

EPA, Monsanto ignore health risks of RNA interference technology

The GLP aggregated and excerpted this blog/article to reflect the diversity of news, opinion, and analysis.

Americans could soon be eating apples that won't turn brown after slicing. The apples were created using advanced biotechnology called RNA interference (RNAi). But a number of disturbing questions remain about how RNAi technology might affect human health.

The major issue is whether plant RNA molecules can pass through the intestine wall in humans, enter the bloodstream and cause serious health problems. The EPA's review doesn't consider several studies. [One by Dr. Vicki Vance](#), a biology professor at the University of South Carolina, found that dietary RNAs from plants could cross the gastrointestinal barrier and act as a potential cancer treatment.

"Many of these GM crops will harbor populations of small RNAs that don't exist in nature and may have potential to suppress mammalian gene expression in unexpected ways," she says.

Vance was a strong supporter of genetic engineering until [she claimed] Monsanto officials tried to quash her research showing dietary RNA crossed the gastrointestinal barrier.

RNAi technology, Vance says, may help create "an effective, nontoxic, noninvasive and inexpensive preventative (or treatment) for cancer and perhaps other diseases... From the viewpoint of Big Ag companies, however, it raises unfortunate questions about the safety of RNAi food crops that, I think, they would rather deny than address."

Reply to article by Thomas Baldwin, PhD from the University of Georgia in plant pathology. Current research involves effects of siRNA and miRNA on fungi. Twitter handle: @TomahawkVPhD.

Hi Paul,

Interesting article and partially accurate. There is one critical concept you are missing, which is Specificity. Specificity is critical for function of small interfering RNAs cut out from the long double stranded RNA. What you are trying to convey as a concern is off-target effects. However, You are conflating uptake and off-target effects. Dr. Vance's experiments have more to do with uptake, then off-target effects considering she used a miRNA cocktail with specific targets.

Dr. Vance's experiments are very well executed. Keep in mind her experiments used direct feeding of miRNAs designed to target tumors and to mimic plant derived miRNA. The experiments were not with transgenic plants. The miRNA were orally fed and in much higher concentration then you would get in a normal plant diet.

In her methods, she gavaged 17-22g mice with 150 ul of 61 ug of total plant Rna spiked with 4.5 to 7.4 ug of each of the 3 tumor suppressing miRNA. That's a total of 613 ng/g or 613 ug/kg on the lowest end

containing only miRNA targeting the tumor genes. To convert that to human weight a serving of vegetables would be several orders of magnitude off. Her excellent experiments were designed to show the possibility of drug delivery, not as a feeding model with plant material containing RNases, fibers, and a boat load of DNA.

Further more, You should cite her quotation as she does an excellent job at risk assessment:

http://www.apsnet.org/members/outreach/ppb/Documents/PNews2014_03.pdf

The sequence of siRNA and miRNA is important for function. My biggest criticism of this article is your independent assessment that DsRNA targeting insect genes is significantly more dangerous over those DsRNA designed against plant genes. The mechanism is exactly the same.

I contest, and I'm certain Dr. Vance would agree, that off-targets are determined on the sequence and how close those siRNA and miRNA species are to a mistaken target. Therefore, the risk of an insect gene or a plant gene off-target is dependent on the sequence, which can be equally divergent.

I cannot speak for Dr. Vance being targeted by Monsanto. If that is true, it is egregious. However, Dr. Vance supports science and scientists as evident by her twitter account. I would not call her anti-GMO, but certainly pro-science.

Read full, original post and comments: [A Very Different Kind of GMO is Headed to Supermarket Shelves](#)