

## ASCORBIC ACID AS A DRUG

Ascorbic acid is a cheap and safe drug. There have been many claims that it is useful in the treatment of a large number of diseases. Its most enthusiastic advocate is Linus Pauling (1976), whose book *Vitamin C and the Common Cold and the Flu* has had a great influence. Pauling became interested in ascorbic acid in 1966 when he received a letter from Irwin Stone, the successful novelist, advising him to take large doses of it daily. He and his wife then began to take 1 g or more daily and at once 'noticed an increased feeling of wellbeing, and especially a striking decrease in the number of colds that we caught and in their severity.' He then began to study the literature on ascorbic acid and the first edition of his book appeared in 1970 and soon had large numbers of readers.

Pauling was greatly respected by scientists for his work as a chemist on the structure of large molecules and especially by biologists for his explanation of how a small change in the chemical composition of haemoglobin was responsible for the sickle cell phenomenon in red blood corpuscles. He was also well known to the general public for his work to promote peace and had the rare distinction of receiving two Nobel prizes, one for science and one for peace. Furthermore, his book on vitamin C was beautifully written and easily read by the general public despite the fact that it contained complicated scientific argument and many references to the literature. As a result of his advocacy, very large numbers of the public in America and other countries began to take tablets of ascorbic acid regularly.

Pauling's hypothesis was based on a study of the evolution of the diet of primates. He calculated the average content of ascorbic acid in 110 natural plant foods, as might be eaten by a gorilla, and showed that a human adult eating a diet made up of these foods would obtain 2.3 g of the vitamin, some 50 times the USA recommended intake. Furthermore, he showed that the potential rate of synthesis of ascorbic acid, as reported in several species of animals, if extrapolated to man, indicated a human daily requirement of up to 10 g.

Pauling's book has stimulated at least 15 clinical trials of the use of ascorbic acid in prophylaxis or treatment of the common cold. Not all of these were technically good. The largest and best of these were carried out in Toronto,<sup>22</sup> in which 1349 subjects out of 3520 who enrolled completed the three months of study. The subjects were divided into eight groups who received a placebo or a dose of ascorbic acid both prophylactically throughout the trial and during episodes of infection. Table 14.2 shows the treatment schedules and an abstract of their results. One of the placebo groups had fewer episodes and of less severity than any of the other groups. None of the groups receiving ascorbic acid had

**Table 14.2** Ascorbic acid in the prophylaxis and treatment of the common cold

Treatment (g ascorbic acid/day)		Mean number of episodes	Mean days of symptoms	Mean days off work
Prophylactic	Therapeutic			
Placebo	Placebo	1.53	5.40	1.18
Placebo	Placebo	1.47	4.16	0.94
0.25	Placebo	1.53	4.77	1.11
1.0	Placebo	1.51	5.04	1.09
2.0	Placebo	1.51	4.87	1.29
Placebo	4	1.52	4.82	0.97
Placebo	8	1.58	4.52	1.05
1	4	1.57	5.38	1.13

a sickness experience that was statistically different from the placebo groups. Pauling has supported claims from a hospital in Scotland that large doses of ascorbic acid given to patients with terminal cancer prolongs their life and improves its quality.<sup>23</sup> This study lacked adequate controls, and in a well-designed trial from the Stanford Medical School patients with advanced cancer got no benefit from large doses of the vitamin.<sup>24</sup>

**Toxicity.** Ascorbic acid in large doses has been taken by many thousands of persons for long periods without untoward effect and must be one of the safest drugs. Yet it is known to increase the urinary output of oxalic acid and of uric acid, and intestinal absorption of iron. Large doses are therefore dangerous to those with a liability to urinary stones or to iron-storage disease. The Canadian workers found that after an abrupt withdrawal of a high dose, blood concentrations of ascorbic acid were abnormally low, and this might be dangerous. For these reasons we cannot recommend that large doses should be taken for long periods for prophylactic purposes. The risk of taking up to 4 g daily for a few days for therapeutic purposes should be acceptable.

**Orthomolecular medicine.** Pauling claims in his book that large doses of ascorbic acid may be beneficial in cancer, heart disease, schizophrenia and other diseases. This view is derived from his concept of orthomolecular medicine which '... is the preservation of good health and the treatment of disease by varying the concentrations in the human body of substances that are normally present in the body and are required for health.... To achieve the best of health, the rate of intake of essential foods should be such as to establish and maintain optimum concentrations of essential molecules, such as those of ascorbic acid. There is no doubt that a high concentration of ascorbic acid is needed to provide the maximum protection against infection, and to permit the rapid healing of wounds. I believe that in general the treatment of disease by the use of substances such as ascorbic acid, that are normally present in the human body and are required for life is to be preferred to the treatment by the use of powerful synthetic substances or plant products, which may, and usually do,

have undesirable side effects.'

Orthomolecular medicine is an attractive idea, but the principle appears to work only in those very rare cases of heredity disorders caused by enzymic defects which respond to pharmacological doses of a vitamin (p. 350).

# Davidson and Passmore Human Nutrition and Dietetics

---

**R. Passmore M. A.  
Eastwood**

Assisted by the following  
members of the Edinburgh  
Medical School

**A. R. MILLS** *Community medicine*

**W. A. M. CUTTING** *Paediatrics*

**B. F. CLARK** *Diabetes*

**JANET KNOX** *Dietetics*

**M. F. OLIVER** *Cardiology*

**J. M. BONE** *Renal diseases*

EIGHTH EDITION

CHURCHILL LIVINGSTONE

EDINBURGH LONDON MELBOURNE AND NEW YORK 1986

© Longman Group Limited 1986

First edition 1959  
Second edition 1963  
Third edition 1966  
Fourth edition 1969  
Fifth edition 1972  
Sixth edition 1975  
Seventh edition 1979  
Eighth edition 1986

ISBN 0 443 02467 7 (PPR)  
ISBN 0 443 02486 3 (CSD)

British Library Cataloguing in Publication Data

Davidson, Sir Stanley

Davidson and Passmore human nutrition and dietetics. — 8th ed.

1. Nutrition

I. Title II. Passmore, R. III. Eastwood, M. A.  
613.2 TX353

Library of Congress Cataloging in Publication Data

Davidson, Leybourne Stanley Patrick, Sir, 1894-

Davidson and Passmore Human nutrition and dietetics.

Rev. ed. of: Human nutrition and dietetics/Stanley

Davidson . . . [et al.] 7th ed. 1979.

Bibliography: p.

Includes index.

1. Nutritional disorders. 2. Diet therapy. 3. Nutrition.

I. Passmore, R. (Reginald) II. Eastwood, M. A. (Martin A.) III. Title. IV. Title: Human nutrition and dietetics.

[DNLM; 1. Diet Therapy. 2. Nutrition Disorders. WB  
400 D252h] RC620.D38 1985 613.2 85-12762