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Editorial

Virus Detection: What Were We Doing before COVID-19 Changed the World?

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As we sit here locked down in our homes while COVID-19 threatens how we live our lives, one thinks about the old life we led. We seldom worried about contact with other people, or people walking past us in the street. When we caught a viral infection, most of us thought of a cold or flu, and expected aches, pains, and a stuffy head, but few of us feared loss of life. And not many people were interested in topics such as testing rates, testing methods, or testing speeds. But some were. The papers in this virtual issue are by some of the researchers that have been developing tests to detect viruses. The type of research they were doing was no less important then than it is now. Current events have just brought the importance of their work into focus. HIV, SARS, MERS, bird flu, and zika had demonstrated that the emergence of new viruses can have an incredible effect on the world. Typically only affected communities paid attention, but with COVID-19 that is all of us.

What we have learned from COVID-19 is that the regions of the globe most successful in reducing the spread of the virus—think South Korea, Taiwan, and Australia to name a few—had a dual strategy of a rapid lockdown of the country, and extensive testing, Many tests per thousand people, and a low percentage of tests performed being positive, is a commonality. Experience with a variety of other viral outbreaks certainly meant much of South East Asia had well developed protocols established, which centered around testing and isolation. So, testing has been at the very front line of the fight against COVID-19. The most effective testing strategies are stratified, rather than being a one-size-fits-all approach. There are important roles for very simple screening tool such as temperature sensing, rapid molecular tests—including the lateral flow-based IgM and IgG antibody tests that indicate exposure and response to the virus, and the quantitative PCR tests that measure the viral genome directly. We need all these types of tests, and we need improvements. It is clear that a rapid, portable test that could detect the virus directly, with high sensitivity and specificity, would be a brilliant advance. It is also clear that improving the sensitivity of the serological tests, so they could warn of infection earlier, would help reduce community transmissions.

In this virtual issue we concentrate on the development of molecular tests for viruses, a focus not surprising for two chemistry journals dealing with analytical measurement. The issue leads with a review on detection of biothreats (Mother Nature is an accomplished bioterrorist!), and then covers a range of innovative technologies[1] that focus on assays for point of care testing,[2−4] faster diagnostic testing,[5−8] more sensitive diagnostic testing,[9−17] characterizing the response to the virus,[18−21] and highly sensitive methods for biologically tracking and characterizing the virus.[22,23] The papers cover technologies that detect genes specific to a virus, that detect antibodies, and that even detect the virus particles themselves. They cover viruses from the flu, to Ebola, MERS, zika, HIV, and already, SARS-CoV-2. We already have other papers going through our reviewing processes on SARS-CoV-2. We feel the papers in this virtual issue serve as a benchmark of the types of innovation the journals *Analytical Chemistry* and *ACS Sensors* are looking for. The papers we selected are just a subset of the many wonderful, innovative papers on infection detection we have published, and they represent the incredible work being done around the globe in detection science that will help keep us safe. When we read the papers, they give us hope that we will be far better equipped to deal with any future potential pandemics. We thank these scientists for their research.

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Notes

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