

# Foreword



While plants and micro organism have the capability to produce the vitamins necessary for the metabolism themselves, humans and animals have unfortunately lost this ability during evolution. Because of the lack of specific enzymes for synthesis, vitamins became essential nutrients for them. It was recognized more than 3500 years ago that vitamins are essential food ingredients for maintaining health and well-being. The first records related to the use of specific food items, as we know today contain information on specific vitamins, such as vitamin A in liver, to prevent specific diseases such as night blindness. Only 3000 years later specific conditions of deficiency were recorded that could be attributed to the deficiency of selected nutrients. Well known examples are scurvy (vitamin C deficiency), beriberi (vitamin B<sub>1</sub>) and rickets (vitamin D). It took another 400 years until we were able to attribute these disease conditions to specific active substances in our diet named then vitamins. Although we now know that vitamins are not a uniform group of chemical substances like proteins, carbohydrates and lipids, we still use the term to describe the whole group.

Since the beginning of the last century our knowledge on the biological function of vitamins on the molecular and cellular level has increased significantly. This research is reflected by 20 Noble Prize winners between 1928 and 1967. Despite intensive research efforts no additional vitamins have been added to the list of 13 vitamins accumulated between 1897 and 1941.

While in the past, scientist have basically been concerned with the role of vitamins in preventing vitamin related disease and their biochemical functions, today it is recognized that vitamins have an important role in health and well-being beyond the mere prevention of deficiency. This aspect of vitamins is based on the observation that vitamins are not only coenzymes in metabolic processes but also act as potent antioxidants and have hormone-like functions. The later is clearly

visible in the history of vitamin D research. In the late 1970's, research established vitamin D as a hormone essential in bone metabolism. Based on such findings, vitamins are no longer classified into groups defined simply by their physical-chemical properties – such as water-soluble and fat-soluble vitamins. More appropriately, vitamins are now classified according to their biological function in the body; vitamins with coenzyme functions, vitamins with hormone-like properties and vitamins with antioxidants properties. But as expected the borderlines between these groups can not clearly be defined and needs readjustment with the rapid progress in research.

In developing countries chronic, diet-related diseases are still an important public health problem but in the affluent societies, the prevention of degenerative diseases and also acute vitamin deficiencies might be of concern. Regarding the continuing debate of optimal vitamin levels and tolerable upper intake levels (UL) a valid knowledge-base of the daily expanding scientific evidence is necessary. This includes for example the definition of populations at risk, the problem of appropriate biomarkers that not only reflect the dietary intake but also the local status in specific tissues at risk of deficiency as well as environmental factors that influence status and need for certain vitamins.

The following chapters of this book will contribute to the better understanding of the important role of vitamins not only in preventing specific deficiencies but also maintaining and improving human health and well-being by summarizing the actual knowledge-base for the individual vitamins.

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