Reply to Tournier, “Pandemic Legion History More Complex than Previously Thought”

David M. Morens, a Jeffery K. Taubenberger b

a Office of the Director, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland, USA
b Viral Pathogenesis and Evolution Section, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland, USA

We thank Dr. Tournier for his comments, which highlight the importance of using modern tools and modern knowledge to look backwards in time to try to understand new disease emergences. We want to emphasize for readers that we neither believe nor meant to imply that phylogenetic dating of viruses and bacteria strictly reflects what is referred to as “emergence.” It is accepted, for example, that the first human infections with HIV probably occurred at some time between the late 1800s and early 1900s, and yet we date the emergence of HIV/AIDS to 1981, when the disease was first recognized clinically and epidemiologically (1), reflecting understanding of the different meanings of the terms “disease emergence” and “microbial origin.” It was surely an analogous situation with ancient diseases, because it takes time, sometimes long periods, for host-switched infections to actually emerge as epidemic or pandemic diseases. In man’s hunter-gatherer days, before about 12,000 years ago, humans lived in very small clan groups without extensive or continual contact with other humans. Pandemicity and large-scale epidemicity were therefore impossible or delayed (2). We also underscore that we have never suggested that human tuberculosis was derived from bovine tuberculosis; in fact, newer data suggest multiple confusing possibilities for the origin of human Mycobacterium tuberculosis (3). In short, we have not taken positions on when organisms first infected humans and suggest only that the settling of humans into villages and cities facilitated the emergent spread of such organisms.

Regarding the perpetually intriguing Plague of Athens (years 430 to 425 before the Common Era [BCE]), although we noted that other scholars have linked the disease to anthrax, we ourselves have never espoused this view, although we retain it as one of a number of possibilities (4). Clearly, the anthrax bacillus is an ancient organism; if it was the cause of the Plague of Athens, there is nothing to suggest that it emerged only in 430 BC. Indeed, common sense would suggest that it probably first infected humans long before.

In our brief review, touching only tangentially on the subject of ancient disease origins, we repeated the conventional wisdom among anthropologists and historians that many important human diseases “emerged” during the Neolithic Revolution (2), a turning point at which some endemic diseases became epidemic or even pandemic. Going forward, it will be interesting to see whether, and to what extent, phylogenetic and other data converge or are at seeming odds with historical data, understanding that the age of the organism and the age of its emergence may in some cases be very different but in other cases less so. Such data for diseases such as measles, smallpox, and some others remain unresolved and even controversial but also create opportunities for scientists to examine and potentially clarify infectious disease history. In short, infectious organisms are ancient and initial human infectious with some of them probably occurred millennia ago, but in our view, emergence into recognized epidemic and pandemic disease in most cases could only have occurred after humans transitioned from hunter/gatherers into early civilizations.
REFERENCES


