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Nutrition and Aging

Irwin H. Rosenberg, Boston, Mass., USA
Ana Sastre, Madrid, Spain
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Preface

The global demographic transition to an older population effects developing as well as developed countries. By 2050, the world population over 60 years of age is expected to reach two billion. Meeting the special nutrition needs of this expanding population, so as to prevent age-related degenerative disease, is a growing imperative. Many of the age-related conditions, which have such a strong impact on the need and cost of health care and the quality of life of aging populations, have important nutritional components. Among these are cardiovascular disease, diabetes, stroke, osteoporosis, cataract, and cognitive decline.

The goal of this 6th Nestlé Nutrition Workshop within the Clinical and Performance Program was to examine the relationships between nutritional factors and aging and age-related disease and function. The workshop and this monograph was organized to explore Nutrition and Aging by first examining our knowledge of the genetic controls and nutritional effects of aging, turning then to energy regulation and changes in body composition. Next we focus on some of the well-known and important effects of nutritional status on the aging and degenerative processes before moving to the possibilities for intervention and prevention to approach the public health challenge of aging and disease. Finally, we sought to achieve some consensus on recommendations to investigators and health professionals on two important management issues in geriatrics and care of the aging: the geriatric assessment, which includes an appropriate content of nutritional evaluation, and the assessment of changing cognitive function with age.

The first session on Nutrition Effects, Genetic Control and Aging addresses some of the basic biology of aging in relation to nutrition. One theme is that aging is affected by the earliest experiences in life, even fetal life, based upon
studies in several countries that relate small birth rate and show growth in the first year of life to greater risk of hypertension, heart disease and diabetes in adult life. Another theme relates caloric restriction to greater longevity and a healthier age span based upon research on animals fed on nutritionally full, but calorically low diets. The theme of genetic factors focuses on the DNA of mitochondria and the importance of mitochondrial transmission in neurogenerative diseases.

There is a loss of regulation of appetite control with aging which may lead to increased fat accumulation and may also contribute to loss of lean mass. Body cell mass, especially muscle mass, declines after age 20 years. The session on *Energy Regulation and Body Composition* examines these important changes in regulatory capacity and also explores insulin resistance with the associated increased risk of type 2 diabetes and heart disease, especially in the presence of increased obesity. Related changes in the aging gastrointestinal system may underlie some of these age-related functional changes.

The session on *Known Related Effects of Nutrition on Aging* explores and discusses a leading example of nutritional factors and age-related disease, osteoporosis. While physical activity is another important factor in the genesis or prevention of osteoporosis, muscle function is particularly dependent on activity. Though total protein and other dietary factors may be important. Memory and cognition can be influenced by diet and nutritional factors including some B vitamins that effect blood homocysteine. The short-term effects of nutrition on cognition may be small, but significant, longer term effects on cognition and the prevention of dementia are clearly deserving of more study.

Certain conditions offer a public health challenge and call out for nutritional intervention studies as described in Session IV. Those considered were sarcopenia, or age-related loss of muscle mass and strength which responds to resistance training (strength training exercise). Exercise also reverses some forms of depression. Cataract and age-related macular degeneration may be related to anti-oxidant nutrient intake (especially vitamins C and E) and intervention trials are underway which could have an important impact on health care costs and quality of life relating to the maintenance of vision. Dehydration is an under-diagnosed complication of aging and, given the loss of some of the mechanisms for regulation of body hydration, vigorous approaches to understanding and preventing dehydration will be important especially in the institutionalized elderly. Another important functional change with aging is immune disregulation, which can increase the risk of infection and cancer. Intervention trials with vitamin E reverse disregulation at the level of the macrophage and memory cell; other nutrients, including zinc, vitamin B6, selenium, and even multivitamins may be candidates for use in intervention.

The final session examines recommendations for screening for the risk of physical and mental disabilities in free living elderly and geriatric patients. We
explore the need to use screening methods for multiple functions and also the need for assessment for cognition such as the Mini-Mental Status Examination, assessment of gait and balance, and also assessment for depression.

Overall, the workshop draws together leading international scientists to examine the most important elements of nutrition and aging, and to explore not only the important scientific horizons, but also the opportunities for application of knowledge to improve the health and well-being of the fastest growing segment of the world’s population.

Irwin H. Rosenberg, Ana Sastre
Foreword

Longevity is increasing in many parts of the world. When the topic ‘Nutrition and Aging’ was chosen for this workshop, it was felt that there was a need to discuss the issue on a larger scale regarding not only physiological and nutritional factors, but also genetic aspects, environmental programming, control of appetite, organ-dependent influences on aging as well as preventive possibilities.

I would like to thank the two chairpersons, Prof. Ana Sastre and Prof. Irwin Rosenberg, who are both leading experts in research dedicated to the interrelationship between nutrition and aging. They succeeded in uniting 16 speakers covering the whole spectrum of this topic. Prof. Sastre is the founder of the Dietetics and Clinical Nutrition Unit at the Hospital Ramon y Cajal in Madrid and has been the coordinator of this unit for the past 22 years. She is the Medical Associate Director of this hospital. Prof. Rosenberg is a gastroenterologist with research interests in intestinal absorption of vitamins and minerals, as well as in nutrient availability. He is Director at Tufts University in Boston.

The invited scientists from 12 countries substantially contributed to the fruitful discussions, which are also published in this book. Many thanks also to Mr. Javier Dorca and his team from Nestlé Spain who provided all logistic support for this workshop in a very competent manner. It was obvious that everybody enjoyed the cordial Spanish hospitality. Dr. Philippe Steenhout from the Nutrition Strategic Business Division in Vevey, Switzerland, was responsible for the Scientific coordination. His intensive co-operation with the chairpersons was essential for the success of this workshop.

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