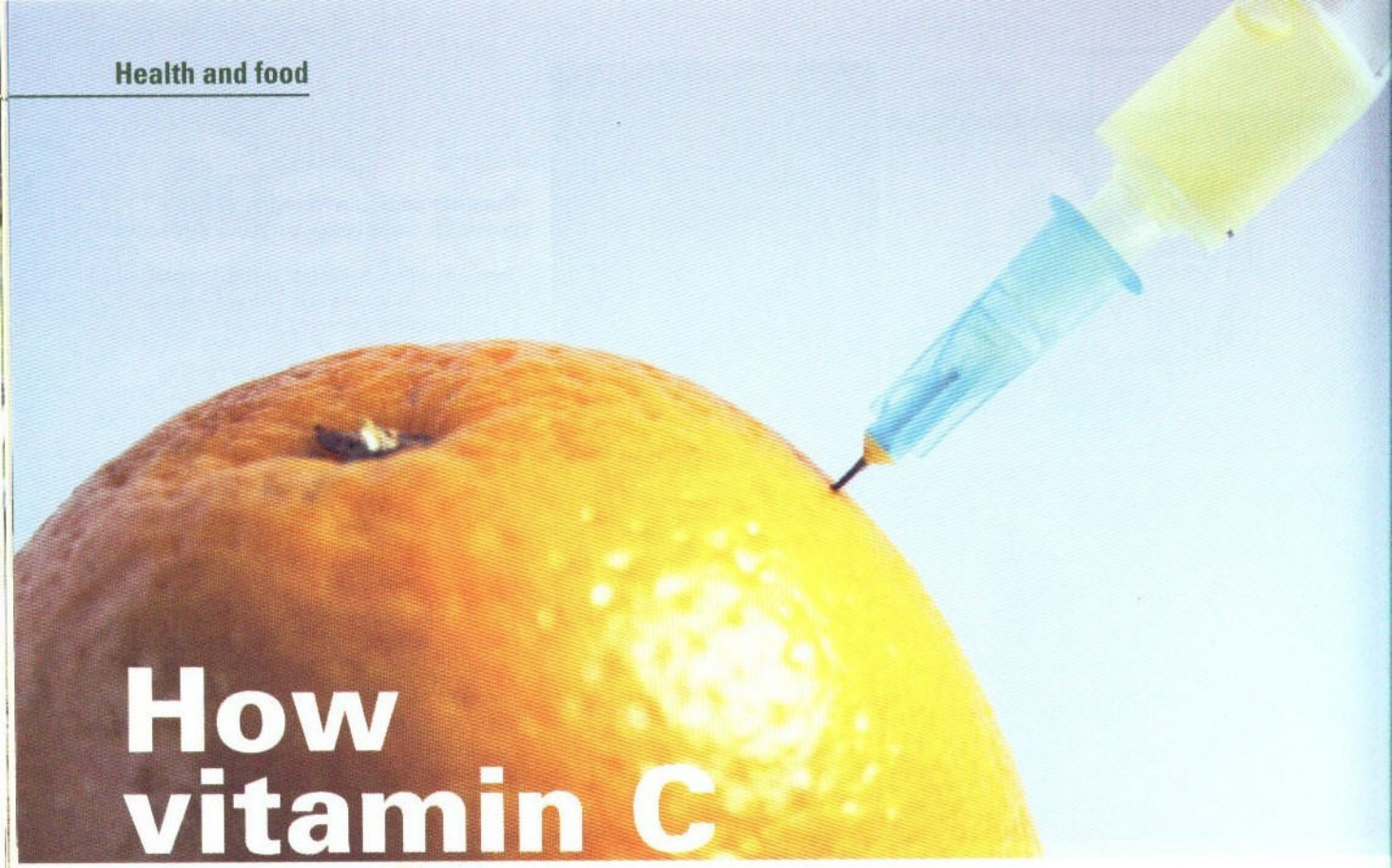

How vitamin C combats cancer

Sue Claridge investigates the curative powers of high dose vitamin C

Vitamin C has recently stirred up a truckload of defensiveness in the medical orthodoxy. It all started when TV3 aired a 60 Minutes programme on Waikato farmer, Allan Smith, who was dying from 'swine flu'. The doctors recommended turning off his life support machine. His family insisted on trying intravenous (IV) vitamin C, and had to resort to lawyers to ensure he kept getting it. Today Allan Smith is alive and well, while others are fighting to get IV vitamin C administered to very sick family members.

In their promotion for the 60 Minutes 'Living Proof' programme, TV3 asks, 'Have the family stumbled on a miracle cure?'

There was no stumbling on a miracle cure by anyone. The idea that vitamin C could have such amazing curative powers is nothing new, and many people working in the holistic and natural health sector have been aware of the value of IV vitamin C for decades.

Linus Pauling – who was awarded the Nobel Prize in Chemistry in 1954, and the Nobel Peace Prize in 1962 – was 'fascinated with the multifaceted role of vitamin C (ascorbic acid) in maintaining health'.[1] Originally he investigated the role of vitamin C in large doses as a prophylactic or palliative for the common cold. Subsequently he 'became convinced of ascorbate's value in combating the flu, cancer, cardiovascular disease, infections, and degenerative problems in the aging process'.[1]

However, his belief in the value of vitamin C as a therapeutic agent has, until recently, been largely ignored by the medical establishment and his ideas were dismissed as quackery.

Ascorbic acid, at concentrations achieved through IV administration, causes cancer cell death

What is vitamin C?

Vitamin C, more properly known as ascorbic acid, is an essential nutrient that is made internally by almost all animals, with the notable exceptions of higher primates (including human beings), guinea pigs and fruit-eating bats.

In humans, vitamin C is involved in many important metabolic functions and is a highly effective antioxidant. Vitamin C deficiency is probably best known for causing scurvy. However, low levels of vitamin C – far short of the deficiency required to cause scurvy – have been associated with many diseases.

Hungarian physiologist Albert Szent Gyorgyi, who is credited with discovering vitamin C, said: 'If you don't take ascorbic acid

Vitamin C can help restrict the rate of tumour growth, increase responsiveness to chemotherapy, and might even prevent formation of solid tumours – New Zealand research

with your food you get scurvy, so the medical profession said that if you don't get scurvy you must be all right. I think this is a very grave error'.

Dr Thomas Levy, cardiologist and author of the book *Curing the Incurable: Vitamin C, Infectious Diseases and Toxins*, is a staunch advocate of the use of vitamin C and says it should be part of the routine therapy of any infectious disease or toxin exposure in a hospital setting, and not just those cases that are life-threatening.

However, it is in the treatment of cancer that IV vitamin C is perhaps best known.

Vitamin C and cancer

In a paper published in *Alternative Medicine Review* in 1998, Kathleen Head discussed 29 studies (including two multi-study meta-analyses) that found a positive association between higher vitamin C intake or vitamin C levels in the blood and a reduced risk of cancer, including breast, cervical, bladder, gastro-esophogeal and colo-rectal cancer, and leukaemia and lymphoma.[2] Further studies in the intervening twelve years have found that low vitamin C intake and/or low serum vitamin C levels are associated with an increased risk of cancer and/or an increased risk of death.

Drs Anitra Carr and Balz Frei, in a review of biochemical, clinical, and epidemiologic evidence for a role of vitamin C in chronic disease prevention, discovered that, where there were significant cancer risk reductions, they were in people consuming at least 80 to 110 mg of vitamin C daily.[3]

The use of high-dose vitamin C for the treatment of cancer is not a new idea – just one that the medical establishment has repudiated until very recently. In fact, more than thirty years ago Ewan Cameron, Allan Campbell and Linus Pauling reported on the beneficial effects of high-dose vitamin C therapy for patients with terminal cancer. It was noted in 2006 in the *Canadian Medical Association Journal*, that 'the notion that high-dose vitamin C was selectively toxic to cancer cells was biologically implausible' and thus it was rejected by mainstream oncologists.[4]

However, it has since been recognised that the early randomised controlled trials that failed to show any benefit, used high-dose *oral* vitamin C, rather than the combination of *intravenous* (IV) *and oral* vitamin C used in the Cameron-Campbell-Pauling studies.[5,3]

Recent studies have shown that a 10 gram dose of vitamin C administered intravenously produces blood concentrations more than 25 times higher than the same dose administered orally, and as much as a 70-fold difference in blood concentration is expected between IV and oral administration depending on the dose.[5,6]

The antipathy of mainstream medicine towards IV vitamin C began to change when this phenomenon was reported in the *Annals of Internal Medicine* in 2004. Researchers concluded that 'because efficacy of vitamin C treatment cannot be judged from clinical trials that use only oral dosing, the role of vitamin C in cancer treatment should be reevaluated'.[6]

This spurred researchers at the US National Institutes of Health to undertake their own investigations. They carried out a benchmark study which investigated whether or not ascorbic acid could selectively kill cancer cells and determined the mechanism for this action.[5] The results, published in 2005, state that ascorbic acid, at concentrations achieved through IV administration, caused cancer cell death.

If large amounts of vitamin C are presented to cancer cells, large amounts are absorbed. In high concentrations the antioxidant vitamin C behaves as a pro-oxidant, interacting with intracellular copper and iron and producing small amounts of hydrogen peroxide. The peroxide continues to build up until it eventually causes the dissolution or destruction of cells by disrupting or bursting the cell membrane from the inside out.[5]

IV vitamin C acts as a pro-drug, effectively delivering H_2O_2 (hydrogen peroxide) to the cancer cells; once the vitamin C was taken up by the cancer cells it causes H_2O_2 to be produced without any build up of H_2O_2 in the blood. The researchers concluded that 'ascorbate administered IV is likely to be safe in most patients, with virtually no toxicity compared to most currently available cancer chemotherapeutic agents'.[5]

New Zealand research

Some of the most exciting recent research on cancer and vitamin C has been carried out here in New Zealand. In July, Professor Margreet Vissers, from Otago University, reported that vitamin C may have a role in controlling tumour growth.

Publishing their results in the highly regarded journal, *Cancer Research*, Professor Vissers' team found that high-grade tumours had around 40 per cent less vitamin C than matched, adjacent, normal tissue.[7]

"Our results offer a promising and simple intervention to help in our fight against cancer, at the level of both prevention and cure," Professor Vissers said.

The study showed that vitamin C could help restrict the rate of tumour growth, increase responsiveness to chemotherapy and might even prevent formation of solid tumours.

"There's enough information now for people to be seriously thinking about doing this, to apply this to the clinic or be setting up some clinical trials," she told the *New Zealand Herald* after publication of the study.

New Zealand doctors say 'NO'

Despite increasing evidence of the benefits of IV vitamin C, some doctors are refusing to allow their patients to be treated with high dose vitamin C even when orthodox medicine has nothing left to offer.

In a media release issued on 14 September, the Auckland District Health Board announced that Auckland Hospital's Clinical Practice Committee 'found no evidence that would allow it to say high-dose