**riday Weird Science: Too Many Carrots**

By [Scicurious](javascript:void(0)) | August 26, 2011 |  [[Comments](http://blogs.scientificamerican.com/scicurious-brain/2011/08/26/friday-weird-science-too-many-carrots-and-why-you-should-believe-your-dad/#respond)5](http://blogs.scientificamerican.com/scicurious-brain/2011/08/26/friday-weird-science-too-many-carrots-and-why-you-should-believe-your-dad/" \l "respond" \o "Comment on Friday Weird Science: Too Many Carrots)

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Over at my Scientopia site, I usually do a Friday Weird Science feature. This can range from [semen](http://scientopia.org/blogs/scicurious/2011/08/12/friday-weird-science-nutty-semen/), to [sneezing](http://scientopia.org/blogs/scicurious/2011/01/10/the-sneeze/), to really [anything in between](http://scientopia.org/blogs/scicurious/2011/08/05/friday-weird-science-for-a-highly-symmetrical-butt-you-might-want-to-consider-soccer-instead-of-tennis/), anything that I happen to find weird and hilarious and interesting. Unfortunately, the Scientopia site is down right now, so today I’ll be putting Friday Weird Science HERE, because neither rain, snow, sleet, hurricanes, or potential DDoS attacks will stop Friday Weird Science! And today’s topic? CARROTS.

[](http://blogs.scientificamerican.com/scicurious-brain/files/2011/08/800px-CarrotRoots.jpg)  
([Source](http://en.wikipedia.org/wiki/File:CarrotRoots.jpg))

So you know how your parents sometimes tell you these stories as a kid. And you often believe them, and it turns out they were messing with you? Well, SciDad did the opposite to little ‘ol me.

You see, Sci’s Dad used to love to tell this story of how, when he was a baby, he loved carrots. LOVED them. It was the only thing he would eat, strained carrots. And so my poor grandmother worked herself crazy straining (and maybe buying, I don’t know if they were on the market yet) carrots. And BOY did he eat them. In the end, he swore he ate SO MANY that he actually turned ORANGE, and when they took him to the doctor the doctor put it down to too many carrots.

And each time my Dad would tell this story, I would roll my skeptical eyes and be like “yeah, RIGHT Dad. You can’t turn orange from eating CARROTS.”

…and you know what? I was WRONG. The other day I was thinking of this story, and I decided to run a little search on Pubmed, just to see.

AND YOU CAN TURN ORANGE FROM EATING CARROTS!!!! This was a massive revelation to me, I really think my jaw hit the floor. I had to immediately send an email to my Dad apologizing for not believing him all these years.

And of course, I HAVE to blog about it.

Wageesha et al. “Studies on hypercarotenemia due to excessive ingestion of carrot, pumpkin and papaw” International Journal of Food Sciences and Nutrition, 2011.

([Jason of Thoughtful Animal](http://blogs.scientificamerican.com/thoughtful-animal/) helped me find this paper, and we were both wondering where on earth we’d heard of papaws before. It was here!! “If you pick a RAW paw, next time, beware!”)

Hypercarotenemia, otherwise known as carotenosis, is actually a perfectly harmless effect. It’s the effect of turning spontaneously YELLOW (not actually orange), in response to eating too many carrots. But it’s not just carrots, it can also be papaw or pumpkin, or anything else with a large amount of vitamin A. The net effect looks a bit like jaundice (what with the yellow), but is distinguishable because it doesn’t effect the sclera, or whites, of you eyes.

[](http://blogs.scientificamerican.com/scicurious-brain/files/2011/08/220px-Carotenoderma_Nose.jpg)  
(This baby has carotenosis. Looks normal, but look at its NOSE. See? [Source](http://en.wikipedia.org/wiki/Carotenosis))

Basically, the condition arises from eating too many carotenoid bearing foods. This usually makes you think of foods that are orange, but can also include green leafy veggies and yellow foods. These foods carry carotenoids, in particular those that are the precursors to vitamin A. Your body then breaks down the carotenoids to vitamin A, and then breaks it down further to be excreted. We know right now that there is a mutation in the enzyme 15,150 -monooxygenase, which converts carotenoids to vitamin A, which can produce carotenosis, but there are other stages in this pathway too, and it’s possible that if one of them gets out of whack, you turn a little orange. The condition occurs most commonly in infants and children, and so the authors here ran a bunch of chemical tests trying to figure out WHY.

They took 21 kids reporting carotenosis, and took serum and fecal samples (ah, fecal samples, what fun!). They then ran them out on high performance liquid chromatography columns, which allow separation of fluids by their chemical content, to figure out exactly what was in them and in what amounts. You see, carotenoid breakdown goes in four stages.

1) alpha or beta carotene (or beta-cryptoxanthin if you’re eating papaw), the starting compound is converted to  
2) Vitamin A. Excess amounts of vitamin A go to the liver and get broken down to  
3) monohydroxy which undergoes another step to  
4) polyhydroxy, which allows it to get  
5) excreted in the urine.

By measuring the various amounts of these compounds, scientists could see where the system might be getting overloaded, and producing too much backup, thus producing the distinct yellow-orange hue. Of course there’s also the option of a vitamin A megadose, but many children develop the condition even without that.

And it turns out that how fast kids metabolism carotenoids varied VERY widely. Some had stoppages in steps 1-2, some in 2-3, some in 3-4, some in 4-5. But a lower amount in any one of those steps led to a HIGHER amount of buildup of compounds in the previous steps, resulting in buildups of carotenoids, and yellow skin. So any dysregulation in the pathway can screw you up…but only so much. It turns out the tightest control on the carotenosis was when they took the carrots (and pumpkin and papaw) AWAY from the children. All of them cleared up within weeks. So it appears in this case, you really ARE what you eat.

Luckily, the condition is entirely harmless (other than the panic induced in the parents by having a suddenly orange child), but it’s still really interesting to see how it happens! And for those of you looking yellowish, if it’s not jaundice, you may very well have to lay off the carrots.

Wageesha ND, Ekanayake S, Jansz ER, & Lamabadusuriya S (2011). Studies on hypercarotenemia due to excessive ingestion of carrot, pumpkin and papaw.*International journal of food sciences and nutrition, 62* (1), 20-5 PMID: [20868341](http://www.ncbi.nlm.nih.gov/pubmed/20868341)