Lesson from Ebola: Tobacco plant key to developing GMO drugs of the future

I recently had the most absurd exchange of tweets with an anti-GMO activist that went something like this:

Me (not tweeting to anyone in particular): Today, 93 percent of Americans understand that tobacco causes lung cancer, various other cancers, heart disease and strokes. That's because the evidence has been public for more than 60 years.

Anti-GMO guy: You're misinformed. My grandfather was an organic farmer who smoked and lived to 100; tobacco causes cancer, only when it's GMO tobacco, which is what most tobacco companies are using these days .

The irony here is that, while any tobacco is harmful if smoked, there's a kind of tobacco that's being put to positive use—namely, the use of the plant to produce antibodies that make up the drug ZMapp for treating Ebola virus–and it's GMO tobacco. Compared with bacteria, the more commonly genetically engineered organisms, the tobacco plant can produce the needed ZMapp antibodies more quickly and in greater numbers. Because of the unique qualities of the tobacco plant, it turns out that it is incredibly useful to use for research purposes, particularly in developing life saving pharmaceuticals As for non-GMO (natural) tobacco, that's still useful only to deliver carcinogens into people's lungs.

What do the polls show?

The anti-GMO grandson of the organic smoking centenarian represents the extreme end of a public opinion spectrum. Even if rationalization still keeps many people smoking, most people today do actually know that the smoking-cancer connection is due to the carcinogenic chemicals that occur naturally in tobacco leaves and other carcinogens that are created when other naturally occurring chemicals in the plant are burned. That was the one good finding of a recent poll conducted by Pew and the American Association for the Advancement of Science (AAAS), but that poll also revealed huge gaps between the public and scientists on a host of other issues, including GMO safety. While 88 percent of its member scientists consider GMO foods safe, only 37 percent of the public is as sanguine.

This disparity should raise concern among science educators. Nevertheless, for those grasping the potential benefits of GM technology, the PEW-AAAS result is balanced by another recent study showing that the public is not as opposed to GMOs as one might think. Conducted by researchers at North Carolina State University and the University of Minnesota, the other study found that most consumers are open-minded about GMO products when those products have health benefits, nutritionally, or otherwise. ZMapp made from GM tobacco to fight Ebola is the most famous example of a GM product to which the public already has little objections, but there are others just over the horizon.

Genetically modified plants and medical biotech

With an approach similar to that used for ZMapp, GM tobacco is also being used to develop flu vaccines, while potatoes are being used for vaccines against hepatitis B and noroviruses, another kind of hepatitis B

vaccine is being developed from GM corn, and other plants are being considered to host genes for making vaccines against certain rhinoviruses and even immunodeficiency virus (HIV, the virus that causes AIDS). Additionally, chemical compounds taken from spinach are being adapted for immunization against rabies, while enzymes made by carrot cells are being used for treatment of a genetic condition called Gaucher disease. Finally, the gene for human insulin has been transferred into safflower plants to improve diabetes treatment.

We're at the beginning of a new age, the era of GMO medicine. While it's moving extremely rapidly and the public may be overwhelmed, the potential benefits are enormous. People will live longer and higher quality lives as a result of the new treatments, and if it's explained right and the benefits made clear, the public will embrace it. Well, maybe except for a few ideologues at the end of the spectrum.

David Warmflash is an astrobiologist, physician, and science writer. Follow @CosmicEvolution to read what he is saying on Twitter.