Bob Simon's final 60 Minutes: Grinding progress of ZMAPP Ebola GMO drug

CBS aired Bob Simon's last piece for 60 Minutes on Sunday night on a cure for Ebola: a drug made from genetically modified tobacco. Some anti-GMO activists have attacked this innovative drug as dangerous solely because it has been genetically engineered.

Simon died last week in a tragic car accident. His death, and his funeral Tuesday, February 18, pay tribute to his 47-year career. In his last report, Simon highlighted the under-supported research behind the ZMAPP drug. He focused on the length of time it currently takes to produce the drug as well as lack of U.S. government support over the last 12 years of the drug's development from discovery to trials.

Click here for the longer 60 Minutes tribute to the late Bob Simon (13:52)

So far there have been 22,894 infections, with 9,177 deaths, from the Ebola virus, primarily in Liberia, Sierra Leone and Guinea, yet the drug is only now about to begin clinical trials in humans in Liberia. Infections in Liberia have been reduced dramatically with only three new cases recently.

Starting last August, the ZMAPP drug has been used to treat nine patients, first with American medical missionary doctor Kent Brantly, who recovered.

Unbeknownst to Brantly, who contracted the virus doing medical work in Liberia, infectious disease researcher Gary Kobinger, of the Public Health Agency of Canada, had produced an Ebola drug called ZMAPP. But so far, Kobinger had only tested it successfully on monkeys.

Brantly received the drug and "after two or three hours, I was actually able to get up and walk to the bathroom," he said.

Though it's not yet clear that the drug is responsible, as not all have survived the treatment. Brantly also had a blood transfusion and first-rate medical care. This is why trials are needed.

MAPP is produced by a small San Diego-based biotech company called Mapp Biopharmaceutical who began the research 12 years ago, reported Simon. The only investor the company could get was the U.S. government, who after 9/11 ramped up funding for potentially threatening diseases that could be weaponized, including Ebola.

The scientists use a common tobacco bacteria, genetically engineered with different components of the Ebola virus, to infect a large number of tobacco plants.The infection spurs the plants to make antibodies to the virus, including the pieces of viral Ebola DNA. Though tobacco has the stigma of bad health. CEO Hugh Hadyon of Kentucky Bioprocessing, which produces the drug in greenhouses said that it is clearly an irony but that the plant can be used for good. Tobacco is a good organism to produce genetically engineered drugs because its relatively easy to infect the plants with altered bacteria, the plants' immune systems react well.

Meanwhile, anti-GMO websites decried the use of a genetically modified crop to produce a drug, spreading fears that it will cause cancer or elephantiasis. Here is just one of many blogs, from the quack website NaturalNews:

> At no point have GM monoclonal antibodies ever been successful in human trials, as they are, by their very nature, incompatible with the human immune system. Using synthetic proteins that exist nowhere in nature to trigger some kind of positive immune response by the body is human pride and arrogance at its pinnacle — a loathsome attempt at playing God that appears to always result in catastrophic biological damage.

The blog cited alleged failed clinical trials in Europe of drugs developed using similar technology. Yet, so far, one drug treatment generated by GM plants has received approval by the FDA—Elelyso uses a novel vector with carrot cells to treat Gaucher disease, indicating that successful biopharming solutions are possible.

In reality, there is no need to think of a drug produced from GM tobacco as any different from GM crops. Distilled down to the basics, the technologies are the same. GM crops have been found to be safe by scientific consensus. GM pharma, then, doesn't make as scary a picture as activists paint.

Interestingly, even the British organization GM Watch, which is a watchdog group skeptical of GMOs, says that they have no problem with the medical use of GMOs, a contradiction with their stance on GM crops. So the anti-GMOers are split on this one.

GM Watch clarified that they are primarily opposed to GM pharma products that are farmed in the open as opposed to contained settings. However, Kentucky Bioprocessing grows its tobacco in greenhouses, making the group's concerns moot.

"We have no problem with the medical use of GM technology as long as products are developed in properly contained settings and tested and used responsibly," a statement says. "We applaud the developer company for observing that precaution, which should be a regulatory requirement for all GM pharma crops."

But Simon reports the long process to produce ZMAPP, which is one factor that has hindered the progress of the treatment:

> The tobacco plants first have to be grown for 24 days. Then they are immersed in a liquid containing a gene that tells them to make special antibodies which tells them to make antibodies which help the immune system fight viruses, in this case Ebola. As the plants grow the p copy those antibodies over and over again. …The leaves are then ground up into aliquid, which looks like a juice you buy at a health food store. Since Zmapp is made up of three different antibodies the process has to be repeated three times using 6,000 pounds of different tobacco plants.

The process takes six weeks and yields only enough for dozens of doses.

Simon then pushes to find out why so little of the drug existed when the epidemic broke out last year. He visits the Biomedical Advanced Research and Development Authority under the U.S. Department of Health and Human Services, the bureaucracy created to ready the nation for outbreaks like Ebola.

While BARDA has government manufacturing center intended to make drugs and vaccines quickly, they haven't produced a single dose of ZMAPP.

Simon presses Robert Kadlec, President Bush's point-man on biodefense, on why the U.S. isn't ready for a number of biological threats initially targeted after 9/11. "In terms of the accumulation of your responses, it doesn't sound very good does it?" Simon asked.

Kadlec responded, "It's not very promising and again I think the Ebola crisis gives the opportunity to highlight… that we can do better on this."

Additional Resources:

- Experimental Drug Saves Monkeys Stricken With Ebola, NPR
- Ebola drug 'ZMapp' shows potential of biopharmed medicine, Wall Street Journal
- Should GMO drugs be perceived differently than GMO food? Genetic Literacy Project