Wigler November 9, 2014

How to cure Ebola and curb the epidemic

Ebola is spreading rapidly in Africa and has reached our shores. What do we do? And what is to be done in the African nations most severely affected? This is not a hard problem, at least in scientific terms. The general public, which is understandably alarmed, should know this: the technology needed to end the current crisis is in standard use. The answer to the crisis, for those in Africa and everywhere else the Ebola virus surfaces, is evident. We are personally familiar with the technologies needed to curb the epidemic, and some of us have been involved over a period of years in the development and deployment or the technologies.

The facts point to a clear answer to the present crisis. First, people who have recovered from Ebola -- and about half do -- develop neutralizing antibodies (ABs) to the virus. Their ABs can save the lives of others, thanks to a phenomenon called passive immunization. This has been exploited on a small scale during the current outbreak, as some patients have been treated effectively with survivors' donated serum. However, sera collected from survivors can contain other pathogens, so this approach is neither practical nor completely safe on a large scale. If we had a sufficient supply of purified Ebola-neutralizing ABs, we would administer them to everyone infected to promote recovery, and to all healthcare workers and soldiers on the front lines *before* they are exposed, protecting them from infection.

The academic and biotechnology sectors know how to build this supply on short notice. If we follow through, we will stem the current epidemic and buy time while a vaccine is readied to prevent the next outbreak. Typically, therapeutic ABs -- such as the existing drugs Herceptin and Humira -- are made in fermentation vats in which genetically engineered animal cells are grown in high volume. One company already makes Ebola-neutralizing ABs, but does this in engineered tobacco leaves. Production therefore cannot be rapidly scaled up. The company is obliged, ethically and perhaps legally, to offer the critical DNA to the government.

In parallel, we should culture the blood cells that make antibodies to the virus from survivors of Ebola, and clone the genes encoding the ABs from these cells on a continuing basis. The government should distribute the AB genes to known high-volume commercial AB producers, who should be organized to manufacture sufficient quantities to stave off the current Ebola threat, in this country and abroad.

The outstanding questions are practical. Who is going to mobilize and coordinate the effort to produce a large supply of purified Ebola-neutralizing antibodies? How will commercial participants in this effort be compensated? How can the work be fast tracked through regulatory hurdles? Since these questions are straightforward legal and logistical ones – not scientific – the burning question reduces to whether a plan such as that we have described here is in fact being carried out.

We assume that the U.S. government already has set such a plan in motion. If so, we encourage publicity in the interest of reducing fear. In the event that such efforts have not yet gotten under way, or do not yet have the full backing of the government, we want to indicate here our enthusiastic support, and remind all involved that time is of the essence. A full-throttled response is required.

This is one war our country should be fighting with all its might, one in which all peoples of the world stand on the same side against a common enemy.

Co-authores: Marc Tessier-Lavigne, Richard Axel, David Baltimore, Tom Maniatis, David Botstein, Jim Simons, Bruce Stillman and Jim Watson. Rejected for publication in the NYTimes, Boston Globe, Wall Street Journal, Washington Post and LATimes. Covered by Thomson-Reuters at http://www.reuters.com/article/2014/11/07/us-health-ebola-usa-antibodies-exclusive-idUSKBN0IR1I520141107