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Editorial Note on a Synthetic Chemistry Dose for the Health Crisis

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EDITORIAL NOTE

The SARS-CoV-2 epidemic has motivated experts from several fields to collaborate in order to develop a successful solution. We investigate how we might effectively contribute to this continuing endeavour as academic synthetic chemists. The present epidemic is reminiscent of previous global health crises in which synthetic chemists made important translational contributions through basic research. Several research topics are presented above in the context of producing compounds like remdesivir, which require additional development and innovation from chemists in order to drive advancements in antiviral research during this time of need. If we want to combat global health concerns like COVID-19, we must drive future breakthroughs in synthetic chemistry as a community.

The ongoing COVID-19 issue has altered the global scene; for chemists, the enforced self-isolation and social distancing instructions have severely hampered research activities. The new coronavirus (SARS-CoV-2) has infected over 2.1 million individuals in the United States alone, resulting in 116,000 deaths as of June 16, 2020 and has brought life as we know it to a complete halt.

COVID-19 medicines are being developed by scientists from all disciplines. As of May 10, 2020, 172 therapies for COVID-19 were being studied in 308 ongoing or recruiting clinical studies across 65 countries. The present crisis has prompted scientists to examine large chemical libraries in the hunt for novel antiviral treatments. Scientists are hitting the problem from all angles, repurposing current treatments, launching virtual screening campaigns and looking into the structural foundation for viral entrance into host cells at a breakneck speed. What should we, as synthetic chemists in academia, focus to contribute to this pandemic response, given all of these efforts? In the absence of a vaccine, antiviral therapy will most likely be the first line of protection. Existing synthesised small molecule medicines may offer the best potential for bringing a treatment to market to address growing worldwide need, among the numerous therapies presently being investigated. The current pandemic's size inevitably prompts parallels to previous global health disasters. Synthetic chemistry has been essential in tackling the issue of infectious illness on a worldwide scale in the century after the devastating 1918 Spanish Flu epidemic, which infected up to one-third of the world's population; examples abound. The development of new antibiotic medicines such as penicillin V in the decades after the discovery of natural penicillin in 1929 changed infectious disease medicine. Total synthesis, semi-synthesis and large-scale fermentation techniques were used to accomplish these breakthroughs in the post-war era.

The discovery of quinine in 1944 prompted a slew of chemists and other scientists to devote their efforts to combating malaria on a global scale. These efforts eventually led to the discovery of drugs like chloroquine and artemisinin, as well as a slew of other chemicals that revolutionised the way parasitic illnesses were treated. As the retrovirus expanded over the globe at the end of the twentieth century, the HIV/AIDS epidemic galvanised the chemical community to produce a spectrum of molecules effective for infection mitigation. Synthetic chemists, both in university and corporate facilities, played critical roles in resolving worldwide human health problems in each of these situations. Taking a small molecule therapy from discovery to large-scale manufacture is no easy task and the extent to which the scientific community has succeeded in treating infectious illnesses is inextricably linked to the worldwide synthesis and distribution of such medications.