

Vitamin C as a treatment for cancer—the evidence so far

April 25 2018, by Catherine Pickworth



Credit: Cancer Research UK

If a headline says research shows a diet rich in a food 'could help fight cancer' then our advice would be to read on with a critical eye.

Vitamin C is a great example of this. In fact, headlines from last year could have you believe that eating oranges might cure [cancer](#).

This media interest stemmed from two studies testing the potential of using high doses of [vitamin C](#) to treat cancer. The results add to early evidence suggesting that vitamin C's potential as a cancer treatment should be explored. But eating lots of food containing vitamin C is unlikely to provide our bodies with the same carefully controlled levels of purified chemicals being tested in these scientific studies. And this is where the simple message of 'eat x to cure y' fails.

So let's take a look at what the scientists behind the latest headlines found, and where the research field is nearly 10 years on from our first blog post on vitamin C.

Oranges aren't enough

The interest in these studies seems to have partly come from the fact that vitamin C is considered 'natural' and found in lots of foods, from oranges to broccoli. It can also be consumed in high doses via supplements.

But a closer look at the research reveals that neither study used food or supplements as the source of vitamin C being tested to treat cancer. Instead, the researchers were injecting patients or mice with very high doses of vitamin C – much higher than you could get from food or supplements directly.

And the difference between injecting a molecule and getting it through what you eat is vast, says Professor Anne Thomas, a Cancer Research UK-funded scientist at the University of Leicester. In their centre, work has included a clinical trial on curcumin, a molecule extracted from the yellow curry spice turmeric, and is something we've blogged about before.

"If you inject a drug, you generally get the active bit more quickly into

the system," she says. "But if you're eating food, or a food supplement, we don't know how much of that active compound someone is having."

"We can guesstimate, but you don't know for certain and it is going to vary from person to person how much they get once it's been digested."

"By injecting a drug, you make the delivery of the active substance more reliable, and bypass the factors that can affect that."

A mixed basket of results

This leaves us with a question: could a high dose vitamin C jab be used to treat cancer? So far, the evidence is mixed.

In the most recent studies, results tentatively support the idea that high-dose vitamin C has potential as a cancer treatment. But this is far from clear-cut.

The first study tested vitamin C as a treatment in mice with blood cancer, and found that injecting high doses of vitamin C slowed down the progression of the disease.

But as mice are very different to people, this has some way to go before we can say that vitamin C will help treat [cancer patients](#).

The other study was testing the safety of high dose vitamin C injections in people with either non-small cell lung cancer or glioblastoma, an aggressive type of brain tumour, not if it's an effective treatment. These tests would follow only if the injections are safe.

This early work showed that doctors could safely inject high doses of vitamin C into patients, but as they only tested it in a small number of people it's hard to say if this would be the same for everyone.

This is far from the clear-cut answer some headlines would have you believe. Especially considering neither study looked at long term effects of a vitamin C jab in people, and to date there's no evidence that vitamin C improves cancer survival.

Some studies have suggested that vitamin C may help alleviate some of the side effects of [cancer treatment](#). But other [clinical trials](#) had to be stopped early due to severe side effects caused by vitamin C itself.

Some studies have even suggested vitamin C could interfere with some anti-cancer drugs, with one study showing it may even protect [breast cancer cells](#) from the drug tamoxifen.

Together, the research paints a confused picture, and perhaps it's unsurprising that headlines around vitamin C can often be misleading. But as there's no evidence a vitamin C jab cures cancer, and may even cause harm, this is unlikely to become a treatment any time soon.

So, what should I do?

High dose injections of vitamin C aren't routinely available for cancer patients. And research testing these jabs is in its earliest stages. But when headlines draw connections between this research and what we eat, cancer patients may be left asking: 'Is it worthwhile taking [vitamin supplements](#)?' Martin Ledwick, Cancer Research UK's head information nurse, says cancer patients shouldn't take them without first talking to their doctor.

"The key thing is we just don't know if it is safe to take them alongside conventional treatment that is known to work. It is possible that in some situations they may interfere with the way chemotherapy works, which might make treatment less effective."

This doesn't mean to say vitamin C won't be of benefit to some patients one day. But there's certainly no evidence yet from any clinical trial that vitamin C improves cancer survival.

Either way, given the mixed results so far, media reports around vitamin C could be doing more harm than good. And as for vitamin C as the next big wonder drug? The signs aren't pointing that way just yet.

More information: Luisa Cimmino et al. Restoration of TET2 Function Blocks Aberrant Self-Renewal and Leukemia Progression, *Cell* (2017). [DOI: 10.1016/j.cell.2017.07.032](https://doi.org/10.1016/j.cell.2017.07.032)

Joshua D. Schoenfeld et al. O₂ ·– and H₂O₂-Mediated Disruption of Fe Metabolism Causes the Differential Susceptibility of NSCLC and GBM Cancer Cells to Pharmacological Ascorbate, *Cancer Cell* (2017). [DOI: 10.1016/j.ccell.2017.02.018](https://doi.org/10.1016/j.ccell.2017.02.018)

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