

# executive health

the report that briefs you on what to watch

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Linus Pauling, Ph.D.:

## ON VITAMIN C AND INFECTIOUS DISEASES

*The value of vitamin C, in intake somewhat larger than customary, for controlling the common cold and some other infectious diseases is now rather generally recognized. But the great clinical value of much larger doses, of the order of 50,000 milligrams per day, has not yet been recognized and made a part of conventional medical practice. Two clinicians, Drs. Fred R. Klenner and Robert F. Cathcart, III, are the outstanding pioneers in this field. Their discoveries may revolutionize treatment of infectious diseases, including the most serious.*

Frederick Robert Klenner, M.D. graduated from Duke University School of Medicine in March 1936, and after three years of hospital training entered the private practice of medicine in Reidsville, N.C., specializing in diseases of the chest but also carrying on some general practice. He is still practicing medicine in Reidsville, but has been hampered during the last year by the withdrawal of his hospital privileges because of his extensive use of vitamin C in the treatment of disease.

Early in his medical practice, Dr. Klenner became interested in vitamin C because of a report by Dr. Claus W. Jungeblut, who was working in the College of Physicians and Surgeons of Columbia University. Dr. Jungeblut reported finding that sodium ascorbate (vitamin C) is effective in inactivating the virus of poliomyelitis and in protecting monkeys against paralysis after poliomyelitis virus particles had been injected.

When patients in the early stages of an attack of

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poliomyelitis began coming to Dr. Klenner, he started, rather cautiously, checking on the possible value of sodium ascorbate. *In 1949, he became the first person to report the successful treatment of polio patients by injections of large amounts of the vitamin.*

As Dr. Klenner noted, in the polio epidemic of 1948, sixty patients with the disease had come under his care. His initial dose of sodium ascorbate was 1000 to 2000 milligrams, depending on age, administered either by intravenous or intramuscular injection. The dose was repeated every two hours, for one day, then every six hours for the next two days. *Every patient, Klenner reported, recovered uneventfully within three to five days.*

There had been many earlier reports, beginning about 1940, of the value of massive doses of vitamin C in controlling the common cold and some other infectious diseases, but the doses that, in fact, were tried were usually rather small — 200 milligrams per day, or, rarely, as much as 500 or 1000.

Dr. Klenner, in his first paper published in 1948, had reported successful treatment of patients with virus pneumonia by injection of between 2000 and 4000 milligrams of vitamin C per day. But, by 1949, he was administering 15 to 20 grams (15,000 to 20,000 milligrams) — half by injection and half by mouth. In 1952, he reported that he had employed 80 grams of vitamin C per day, for four days, in each of two polio patients — a woman 21 years old and another 28 years old — with benefit to both. Half the amount was given intravenously and half by mouth.

In his thirty published papers, Dr. Klenner has described his success in using vitamin C *in very large doses* to treat patients with *virus pneumonia, poliomyelitis, influenza, measles, chickenpox, hepatitis, tetanus, mononucleosis, puerperal sepsis, herpes zoster (shingles), and herpes simplex (cold sores, fever blisters).*

For any serious virus infection, Dr. Klenner now recommends an intravenous injection of 350 milligrams per kilogram of body weight of the patient, followed by similar injections every one to four hours, depending upon clinical improvement. Each of these injections is about 25 grams of sodium ascorbate for a 70-kilogram (154-pound) adult.

A representative case history reported by Dr. Klenner is that of a woman in a coma with advanced virus pneumonia. He administered 125 grams of sodium ascorbate by intravenous infusion over a period of twelve hours, at the end of which the patient was conscious and on the road to recovery.

**“If the proper large doses are used . . .”**

In a chapter on virus infections in his book *The Healing Factor: Vitamin, C Against Disease*, Dr.

Irwin Stone notes the work of Klenner and a few other investigators. He mentions that Klenner suggests that the optimum dosage rate for a virus infection in a 70-kilogram adult is between 25 and 200 grams per day, going far beyond the amounts that had been previously tried.

“The main value of Klenner’s work,” Dr. Stone remarks, “is in showing that any active viral disease can be successfully brought under control with ascorbic acid (vitamin C) if the proper large doses are used.

“It is inconceivable, but true,” Stone adds, “that Klenner’s pioneering work has been almost completely ignored; no large-scale tests have been made to explore the exciting possibilities of his provocative clinical results.”

And this in the face of the fact that, as Stone points out, “Millions of dollars of research money have been spent in unsuccessful attempts to find a non-toxic, effective virucide and all sorts of exotic chemicals have been tried. All the while, harmless, inexpensive, and non-toxic ascorbic acid has been within easy reach of these investigators. It might prove to be the ‘magic bullet’ for the control of the viral diseases.”

Most of Dr. Klenner’s early papers appeared in a rather obscure publication, the *Journal of Southern Medicine and Surgery*. His failure to get his papers published in a medical journal with wider circulation may have been in part responsible for the small impact they had on his fellow physicians.

During the years following publication of his first papers, in which he recommended use of very large amounts of vitamin C in the treatment of viral infections, other investigators continued to report on rather limited success in controlling these diseases by administration of 200 milligrams of vitamin C per day, or sometimes somewhat larger amounts.

One investigator in 1955 reported improvement in ten of twelve patients with brucellosis (undulant fever) upon treatment with 3000 to 6000 milligrams of vitamin C per day, but he was an exception in using even this much of the vitamin, much less than recommended by Dr. Klenner.

“Many physicians,” Dr. Klenner reported in 1951, “refused to employ vitamin C in the amounts suggested, simply because it is counter to their fixed ideas of what is reasonable; but they do not refuse to try some new product being advertised by an alert drug firm. It is difficult for me to reconcile these two attitudes.

“On the other hand, many physicians who have been willing to try vitamin C against the virus of poliomyelitis have attained the same striking results as we reported. Scores of letters from practitioners here in the United States and in Canada could be presented in evidence. In some instances, doctors have cured their



own children of poliomyelitis by giving vitamin C and in other cases doctors themselves have been cured," Dr. Klenner observed.

It is my own impression that this situation has not changed much in the 32 years since Klenner made those observations. Many physicians still scoff at the idea that vitamin C in large or very large intakes has value in controlling disease, and this attitude seems to reflect their fixed ideas and their ignorance.

On the other hand, many letters that my associate Dr. Ewan Cameron and I have received from physicians about their own observations and own experience indicate that *a larger and larger fraction of physicians is beginning to recognize the great value that vitamin C has in the control of infectious diseases, cancer, and heart disease.*

### **The remarkable contribution of Dr. Robert F. Cathcart, III**

The other outstanding pioneer in the treatment of viral diseases by use of very large doses of vitamin C is Robert Fulton Cathcart, III, M.D. of San Mateo, California.

A native of San Antonio, Texas, Dr. Cathcart was educated in California, receiving the B.A. degree from Stanford University in 1954 and the M.D. degree from the University of California, San Francisco in 1961.

After completing his internship and residency in orthopedic surgery at Stanford University Hospital, he practiced orthopedic surgery in San Mateo for five years. In his practice he made use of a hip-joint prosthesis—a metal ball attached to a spike, designed to fit inside the upper end of the femur and replace the round part of the upper leg bone when it has been broken off, as happens rather often with elderly people.

This prosthesis had been invented by Austin Moore, an English researcher, and it had been used for many years, even though about one-third of the patients had trouble with it because of erosion of the socket into which the ball fits. Austin Moore had made the ball perfectly round and smooth, with the idea that this would prevent the erosion.

At Stanford Medical School, Dr. Cathcart measured 35 hip bones and found that the ball at the top of the femur is ellipsoidal rather than perfectly round, with the larger and smaller diameters differing by about 2 percent. He accordingly designed a new hip-joint prosthesis, with an ellipsoidal ball similar to that found in the human femur. This change in design seems to have solved the problem, and now 500 of the Cathcart prostheses are being installed each month in the United States, Canada, and Australia.

Dr. Cathcart, who began his remarkable clinical work with vitamin C and infectious diseases about twelve years ago, was not led to it by the studies of Jungeblut

or Klenner. He had been troubled since childhood by serious respiratory infections. When he read my book, *Vitamin C and the Common Cold*, in 1970, he tried the treatment recommended by me (and Irwin Stone) of taking one or two grams of vitamin C every hour, beginning at the first sign or symptom of a cold. He soon found, however, that, although this treatment was reasonably effective, it was still better for him to take a single dose of eight grams, followed, if the signs and symptoms had not gone away, with another dose of eight grams some hours later.

So interested did he become in vitamin C that he gave up his practice as an orthopedic surgeon and entered into general medical practice, specializing in the treatment of patients with serious infectious diseases. He has presented his observations recently in a report in the journal *Medical Hypotheses* (November, 1981). Between 1971 and 1981, he treated *over 9000 patients* by giving them large doses of vitamin C.

Dr. Cathcart administers ascorbate by intravenous infusion or intramuscular injection when it seems necessary, but usually relies upon oral administration. The usual intake is between 15 and 200 grams per day, depending upon the disease and the reaction of the patient to the vitamin. He agrees with Dr. Klenner in concluding that very large doses of ascorbate can control even severe viral infections.

"Since 1970," he notes, "I have not had to hospitalize a single patient for an acute viral disease or a complication from such a disease, if the patient utilized the method. In some cases, such as with three cases of viral pneumonia, it was necessary to utilize intravenous ascorbate. Admittedly, I have been lucky because no patient has arrived with such severe symptoms as to necessitate immediate hospitalization. There have been many patients where there was no question that they would have required hospitalization in a very short period of time had not ascorbate been administered."

Dr. Cathcart has made a remarkable contribution through his observations about *bowel tolerance of vitamin C*. Because of his greater emphasis on oral ingestion of the vitamin than shown by Dr. Klenner, who relies upon injections for nearly every patient, Dr. Cathcart made some surprising discoveries.

It is well known that a person in ordinary health, not suffering from disease, can take a certain amount of vitamin C by mouth without a laxative effect but that a larger amount causes a rather immediate loose bowel movement. Dr. Cathcart calls this effect the production of diarrhea, but this is a misuse of the word *diarrhea*, which is defined as "a morbid efflux of liquid from the bowels."

The action of a laxative, such as a large dose of vitamin C, is not the production of diarrhea but rather of a loose bowel movement. For most people in ordinary health, the intake of between one gram and four grams



of vitamin C at one time can have this laxative effect. When the vitamin is taken in four doses a day, the bowel tolerance dose for people in ordinary good health is estimated by Cathcart to be between four grams and fifteen grams per 24 hours.

Dr. Cathcart made the remarkable observation that *people who are seriously ill have a much higher bowel tolerance*, so that for some patients an intake as great as 200 grams per 24 hours does not produce a laxative response.

**TABLE I—USUAL BOWEL TOLERANCE DOSES**

CONDITION	GRAMS PER 24 HOURS	NUMBER OF DOSES PER 24 HOURS
normal	4- 15	4
mild cold	30- 60	6-10
severe cold	60-100	8-15
influenza	100-150	8-20
ECHO, coxsackievirus	100-150	8-20
mononucleosis	150-200+	12-25
viral pneumonia	100-200+	12-25
hay fever, asthma	15- 50	4- 8
environmental and food allergy	0.5- 50	4- 8
burn, injury, surgery	25-150	6-20
anxiety, exercise and other mild stresses	15- 25	4- 6
cancer	15-100	4-15
ankylosing spondylitis	15-100	4-15
Reiter's syndrome	15- 60	4-10
acute anterior uveitis	30-100	4-15
rheumatoid arthritis	15-100	4-15
bacterial infections	30-200+	10-25
infectious hepatitis	30-100	6-15
candida infections	15-200+	6-25

In Table 1, taken from Dr. Cathcart's paper in *Medical Hypotheses*, the usual bowel tolerance doses for patients suffering from various diseases or circumstances are given.

It is remarkable that some patients with mononucleosis, viral pneumonia, bacterial infections, or candida (yeast) infections can take more than 200 grams per day—nearly half a pound of the vitamin—*without experiencing looseness of the bowels*. As they begin to recover from their disease, their bowel tolerance limit decreases, so that it is necessary to decrease intake of vitamin C in order not to be made uncomfortable by bowel looseness.

The Cathcart Principle is that in administering oral ascorbate the *amount needed for effective treatment of a patient's disease is an amount slightly less than that causing so much bowel looseness as to be a nuisance*. Cathcart's Principle may be the resultant of two reasonable concepts: first, that vitamin C effectiveness increases with the amount taken, and, second, that it

is not sensible to take so much as to cause intolerable looseness of the bowels.

The bowel tolerance intake, which is determined by the patient himself, is the amount of vitamin C that has some laxative effect, but not so much as to be a nuisance.

Dr. Cathcart has stated that his observations have shown that an intake of the vitamin somewhat less than the bowel tolerance level may be ineffective in controlling the disease; *only the bowel tolerance intake itself can be expected to be effective*.

As an example, he cites the 100-gram cold. This is a cold such that a patient has a bowel tolerance intake of 100 grams a day. Such a cold would not be expected to be controlled by intake of a smaller amount of the vitamin. The failure of vitamin C to control a cold may be attributed to a patient's intake of too small a dose.

Dr. Cathcart, who may see only rather severe colds in his medical practice, gives 30 to 60 grams per day as the bowel tolerance dose for a patient with a mild cold, and 60 to 100 grams per day for a severe cold. Smaller intakes might control a cold if begun at the first sign or symptom.

*It is remarkable that refractory diseases such as mononucleosis and hepatitis respond so well to ascorbate therapy*. Instead of dragging on, feeling miserable, for months, a patient with mononucleosis may be brought back to good health in a few days.

Dr. Cathcart reports on a 23-year-old, 98-pound librarian with severe mononucleosis who ingested a full pound of ascorbic acid in two days. She continued the large intake and felt quite well in three or four days, then went on taking 20 to 30 grams a day for about two months.

He reports that *acute cases of infectious hepatitis respond dramatically to ascorbate therapy*. These cases included two surgeons who may have been inoculated with a patient's blood by accident. One of the surgeons—and the physicians treating him—had difficulty believing that ascorbate was responsible for his improvement, so he stopped taking it. His condition deteriorated. The disease again subsided when he resumed intake of the vitamin, and he rapidly returned to normal.

### Vitamin C and Cancer

Significant benefits from large doses of vitamin C in patients with cancer have been observed by Dr. Ewan Cameron in Vale of Leven Hospital, Loch Lomondside, Scotland, and Dr. Fukumi Morishige in Fukuoka Torikai Hospital and Fukuoka Tarachai Hospital, Fukuoka, Japan. Dr. Cameron's patients receive between 5 and 45 grams of the vitamin per day, and Dr. Morishige's receive similar amounts.

It has been observed that the bowel tolerance limit



## HOW DOES VITAMIN C WORK?

In an earlier Executive Health Report (Vol. XII, No. 3), Dr. Pauling noted some important basic facts about vitamin C which are very much worth noting again here:

- To appreciate why an adequate daily intake of vitamin C is so essential to your well-being, it is necessary first to remember that man has a genetic defect that prevents him from manufacturing vitamin C in his body as practically all other animals do. He must depend upon securing enough from his diet to protect himself.

- Vitamin C is known to have a number of functions in the human body. *It is a reducing agent* (an anti-oxidant) and together with vitamin E, functions in this way to protect tissues, especially cell membranes, against damage by oxidation. The damaged cells can be entered more readily by virus particles than the protected cells, so that protection against colds and other viral diseases by vitamin C depends in part on its effectiveness as a chemical reducing agent.

- In addition, it is known that vitamin C is required for the synthesis by the body of collagen, which is an important constituent of all connective tissue. The tissues are strengthened by an extra intake of vitamin C. The intercellular cement is strengthened, which helps the tissues to resist invasion by the virus particles that cause colds, as well as other virus diseases.

- Vitamin C has also been reported to have direct antibacterial action against bacteria of several different kinds. Part of the protection of the body against bacterial disease is the phagocytic action of white blood cells (leukocytes). It has been known for a long time that the leukocytes can exert their phagocytic activity against bacteria, engulfing and destroying the organisms, only if the leukocytes contain a certain amount of vitamin C.

- A good intake of vitamin C has long been known to be needed for the healing of wounds, broken bones, and burns.

- *It may well be that in general the effectiveness of vitamin C against colds and other diseases operates by bolstering up the natural protective mechanisms of the body in a variety of ways.*

for some patients with cancer is high, over 50 grams per day, and possibly much higher. No one as yet has reported any significant work on treating patients with cancer by use of the Cathcart Principle, giving them the maximum amount of oral ascorbate they can tolerate.

Dr. Klenner has recommended administration of at least 50 grams of sodium ascorbate a day by intravenous infusion to control cancer. In 1974 he stated: "Who can say what 100 g or 300 g given intravenously, daily, for several months might accomplish in cancer. The potential is so great and the employment so elementary that only the illiterate will continue to deny its use." In fact, however, in 1982, the medical authorities denied its use to patients coming to Dr. Klenner, revoking his privileges to bring them to the hospital for treatment with vitamin C.

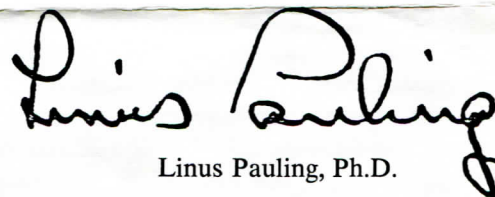
Whenever a new drug is being studied for its possible beneficial effect in the control of cancer, it is given to patients in the largest possible amounts, amounts that cause serious side effects.

So far, no cancer patient has been treated by being given the maximum tolerable amount of vitamin C. In fact, the vitamin is so innocuous that we don't know what the maximum amount is.

\* \* \* \* \*

TO SUM UP: It is my opinion that a vigorous effort should now be made to determine the best ways in which vitamin C can be used for the treatment of cancer, of various infectious diseases, and of cardiovascular diseases.

Dr. Fred L. Klenner, Dr. Robert F. Cathcart, III, Dr. Ewan Cameron, and Dr. Fukumi Morishige have broken the trail and pointed the way. Medical researchers and the whole medical profession should now take advantage of their guidance and determine just how valuable their discoveries are.



Linus Pauling, Ph.D.

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