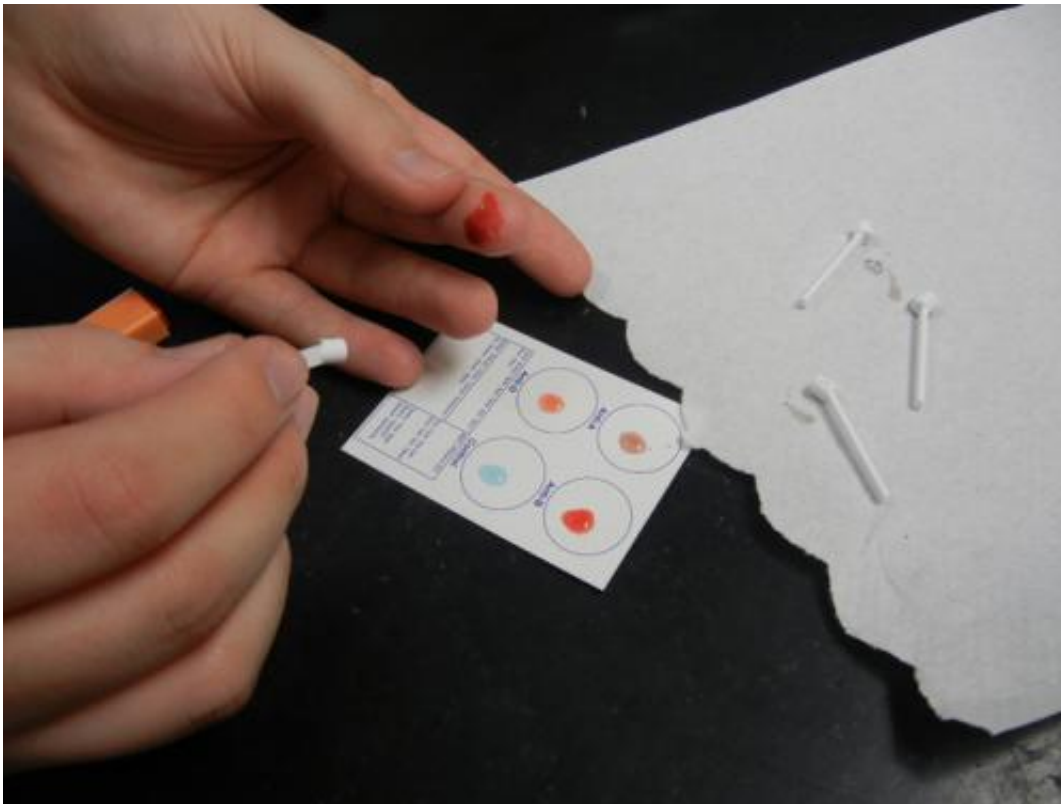


# Plant DNA in blood samples no cause for concern

February 26 2014, by John Runions

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All is well with your blood. Credit: biologycorner

If you believe [this article](#) from Collective Evolution, a site that claims to be "one of the worlds most popular alternative media company", there is currently DNA from genetically modified plants floating in your blood that must be causing some harm. The conclusion is a wild extrapolation and typical of the anti-GMO lobby, which makes it a good case study for

how to treat scientific findings.

The truth is that there may or may not be plant DNA in your blood. The single research paper making this claim, on which the news article is based, is yet to be replicated. But it is more important to note that, even if there is plant DNA in your blood, there is no evidence that it poses a risk to you.

The paper, by Sandor Spisak of Harvard Medical School and colleagues, was published in the journal [PLOS ONE](#) in July 2013. The authors claimed to have found the evidence that pieces of plant DNA, large enough to harbour full genes, circulate in our blood.

Circulating DNA is called cell-free DNA (cf-DNA) and the reason for its presence in blood and its function, if any, remains a mystery. The science presented by Spisak is peer-reviewed – that is, it has been assessed by experts in the field – and seems to have been done in an acceptable way. So I am ready to give their case a hearing.

But their study does not imply that consuming GM foods is dangerous or that GM scientists are doing "bad science", which the news article claims. If foreign DNA from foods we consume circulates in our blood, it must have done so throughout evolutionary history. The fact that we have noticed it only now is interesting.

Before we draw any more conclusions, a lot needs to be done. If cf-DNA's role hasn't been clear, then we must investigate that before we can consider what plant DNA might be doing in the blood.

Spisak makes no mention of GM genes in the original paper. My mind is completely put at ease by the thought that DNA from food has always been circulating in our blood.

Here is why: DNA is found in everything you eat. Our body has evolved to breakdown and reuse consumed DNA and the proteins which it encodes. There is no inherent danger in consuming DNA. To label foreign DNA as sinister is wrong. All DNA you consume is foreign unless you're a cannibal, and even then it's still foreign unless you're consuming your identical twin.

Foreign DNA can cause harm only if it is able to encode proteins that are harmful to the human body. For that to happen it would first need to be incorporated into your genome within the cell nucleus where all of your other genes reside. It would then need to be transcribed so that, ultimately, the foreign protein was produced.

So if there is plant DNA in your blood, it will need to jump through lots of hoops before it can produce a foreign protein. There is no evidence by the way that DNA in your blood can do this, because, if cf-DNA has always been in our blood, we would have noticed plant proteins in our cells.

What is really interesting from Spisak's work is that plant DNA is represented in a relatively high proportion in the cf-DNA pool of human [blood](#). That fact is interesting and worth investigating. Spisak also says that animal DNA was removed from the tested samples because it resembles human DNA too closely and is therefore not distinguishable as "foreign".

## Good science

Being "for" GM doesn't mean that one is against the environment or health and in the pockets of agribusiness as many anti-GMO websites will make you believe. Bryan Walsh writing for [Time](#) makes this point clearly. Most scientists are aware that along [with the promise of GM technology come potential problems](#).

While GM technology may be able to produce rice that is more nutritious or plants that are resistant to a greener herbicide, there are legitimate problems such as weeds acquiring the GM herbicide resistance. The anti-GM lobby loses credibility by being against every aspect of the science. A better approach would be to act as a watchdog against legitimate, testable problems which science would then be accountable for.

For instance, within days of the publication of Spisak's paper, Richard Lusk of the University of Michigan left [a comment](#) where he thought that there could be an alternate explanation for the findings reported. According to Lusk, the method used to analyse cf-DNA, called high-throughput sequencing, has a high-error rate.

Normally, when the DNA to be analysed is plenty and in big chunks, these errors can be minimised. But in Spisak's case, the analysis involved tiny amounts of DNA, which made Lusk think that contamination, if any, might account for the results. In a follow up study, uploaded few weeks ago on [arXiv](#), he concludes that Spisak must consider contamination as the source of plant DNA. Even thoroughly washed plastic equipment can store remnants of DNA that can contaminate results.

It took Lusk six months to thoroughly check Spisak's work. Now Spisak and his colleagues should respond to Lusk's criticism, which may take another six months. Scientific progress is slow, but at least at the end of it we may be more certain than we are today. Poor commentary and cherry-picking data helps no one.

Spisak's study tells us about a significant biological finding that needs to be carefully analysed. The cautionary tale is that one must not extrapolate wildly from good science to create horrific scenarios that are not based on any scientific observations whatsoever.

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