

## **Dr. Gerhard N. Schrauzer, Professor of Chemistry, finds that excessive use of Vitamin C may bring about susceptibility rather than resistance to colds**

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Excessive use of ascorbic acid, or vitamin C, on a regular basis by persons hoping to build up resistance to colds and other respiratory ailments can actually bring about the opposite effect, a University of California, San Diego scientist has shown.

According to Dr. Gerhard N. Schrauzer, Professor of Chemistry at UCSD, although ascorbic acid is considered harmless in single large doses, continual consumption of massive doses alters the vitamin C regulating system of the body leading to an acceleration of the breakdown and excretion of the vitamin.

Through this acceleration, the body adjusts itself to unnecessarily high intakes of the vitamin, Schrauzer said. The organism seems to build up an enzyme which breaks down the vitamin, a phenomenon that has since been confirmed by experiments with guinea pigs. When excessive amounts of vitamin C are stopped, the body metabolism keeps on excreting the normal dietary amounts of the vitamin at a faster rate, an action which can lead to a vitamin C deficiency days or weeks after stopping.

In addition, even those who continue to take large doses of vitamin C may actually have lower circulating levels of the vitamin, Schrauzer said, because of the more rapid metabolism and excretion.

The human body's need for vitamin C became the subject of much discussion in 1970 following the publication by Dr. Linus Pauling of a book which promoted the use of the vitamin for the treatment or prevention of colds. The nationwide publicity given to the alleged desirability of heavy doses of vitamin C in fighting the common cold, led to what Schrauzer called widespread abuse of the vitamin.

And, apparently, the popularity of the vitamin with the general public has not tapered off. A recent survey of pharmaceutical manufacturers and suppliers indicates that the demand for the vitamin has been steadily increasing since the initial surge in 1970.

Schrauzer and other scientists warned at that time that the consumption of ascorbic acid in excessive amounts over long periods of time may be potentially harmful to humans.

"We received reports of individuals who were taking as much as 100 grams of ascorbic acid a day," Schrauzer said. "This would be equivalent to about seven tablespoons a day. Even one teaspoon of ascorbic acid would be many times the daily recommended dose."

In his study of the retention of vitamin C by the human body, Schrauzer used as subjects UCSD students and staff members who admitted to taking excessive doses of the vitamin, some for as long as four and a half years. Schrauzer measured the ascorbic acid levels in the blood and urine of the subjects and compared his findings with control subjects before, during and after a nine-day test.

The results of the study confirmed that the body's tendency to clear ascorbic acid through urine is accelerated by massive dosages of the vitamin, thus achieving just the opposite of the effect desired by the subjects. The study also showed that long-term ingestion of ascorbic acid in gram-amounts leads to a decrease in the level of

the vitamin in the blood of the test subjects. The control group, which had taken the vitamin for only a short period, showed no such decrease.

In another study of use of the vitamin, Schrauzer and his colleagues have been able to confirm that high doses of vitamin C will lower the high altitude resistance of humans.

Prior to World War II, vitamin C in moderate doses was recommended as a means to temporarily increase the "high-altitude resistance" of pilots, airplane passengers and mountaineers. Subsequent research, however, reported that larger doses of vitamin C actually diminished the high-altitude resistance.

"The reverse effect was demonstrated both on rabbits and on humans by German scientists," Schrauzer said. "We repeated some of their experiments and achieved the same results. The effect was noticeable after the subjects had taken three grams of ascorbic acid daily for six days. Their high altitude resistance returned to normal within two weeks after they had stopped taking the vitamin.

"This confirms that large oral doses of vitamin C do diminish the high-altitude resistance of normal subjects," Schrauzer said. "Taking large amounts of the vitamin for whatever reason could increase the risk of persons working under conditions in which the oxygen supply may suddenly or temporarily become limited," he said.

"An additional hazard," Schrauzer said, "would be vitamin C overdosage by patients suffering from diseases accompanied by actual or potential hypoxia. The lower resistance of vitamin C saturated subjects to hypoxic stress provides an additional reason to regard the current concepts concerning the alleged benefits of massive amounts of ascorbic acid with caution."

"Fortunately," Schrauzer said, "vitamin C overdosage is not often serious but caution is necessary for certain individuals, especially in pregnancy."

In 1965, W.A. Cochrane in Canada noted that babies of mothers who had been taking large doses of vitamin C (about 400 milligrams per day) developed scurvy after birth even though they received adequate amounts of the vitamin in their diets.

This demonstrated a prenatal conditioning effect quite similar to that observed in work done by Schrauzer and which has since been demonstrated in experiments with pregnant guinea pigs. At the Institute of Human Nutrition at Columbia University, pregnant animals were fed large doses of vitamin C. After birth, their young, when placed on a vitamin C deficiency diet, developed scurvy and died significantly earlier than offspring of animals not receiving extra vitamin C.

Schrauzer concedes that vitamin C is needed in larger amounts for those who suffer from a cold or other infectious diseases. He points out, however, that this does not mean excessive doses. One to two grams per day for most individuals, he feels, is more than adequate. Even these amounts, he said, should not be taken for extended periods and not by children at all.

What then should normal individuals consider as a good daily intake?

Most scientists agree that 45 milligrams a day is sufficient for adults to maintain a normal body pool of vitamin C. About 35 milligrams per day for infants and an intermediate level of about 40 milligrams per day for young children is sufficient.

According to Schrauzer, the normal average amount of ascorbic acid taken daily through food by Americans in 1909 was calculated to be 105 milligrams. Over the years the amount has fluctuated somewhat but only very slightly.

"It does seem that there is an unnecessary high amount of vitamin C being taken and the current practice of overconsumption has little merit and should be gradually stopped," Schrauzer said.

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