

**From:** [Chassy, Bruce M](#)  
**To:** [Karen Batra](#)  
**Cc:** [Wayne Parrott](#); [L. Val Giddings](#); [Alan McHughen](#)  
**Subject:** Re: Bad Article in the Atlantic on Chinese RNA/biotech study  
**Date:** Tuesday, January 10, 2012 12:37:32 PM

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Karen

The ag biotech chat group has briefly discussed the article but we mostly adopted a wait and see attitude. The paper represents a major and fairly unexpected paradigm shift and should thus not be accepted until it has received careful scrutiny and vetting by the wider scientific community. Of this will require independent verification which has not to date occurred. One of the problems we face today in science, and it is one that confuses non-scientists, is the media publishing the results of single studies like this. Scientific acceptance is a much more deliberate process; it will take years for the Zhang paper to achieve widespread acceptance among scientists. That is if it stands up to scrutiny.

Personally, when I read it I found it pretty exciting and didn't see any immediate holes in the work. I have copied Wayne Parrott on this because he was a co-author on the ILSI siRNA paper. Wayne and I have discussed the Zhang paper. I'll let him speak for himself.

What I say above sounds like a weak response that might not be very persuasive. I would note that if Zhang's claims turn out to be true then we have been eating plant small RNAs since before we came down out of the trees and their influence on our bodies would be nothing new.

Conventional breeding and well as cultural conditions have all altered and influenced small RNA expression, and of course human dietary composition varies greatly. It would be a great leap of logic to assert that changing small RNA content using GM methods would be any different than the changes caused by other factors (eg. conventional breeding). That said, wouldn't it be great if we could eat broccoli and lower LDLs? If Zhang is right, it opens the door to manipulating plants to produce healthful outcomes. As regards the potential risks, they are the same as occur in all kinds of breeding; small RNA mediated changes occur all the time.

The article title is wrong at face value. The dangers are not very real. They are highly speculative and unproven. We are talking about a potential negative impact that is as yet unproven. The Atlantic is using a sensational approach to advance their editorial bias. Not good journalism and not good science but welcome to the misinformation age in which we live. Complaining about that won't get you far.

Regards

Bruce

On Jan 10, 2012, at 7:56 AM, Karen Batra wrote:

Good morning Val, Bruce and Alan!

I'm sure you have seen, but a Jan. 9 article in [The Atlantic](#) reports on new research on

RNA in rice and a potential negative impact on the safety of biotech foods. I have pasted the article, "***The Very Real Dangers of GM Foods***" below. The study was published in September 2011 in the journal *Cell Research* (view [abstract](#)).

We have been discussing whether and how to respond, especially given that the Atlantic's coverage of biotech has not been fair in the past. For most of us communications folks, the science here is way over our heads, and an appropriate response would have some kind of scientific defense. In other words, BIO just writing a letter saying "biotech foods are safe" isn't enough of a response here.

IFIC is also sending out a mass email asking folks to weigh in on the comments page.

If possible, could you all take a look and let me know what you suggest? Either post a comment yourself on the page or provide us with some top-line scientific points that we could use in a letter to the editor? Let me know your thoughts – thanks!

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## The Very Real Danger of Genetically Modified Foods

By Ari LeVaux  
Jan 9 2012, 7:57 AM ET [Comment](#)

*New research shows that when we eat we're consuming more than just vitamins and protein. Our bodies are absorbing information, or microRNA.*

Chinese researchers [have found](#) small pieces of ribonucleic acid (RNA) in the blood and organs of humans who eat rice. The Nanjing University-based team showed that this genetic material will bind to proteins in human liver cells and

influence the uptake of cholesterol from the blood.

The type of RNA in question is called [microRNA](#), due to its small size. MicroRNAs have been studied extensively since their discovery ten years ago, and have been linked to human diseases including cancer, Alzheimer's, and diabetes. The Chinese research provides the first example of ingested plant microRNA surviving digestion and influencing human cell function.

Should the research survive scientific scrutiny, it could prove a game changer in many fields. It would mean that we're eating not just vitamins, protein, and fuel, but information as well.

That knowledge could deepen our understanding of cross-species communication, co-evolution, and predator-prey relationships. It could illuminate new mechanisms for some metabolic disorders and perhaps explain how some herbal medicines function. And it reveals a pathway by which genetically modified (GM) foods might influence human health.

Monsanto's [website](#) states, "There is no need for, or value in testing the safety of GM foods in humans." This viewpoint, while good for business, is built on an understanding of genetics circa 1950. It follows what's called the "[Central Dogma](#)" (PDF) of genetics, which postulates a one-way chain of command between DNA and the cells DNA governs.

The Central Dogma resembles the process of ordering a pizza. The DNA knows what kind of pizza it wants, and orders it. The RNA is the order slip, which communicates the specifics of the pizza to the cook. The finished and delivered pizza is analogous to the protein that DNA codes for.

We've known for years that the Central Dogma, though basically correct, is overly simplistic. For example: Pieces of microRNA that don't code for anything, pizza or otherwise, can travel among cells and influence their activities in many other ways. So while the DNA is ordering pizza, it's also bombarding the pizzeria with unrelated RNA messages that can cancel a cheese delivery, pay the dishwasher nine million dollars, or email the secret sauce recipe to WikiLeaks.

Monsanto's claim that human toxicology tests are unwarranted is based on the doctrine of "substantial equivalence." This term is used around the world as the basis of regulations designed to facilitate the rapid commercialization of genetically engineered foods, by sparing them from extensive safety testing.

According to substantial equivalence, comparisons between GM and non-GM crops need only investigate the end products of DNA translation: the pizza, as it were. "There is no need to test the safety of DNA introduced into GM crops. DNA (and resulting RNA) is present in almost all foods," Monsanto's website reads. "DNA is non-toxic and the presence of DNA, in and of itself, presents no hazard."

The Chinese RNA study threatens to blast a major hole in that claim. It means that DNA can code for microRNA, which can, in fact, be hazardous.

"So long as the introduced protein is determined to be safe, food from GM crops determined to be substantially equivalent is not expected to pose any health risks," Monsanto's website goes on. In other words, as long as the pizza is OK, the introduced DNA doesn't pose a problem.

Chen-Yu Zhang, the lead researcher on the Chinese RNA study, has made no comment regarding the implications of his work for the debate over the safety of GM food. Nonetheless, his discoveries give shape to concerns about substantial equivalence that have been raised for years.

In 1999, a group of scientists wrote a now-landmark letter titled "[Beyond Substantial Equivalence](#)" to the prestigious journal *Nature*. In the letter, Erik Millstone *et. al.* called substantial equivalence "a pseudo-scientific concept" that is "inherently anti-scientific because it was created primarily to provide an excuse for not requiring biochemical or toxicological tests."

To these charges, Monsanto responded: "The concept of substantial equivalence was elaborated by international scientific and regulatory experts convened by the [Organization for Economic Co-operation and Development](#) (OECD) in 1991, well before any biotechnology products were ready for market.

This response is less a rebuttal than a testimonial to Monsanto's marketing prowess. Establishing the concept of substantial equivalence worldwide was a prerequisite to the global commercialization of GM crops. It created a legal framework for selling GM foods anywhere in the world that substantial equivalence was accepted. By the time substantial equivalence was adopted, Monsanto had already developed numerous GM crops and was actively grooming them for market.

The OECD's 34 member nations could be described as largely rich, white, developed, and sympathetic to big business. The group's current mission is to spread economic development to the rest of the world. And while that mission has yet to be accomplished, OECD has helped Monsanto spread substantial equivalence to the rest of the world, selling a lot of GM seed along the way.

The news that we're ingesting information as well as physical material should force the biotech industry to confront the possibility that new DNA can have dangerous implications far beyond the products it codes for. Can we count on the biotech industry to accept the notion that more testing is necessary? Not if such action is perceived as a threat to the bottom line.