Milk and Milk Products in Human Nutrition
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Preface

Milk is the sole source of nutrition for mammals for a period from several days to a few years, depending on species. The complex biology of mammalian milks impacts early growth and development, and may provide a foundation for health throughout the entire lifespan.

Human milk is aimed at being the sole source of nutrition in early infancy, but if breastfeeding is not possible milk substitutes, in general based on cow’s milk protein, need to have a composition fulfilling the same goal of serving as the sole source of nutrition during the first months of life and confer as close as possible the overall health benefits that human milk provides to the infant.

In many populations, milk continues to play a major role in a healthy, balanced diet throughout life. During childhood, pregnancy and adulthood, intake of cow’s milk has important beneficial effects on linear growth, bone development and oral health. Cow’s milk has been especially effective in prevention and treatment of undernutrition in low-income countries. Potentially adverse effects of cow’s milk intake, like increased risk for type 1 diabetes and certain cancers, or negative aspects of dairy fats continue to be under debate in the absence of convincing evidence.

The workshop covered three sessions with excellent presentations of invited lecturers and vivid discussions typical for the Nestlé Nutrition Institute workshops. The first session covered Milk during Pregnancy and Infancy, the second session Milk during Childhood in Low- and High-Income Countries, and the last session General Aspects of Milk: Milk in Adult Nutrition. Together, the three sessions covered most aspects of milk during the life cycle in a global perspective.

This publication includes all the presentations together with the discussions following each of them. The concluding remarks provide a short summary and conclusions drawn from the deliberations of the workshop.

Roger A. Clemens
Olle Hernell
Kim Fleischer Michaelsen
Foreword

Following the workshop on the ‘Biology of Human Milk’ held in 1988, the present 67th workshop was the first one focusing on the health aspects of milk during and beyond the breast milk feeding period, reflecting the major role that milk plays in a healthy, balanced diet across the lifespan. Breast milk is unique, and in the ideal situation, is the sole source of nutrition in early infancy. Breast milk substitutes therefore have to be chosen carefully depending on their suitability for the infant. However, since 1988 the scientific world has reached the consensus that the performance of the breastfed infant rather than the composition of human milk should be the reference for the innovation of breast milk substitutes. The benefits of milk in the diet during the weaning and toddler periods were debated in this workshop, as well as the benefits for school age children and throughout adolescence and adult life. The benefits may be different at different ages.

Amongst the most important beneficial effects summarized during the workshop were:

- Milk remains an important source of dietary calcium, protein, energy, vitamins, minerals, growth factors and other bioactive components in both, low- and high-income countries. Milk can also make a contribution to dietary vitamin D intake, especially when fortified.
- Milk is a crucial part of the diet for child growth and development. There is a clear association with linear growth, although the mechanisms are yet to be fully elucidated.
- Dairy fats contain a range of lipids that may have health-promoting properties including omega-3 LC-PUFA, gangliosides, sphingolipids, etc.

Impact of ingestion of trans-fatty acids or selected saturated fatty acids on health and the association of risk for type 1 diabetes and milk intake were discussed in a balanced manner.

This workshop, held in Marrakech, Morroco, in March 2010, brought together an outstanding group of scientific experts in the field and participants from 30 countries who contributed largely to the lively and intense discussions.
We want to thank the three chairpersons, Prof. Roger Clemens from the USA, Prof. Olle Hernell from Sweden and Prof. Kim Fleischer Michaelsen from Denmark, all highly respected experts in the field of pediatric nutrition, for putting together this outstanding scientific program.

Our special thanks go to Mr. Badr Nassili and Ms. Sophia Jalal and their Nestlé Maghreb team in Morocco for their efficient logistic support and for hosting this workshop in the beautiful environment of Marrakech.

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