

The Vitamin B Complex and Ascorbic Acid

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This chapter provides a summary of physiological and therapeutic roles of members of the vitamin B complex and of vitamin C. The vitamin B complex comprises a large number of compounds that differ extensively in chemical structure and biological action. They were grouped in a single class because they originally were isolated from the same sources, notably liver and yeast. There are traditionally eleven members of the vitamin B complex—namely, thiamine, riboflavin, nicotinic acid, pyridoxine, pantothenic acid, biotin, folic acid, cyanocobalamin, choline, inositol, and paraaminobenzoic acid. Paraaminobenzoic acid is not considered in this chapter, as it is not a true vitamin for any mammalian species but is a growth factor for certain bacteria, where it is a precursor for folic acid synthesis. Although not a traditional member of the group, carnitine also is considered in this chapter because of its biosynthetic relationship to choline and the recent recognition of deficiency states. Folic acid and cyanocobalamin are considered in Chapter 54 because of their special function in hematopoiesis. Vitamin C is especially concentrated in citrus fruits and thus is obtained mostly from sources differing from those of members of the vitamin B complex.

II. ASCORBIC ACID (VITAMIN C)

History. Scurvy, the deficiency disease caused by lack of vitamin C, has been known since the time of the Crusades, especially among northern European populations who subsisted on diets lacking fresh fruits and vegetables over extensive periods of the year. The incidence of scurvy was reduced by the introduction of the potato (a source of vitamin C) to Europe in the seventeenth century. However, the long sea voyages of exploration in the sixteenth to eighteenth centuries, which were undertaken without a supply of fresh fruits and vegetables, resulted in large numbers of the crews dying from scurvy.

Therapeutic Uses. Vitamin C is used for the treatment of ascorbic acid deficiency, especially frank scurvy, which occurs rather infrequently in infants and in adults.

Lack of Clinical Effectiveness of Megadosage. In addition to these specific uses of vitamin C, extensive literature has appeared on the application of this vitamin to a wide variety of diseases. Many such claims are associated with megadosage treatment. However, sporadic reports of the efficacy of vitamin C in curing cancer or the common cold have not been substantiated (*see* Gershoff, 1993). Any preventive benefit that might be derived from such use of ascorbic acid seems small when

weighed against the expense and the risks of the megadosage treatment. The latter include formation of kidney stones resulting from the excessive excretion of oxalate, rebound scurvy in the offspring of mothers taking high doses, and a similar phe-

nomenon when subjects who are consuming large amounts of vitamin C suddenly stop. These rebound phenomena presumably are due to induction of pathways of ascorbic acid metabolism as a result of the preceding high dosage.

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