordance with the recommendations of the European Commission, this pioneer system was to be relayed on October 1, 2021 by the implementation of a new microbiological surveillance system in wastewater (SUM'EAU) piloted by the General Directorate for Health and the Directorate of Water and Biodiversity in order to consolidate existing networks. Unfortunately, the indefinite postponement of the transfer threatens to interrupt the functioning of this surveillance system at a time it could provide an essential epidemiological indicator.

Faced with this worrying situation, **the French National Academy of Medicine recommends**:

• to maintain the operational funding of the Obépine network until its functions are effectively taken over by SUM'EAU so as not to suspend the microbiological monitoring of wastewater currently deployed on 200 wastewater treatment plants;
• to extend this coverage with a reinforced network of the national, metropolitan and ultra-marine territories, by including the departmental veterinary laboratories of analyzis in association with the technical assistance of the treatment plant operators;
• to provide the technical, human and financial means to intensify this surveillance during the period of low transmission of SARS-CoV-2 in order to be able to detect any outbreak of an epidemic relapse as soon as possible;
• to systematically combine RT-PCR tests with sequencing to identify any new variants;
• to set up sample banks to allow retrospective analyzes to be carried out;
• to plan the extension of this environmental monitoring to the detection of other epidemic infectious agents.

Références

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