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# Introductory Chapter: Vitamin C

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## 1. Vitamins

The word vitamin was originally coined to describe amines that are essential for life. It is now known that although not all vitamins are amines, there are organic micronutrients that mean that they must be consumed in small quantities for adequate growth and are required in numerous metabolic reactions to maintain homeostasis. There are 13 vitamins that are recognized by all researchers, and these can be classified as either being soluble in fats (fat soluble) (including vitamins A (retinols and carotenoids), D (cholecalciferol), E (tocopherols and tocotrienols), and K (quinones)) or soluble in water (water soluble) (including vitamin C (ascorbic acid) and the B group vitamins). B group vitamins include the following: vitamin B1 (thiamine), vitamin B2 (riboflavin), vitamin B3 (niacin), vitamin B5 (pantothenic acid), vitamin B6 (pyridoxine), vitamin B7 (biotin), vitamin B9 (folic acid or folate), and vitamin B12 (cobalamins).

## 2. Vitamin deficiencies

Although all 13 vitamins are present in a wide variety of foods, deficiencies are still very common in all parts of the world. There is no magic food that contains all the vitamins; the only way to avoid deficiencies is to consume a variety of foods, which are the bases of all the nutritional guidelines, or consume dietary supplements. In addition to malnutrition, certain diseases and treatments have been shown to affect vitamin absorption or bioavailability. Furthermore, pregnant women and children have a greater need for vitamins because of their increased metabolism during cell replication.

## 3. Vitamin C

Vitamin C, also known as ascorbic acid, is mainly present in fruits and vegetables; citrus fruits, tomatoes and potatoes are the principal exogenous source of this vitamin. The consumption of such foods is important since the human body does not have the ability to produce this essential micronutrient. Because it is water soluble, it can easily be lost by cooking and long-term storage; fortunately, most fruits and vegetables that contain large amounts of vitamin C are consumed fresh without cooking. However, it is well known that most people do not consume the recommended five servings of fruits and vegetables that would be necessary for them to fulfill their daily recommended intake of vitamin C that is around 200 mg. Because of this problem, it is now common that ascorbic acid be used as a dietary supplement, which can easily be added to foods or consumed directly in capsules or part of multivitamin preparations.

Even though it is almost unheard of that people still can be affected by scurvy today, which is directly caused by vitamin C deficiency, its early symptoms are very

common. These include fatigue, inflammatory problems (especially of the gums), depression, joint pain, and anemia. Besides an inadequate ingestion of the vitamin, other causes have been linked to vitamin C deficiency such as smoking (direct and passive), malnutrition (inadequate ingestion of eating unbalanced diets), certain drugs, and malabsorption caused by certain diseases.

The consumption of vitamin C supplements are nowadays very common, not only to prevent deficiencies but also to ensure the wide range of beneficial health effects that have been reported to be associated with the consumption of this vitamin. These include having an active role in immunity, reason for which is that many consume ascorbic acid when they have a common cold, and also because it has been stated that it can play a role in cancer (in its prevention and treatment), cardiovascular diseases, and age-related diseases such as cataracts, among others. Vitamin C is also the most commonly used antioxidant substance in foods because of its safety. This property has made it the object of numerous studies where it is used as adjunctive treatments in many bacterial and virus infections and cancer treatments, another reason that has made it the vitamin of choice by consumers to improve their general health.

#### **4. Conclusions**

Even though the role of vitamin C has been known since the early 1930s and a series of interesting studies have been performed in the 1970s, only recently researchers have been actively studying and demonstrating its role and function in the treatment and prevention of many diseases. These studies will be the key to providing the scientific basis that explains why this simple but important vitamin possesses such a wide range of positive biological activities.

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#### **Conflict of interest**

No conflict of interests exists with the publication of this chapter.

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