

Vitamin E

Who needs it?

**Food faddists say
everyone needs more of it,
scientists say
it needs more study**

by Robert J. Trotter

When vitamin E was discovered in 1922 researchers immediately set out to determine its function in the body. One way to do so was by artificially producing a deficiency of the vitamin in lab animals. The resulting symptoms give some indication of the vitamin's functions. Rats deprived of vitamin E, for example, ceased to reproduce. Some researchers therefore concluded that vitamin E was a fertility drug.

It is possible, however, to produce a variety of symptoms—depending on the species tested—by using various manipulative tricks. Vitamin E was credited with preventing or curing many of the diseases linked with these artificially produced symptoms.

Also, because the vitamin is non-toxic or has not yet been shown to be toxic, it can be administered in very large doses (1,000 or more milligrams a day). Thus physicians faced with diseases for which there was no known cure or explanation felt free to prescribe it. The real or subjective responses from patients receiving this type of therapy were often added to vitamin E's repertoire.

Example: A pregnant woman has suffered spontaneous abortion in the past. She asks her doctor for something. Presuming that vitamin E will have no ill effects, the doctor prescribes it. If the woman carries her child full term, vitamin E has another use. If not, no harm has been done.

John G. Bieri of the Laboratory of Nutrition and Endocrinology at the National Institutes of Health in Bethesda, Md., says this has happened often—especially in Europe and Canada. Many of these seemingly miraculous cures have been reported in the literature. And food faddists and health nuts have latched on to vitamin E as a universal panacea (see box). They claim

that everyone needs to take a daily dose of at least 30 milligrams to stay healthy.

But, says Bieri, "the folklore about vitamin E is 90 percent wishful thinking." Vitamin E is readily available and fairly widespread in the normal diet. It occurs in wheat germ oil, cereals, egg yolk, milk and beef liver. And says Bieri, there is no evidence that anyone needs extra vitamin E. There is no evidence that any deficiency or even a borderline deficiency exists anywhere in the world, he says.

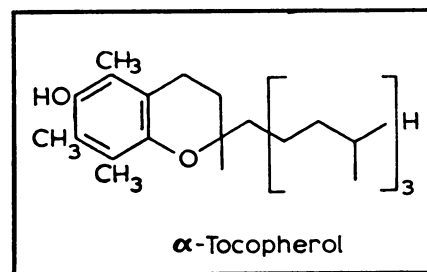
In 1959, however, the Food and Drug Administration did state that vitamin E is essential in human nutrition. Ac-

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According to the Food and Nutrition Board of the National Research Council the daily recommended intake of the vitamin ranges from 5 milligrams for infants to 30 milligrams for adult males. This is based on the usual range of intake of vitamin E and does not stem from any known daily requirement.

But even though there is no evidence of deficiency, scientists would like to have better knowledge of how vitamin E works and what human requirements for it are. Research in progress may eventually lead to that goal. In December the New York Academy of Sciences sponsored a conference on vitamin E

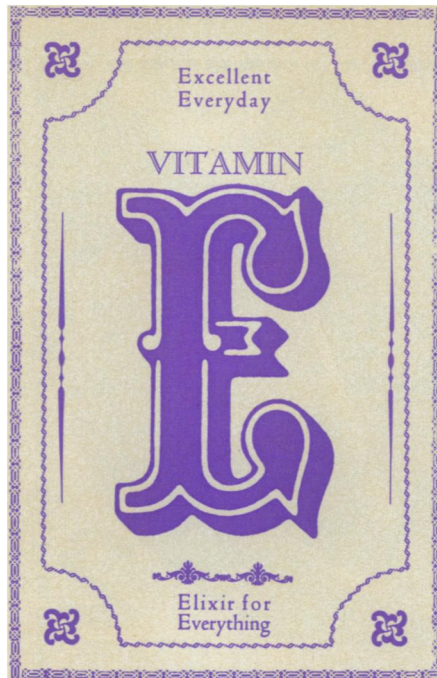


stressing its role in cellular metabolism. The program emphasized "strictly scientific, factually verified information on vitamin E," according to conference co-chairman Herbert J. Kayden of the New York University School of Medicine.

M. S. Losowsky and J. Kelleher of St. James Hospital in Leeds, England, are studying the daily intake of vitamin E (alpha-tocopherol). They measured the content of vitamin E in whole daily diets in England and found that 50 percent of the diets contain less than 5 milligrams a day. A significant proportion were even below 3 milligrams a day. Nevertheless, they say, the tocopherol levels of those persons compare favorably with values published in the United States. This, however, cannot be taken in isolation. The researchers also report that those diets with low tocopherol content also tend to have a low content of polyunsaturated fatty acid (PUFA).

Previous research has shown that an increase in PUFA calls for an increase in vitamin E to keep the tocopherol level at a normal range. Lloyd A. Witting at Elgin State Hospital in Elgin, Ill., says the relationship between vitamin E and PUFA is not so simple. His studies indicate that the concentration of vitamin E beyond an optimum level may actually result in its decreased efficiency as an antioxidant. And the antioxidant theory is the one explanation that is most consistent with the effects of induced vitamin E deficiencies in man and animals.

The antioxidant theory hypothesizes that the only function of vitamin E in biological systems is to protect molecules of unsaturated lipids (fatty substances that with proteins and carbohydrates constitute the principal structural components of living cells) from being



oxidized. Uncontrolled peroxidation (complete oxidation) of lipids leads to widespread damage to intracellular membranes, enzymes and certain metabolites. Therefore all diverse effects of vitamin E deficiency are considered to be secondary, stemming only from one primary process—lipid peroxidation.

Evidence for this theory comes from the fact that synthetic antioxidants (otherwise unrelated to vitamin E) can substitute for the vitamin in preventing certain deficiency symptoms.

Experiments based on the antioxidant theory have shown that red blood cells are among those damaged by vitamin E deficiency. When the deficiency exists the oxidized lipids in the cell membranes do not function properly and hemoglobin escapes from the cells. This produces a type of anemia that occasionally occurs in small premature infants (the only verified case of vitamin E deficiency resulting in a human disease). Samuel Gross and David K. Melhorn of Case Western University School of Medicine in Cleveland examined 234 premature infants. They found that hemolytic anemia does occur in premature infants deficient in vitamin E. They reported that with oral vitamin E treatment all of the children eventually returned to normal.

The antioxidant theory, however, may not be the only way to explain the cell membrane breakdown. J. A. Lucy of the University of London's Royal Free Hospital says that the antioxidant theory only works *in vitro* (outside the body) and probably not *in vivo* (in the body). From his research he concludes that vitamin E fulfills a physicochemical role in the stabilization of cell membranes. Biological membranes have two functions: the compartmentalization of cells and the provision of a structural framework for the attach-

ment of enzymes. Lucy explained how a failure of one or both of these functions could be caused by vitamin E deficiency.

J. Green of Beecham Research Laboratories Nutritional Research Center in Surrey, England, also disagrees with the antioxidant theory. It has two problems, he says. The first is showing that lipid peroxidation occurs at all in tissues; the second is showing that the peroxidation is increased in vitamin E-deficient animals. "Both have been attempted," he says, "neither has been proved."

The antioxidant theory has succeeded in illuminating many areas that need interpretation, but Green feels it has also generated a host of myths that need to be discharged. And the way to end them is by designing experiments to test the antioxidant theory at its most vulnerable points. This should lead to a new understanding of vitamin E, he says, "but the solution remains for the future."

Meanwhile, until more and better-controlled human experiments are conducted and accepted, the role of vitamin E in human nutrition and metabolism will be contested. Nutritionists will admit that the vitamin is necessary, but most will continue to contend that sufficient tocopherols are already available in daily diets. Vitamin E enthusiasts will continue to extol its lifesaving potential and preach megavitamin therapy. But as Bieri says, the vitamin will probably do no harm—and probably no good—though it may have some psychological value for those who think it is doing some good. He notes that vitamin E has enjoyed faddism before (as vitamin C is at present) and it will again, "whenever Americans have nothing better to think about than what they eat." □

Some of the claims made over the years for vitamin E

Vitamin E is a fertility drug. It increases sperm count, makes the ovaries feel good, is used to treat symptoms of menopause and can prevent habitual abortion and congenitally deformed babies. It also relieves chronic constipation and certain gastrointestinal disorders—including peptic ulcers. Vitamin E can be used to cure some alcoholics and to treat the symptoms of withdrawal from drug addiction. It can cure cirrhosis and other disorders of the liver. It can prevent liver spots. It strengthens bones and teeth. Vitamin E is nature's own tranquilizer. It calms the nerves and helps one to think more clearly. It normalizes blood pressure (bringing it up when it is too low and lowering it when it is too high). It is a cold cure—vitamin E weakens the influenza virus. It is also valuable in the treatment of leprosy and various skin diseases. It can prevent sickness due to X-ray therapy. It strengthens the muscles, can control bursitis and is related to muscular dystrophy. It is especially good therapy for heart ailments of all types. It can cure retarded children—even Mongoloids—and can help cure brain and neurological disorders. Vitamin E strengthens the circulatory system and prevents varicose veins. It can be useful in the treatment of atherosclerosis and arteriosclerosis. It helps cure swollen ankles, nocturnal leg cramps (SN: 9/13/69, p. 206) and the restless leg syndrome. It corrects eye disorders in children. It is an anticoagulant. It dissolves blood clots, heals wounds and burns and dissolves scar tissue. It also dissolves nicotine in the lungs. It is good treatment for diabetes, reverses or slows down the aging process, is a protection against cancer and even makes race horses run faster.