



## Polio Biology III What About If We Need The Virus Later?

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Viruses are tricky creatures. We don't understand everything about them. Until recently we didn't even know how polio got inside the cells it infects. But we are learning new things all the time. Polio virus is one of the most cultured (grown) viruses for laboratory study. And yet, there are aspects of its life cycle which remain puzzling. For example, how are the virus's protein subunits assembled after they are produced, inside cells, during infection? Or, what is the effect of a mutation (change) in one of the protein subunits that assemble to produce the case inside which the genes of the virus reside? One thing we do know is that polio virus mutates a lot during infection. Its small component of genes is simply too little to contain the "Proof Reading" enzymes found in larger cells with larger genomes. When polio is eradicated from this earth, which may happen soon, should we keep this virus to continue studying it or should we discard it and allow it to crumble inside the steel of autoclaves throughout the world? This is not a question that will come without controversy.

The World Health Organization recommended in 1996 that the World's known stocks of Smallpox Virus, held by the U.S. Centers for Disease Control and Prevention and the Russian State Research Center of Virology and Biotechnology, be destroyed. The last known outbreak of Smallpox was in Somalia in 1977. So the destruction of laboratory stocks seems like a fitting end to this historical scourge. But what if we learn about a new disease in the future which involves smallpox infection. Suppose smallpox is now dormant inside some people? What if the virus is being held by rogue states that plan to use it as an agent of biological warfare? Or what if we simply want to study it to learn more about viral diseases? These considerations have resulted in President Clinton balking on WHO's directive to destroy smallpox stocks by June 1999. The US will keep its laboratory stocks of Smallpox.

Despite the fact that wild polio infection has not been seen in the Western Hemisphere for quite a few years, we are continuing to learn more about how polio may be harming those it infected 40 years ago. The Pasteur Institute is involved in studies centering on the molecular aspects of a polio infection and have discovered that inside the spines of those of us with PPS polio virus genes (and likely proteins) persist. As we gather more evidence it will become important to find out the mechanism of this persistence. The protein case that surrounds the virus will be a target of much of this research. The polio virus is so small that a big chunk of its genetic material is devoted to the protein case. If a virus loses a gene to make the properly shaped protein for the case it would be impossible for the virus to assemble itself and spread. This could be what allows polio virus to persist. This aspect of virus biology could help explain the Post-Polio Syndrome. At this moment the two main contenders for explaining PPS are the "Wear out Theory" and the "Viral Persistence Theory". One doesn't need a live virus to explain our woes; the other does.

So, I guess I would side with President Clinton's ideas on maintaining Smallpox stocks. The world is safe

from smallpox and we can only learn more by studying the virus. We just don't know enough about them even though we seem to have eliminated the future threat of new epidemics.

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