Editorial: Archives of Virology's 80th anniversary symposium—6 months later

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On the 25th November 2019, around 100 scientists from all fields of virology met to celebrate the 80th anniversary of the publication of the first issue of *Archives of Virology* in February 1939 [6]. The participants were treated to eleven outstanding talks covering all areas of virology. We marvelled at the complexity of African swine fever virus but were frightened by the economic losses that it generates in swine farming. We were concerned about the difficulties of the human immune system to synthesise broadly neutralising antibodies to HIV but encouraged by the success of two vaccines that had been used to control the Ebola outbreak in the Eastern parts of the Democratic Republic of the Congo (DRC). In the last talk, we were astonished at the sheer number of viruses identified in birds, fish and insects by Edward Holmes and his Chinese collaborators. Indeed, he estimated the number of viral species in the global eukaryotic virome to be of the order of 100 million.

In the months after the symposium, the use of vaccines and contact tracing in the DRC thankfully ended the Ebola epidemic. The strain on this poor country and its overburdened health service left many children unvaccinated against childhood diseases, so that an estimated 6000 children for instance are thought to have died from measles infections in the DRC in the last 12 months. Yet, these important events in virology failed to grab international headlines. Instead, a virus from one of those 100 million that Edward Holmes mentioned must have been emerging in Wuhan at the same time as the 80th anniversary meeting in November. In December and January 2020, infected people travelled from China to Iran and Italy, eventually spreading the virus across the globe and consequently putting virology into the headlines of media outlets worldwide. Instantly, virology was transformed from one of the more obscure life science

branches to one about which everyone has an opinion. In recent years when I taught students in my course on Frontiers of Virology at the University of Vienna, I was lucky if one or two of them had heard about an R_0 value and its implications for vaccination and herd immunity. Now, politicians talk about R_0 values as if they were tablets of stone to base long-term policy whereas herd immunity has quite undeservedly been tinged with very negative connotations.

So what should this newly found fame for virology and virologists mean for our field? First, it should mean that we try to educate both the general public, the politicians and the governing bodies that this is not a one off-event. Given the bat origins of SARS-CoV2, including the unusual receptor binding domain and the polybasic furin cleavage site [1, 4, 5], it must be made clear that SARS-CoV2 did not originate in a laboratory but in a bat cave somewhere in China. Further, given that up to 827,000 animal viruses have been estimated to have zoonotic potential [2], it seems certain that at some point in the future another coronavirus will emerge against which the human population is immunologically naïve. The world must prepare testing centres across the globe that can in the future respond rapidly to a novel virus as well as developing and stockpiling broadly cross-reactive vaccines. Second, virology must be moved into the centre of life science and medical teaching in higher education to produce more researchers and doctors trained in virology. Third, teaching of virology should begin in schools with the basics of control of not just respiratory viruses but those transmitted by other routes such as oral-faecal route and skin contact. Many schools now, at least in the EU, offer free human papilloma virus vaccination. This would be an excellent opportunity to inform students what a virus is, what a vaccine is and how a vaccine protects against viral infection. Fourth, the global demand for the rapid development of a SARS-CoV2 vaccine should be used as an opportunity to explain why vaccination is so important to human health and thus to defeat those who actively denounce vaccination and its benefits. Fifth, other viruses should always

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be remembered, and we need to inform societies about the economic problems presently posed, for example, by African swine fever and tomato brown rugose fruit virus. In addition, we should point out that the next influenza pandemic will likely be a H2 subtype as the human population has not been exposed to this subtype since the mid-1960s.

Looking more to home, how has the emergence of SARS-CoV2 affected *Archives of Virology*? Not surprisingly, two members of the Editorial Board were unable to handle manuscripts because of diagnostic duties and many reviewers said that they were unable to accept invitations for similar reasons. Nevertheless, the virology community has continued to support the journal, as illustrated by the issue of the journal that was set at the end of April this year. About 30% of the articles in the issue were 2020 submissions, illustrating that the submission and review process is still proceeding at a rapid pace. We have also received many reviews on all aspects of the SARS-CoV2 pandemic. One of these was published on-line on April 20 and has already seen over 1200 accesses [3]. However, many of the reviews submitted were of a poor quality and were often rejected without review. I strongly encourage authors who wish to submit reviews to the journal on SARS-CoV2 to make sure that they communicate a clear advance in knowledge for the community, that they are focussed on just one particular aspect and that they critically discuss previous literature that has been peer-reviewed (i.e. that excludes material only currently available on pre-print servers). The full guidelines are documented in the “Instructions to Authors”.

Finally, let us look optimistically to the future and imagine the presentations that might be on offer if we celebrate 90 years of *Archive of Virology* in 2028. Perhaps there will be a report on three drugs that target the polymerase, the 3CLpro and the PLPro of the replication complex of SARS-CoV2. Possibly, these drugs will have been developed based on a cryo-EM structure of the coronavirus replication complex. I would hope that a presentation might explain why children are not seriously troubled by SARS-CoV2 infections and why about many infections in the adult population

are asymptomatic. And, of course, one can wish that there will be a discussion on several approaches that were used to develop vaccines and the realisation that antibody-dependent enhancement of infection was not a problem [7]. In my virological fantasy, the final lecture will report on the global network of testing facilities and vaccine stockpiles that were established to detect and treat new zoonoses before they endanger human life. In other worlds, let us hope that the world will have learnt from the unsettling events of Spring 2020.

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