

## Preface

Death incidence attributable to chronic diseases is projected to increase due to the growing and aging population. The rampant increase in the prevalence of overweight and obesity in the USA and other world populations has been attributed to a combination of dietary, socioeconomic, and behavioral causes. These include an imbalance between dietary recommendations and behavior combined with an increasingly sedentary lifestyle. To reduce the burden of chronic diseases, various dietary guidelines are being released by health organizations in the USA and around the world to promote a rebalancing of calories and more physical activity. International efforts are underway to formulate dietary recommendations that prevent chronic diseases and improve quality of life. Unfortunately, socioeconomic constraints contribute to the paradoxical coexistence of noncommunicable diseases with food insecurity.

Various dietary guidelines and patterns emphasize the importance of variety, proportionality, and moderation in food selections. These include the *Mediterranean diet* which, in 2013, was inscribed by UNESCO in the Representative List of the Intangible Cultural Heritage of Humanity. In 2015, the Scientific Report of the Dietary Guidelines for Americans to the US Department of Human Health Services Department of Agriculture recommended the Mediterranean-style pattern among those dietary patterns associated with health promotion. The impetus for developing this volume stems from the wealth of research evidence suggesting that dietary habits and lifestyle characteristic of the Mediterranean region may offer protection against chronic diseases and improve longevity. Contributors have summarized the most up-to-date research evidence related to foods and dietary behaviors that contribute to a healthy Mediterranean diet and lifestyle, the biochemical mechanisms through which bioactive compounds usually found in Mediterranean foods impact on biological processes associated with disease, and opportunities and challenges for implementing a Mediterranean-like dietary pattern in developed and emerging economies. Twenty chapters were assembled by world-renowned experts who conducted a systematic review of the relevant literature and provided an assessment of chronic disease prevention opportunities using diet and food components characteristic of the Mediterranean region. The tone of this text is to establish a “proof of principle” about the importance of the Mediterranean diet and lifestyle approach for disease prevention. The editors regret that because of space limitations not all areas of research related to the Mediterranean diet and lifestyle could be adequately addressed, and acknowledge that geographical differences around the world impose limitations in the choice of foods and dietary customs.

This volume has been organized into five parts to aid in the assimilation of the materials provided. *Part I, Mediterranean Diet and Lifestyle in a World Context*, introduces the challenges and opportunities for maintaining or adopting a Mediterranean-like diet and lifestyle. Emphasis is placed on the realization that sustainability of natural resources is intimately related to agricultural production, food supply, and availability, which in turn impact on dietary behavior and disease risk. Adoption of Mediterranean dietary patterns and lifestyles that have been traditionally associated with reduced incidence of chronic diseases is recommended. Implementation of a Mediterranean-like diet and lifestyle may benefit populations residing in the USA and abroad. Major challenges include globalization

of food supplies, food insecurity, and socioeconomic constraints that limit access to healthier foods, affordable education, and medical care.

*Part II, Historical, Behavioral, and Geographical Perspective on the Mediterranean Diet and Lifestyle*, addresses the historical and behavioral origins of the Mediterranean diet, regional differences in dietary profiles, and the evolution of traditional Mediterranean diet into modern dietary guidelines. The traditional Mediterranean diet reflects the interactions of diverse populations and civilizations that have occupied the Mediterranean basin over thousands of years. In modern times, specific indexes to measure adherence to Mediterranean dietary patterns and their impact on health status have been developed. A key concept that emerges from this section is that food consumption in Mediterranean countries is a cultural element that goes beyond the need to satisfy nutrition needs. Nevertheless, concerns have mounted that modern diet and lifestyle continue to depart from the traditional Mediterranean “Genius loci” as a result of globalization and technological modifications leading to drastic changes in food behavior and increased susceptibility to chronic diseases.

*Part III* presents evidence of the benefits of the *Mediterranean Diet and Lifestyle for Health Promotion*. In addition to olive oil, which is the main source of fats in the Mediterranean region, this section presents other sources of fats that contribute to the overall profile of fatty acids found in the Mediterranean diet. Authors highlight that micronutrients and microconstituents with antioxidant and other properties are common in vegetable oils used in Mediterranean households. These bioactive compounds protect fatty acids from oxidation and are potentially important for reducing chronic disease risk. Olive oil is convincingly recognized as a food that reduces the risk of cardiovascular diseases, and possibly, certain cancers and neurodegenerative disorders. Research evidence is also presented suggesting that the Mediterranean diet decreases inflammatory parameters and risk of mortality. In Chap. 8, the authors conclude that the coordinated actions of phenolic compounds found in red wine and alcohol exert various health effects including a reduced risk of atherosclerosis. Regular and moderate consumption of red wine, 1–2 drinks a day with meals, is recommended. However, sound clinical judgment is needed to determine if alcohol consumption is appropriate based on age, medical history, gender, and predisposition to dependency. No more than one glass of wine/day is recommended for women and two glasses of wine/day for men. Metabolic syndrome has been recognized as a health concern and clinical challenge. There is general agreement that clinical parameters associated with metabolic syndrome can be greatly improved through adoption of lifestyle and dietary changes characteristic of the Mediterranean diet pattern. For example, research evidence from Mediterranean studies suggested a positive correlation between adherence to diets low in saturated fat, trans-fat, cholesterol, added sugar, and sodium; and high in unsaturated fats, complex unrefined carbohydrates, fruits, vegetables, and fish, with improvement of metabolic abnormalities. Unequivocally, these are dietary features typical of the traditional Mediterranean diet. The adoption of metabolomic approaches may offer new opportunities to monitor the health impact of individual food components and Mediterranean-like diets on metabolic syndrome and chronic disease risk.

*Part IV, Aging and Cancer Risk*, gives attention to the fact that the Mediterranean diet relies heavily on components such as fruits, vegetables, whole grains, unsaturated fatty acids, and lean meats and offers a regimen of nutrient-dense foods that provide viable, healthy and gradual weight loss while reducing a number of chronic health conditions that are so prevalent in the aging population. Of these, cognitive decline, dementia, and Alzheimer’s and Parkinson’s disease are age-related conditions that affect mature adults worldwide. Risk factors for cognitive diseases include hypercholesterolemia, obesity, diabetes, and cardiovascular factors, such as hypertension and inflammation. Studies suggest that the Mediterranean diet pattern may be beneficial for preventing and/or attenuating biological processes associated with cognitive impairment. Research data on extra virgin olive oil, the main source of saturated fat in the Mediterranean diet, suggest protective effects of olive oil components on markers of neurodegenerative diseases. Mediterranean-like diet and lifestyle are discussed as options to improve brain mitochondrial functions and for treatment of cognitive impairment and neurodegeneration. Turning to causes impacting cancer death, breast cancer remains the most commonly

diagnosed malignancy in women. Epidemiological studies generally recognize the modifying role of diet on breast cancer risk. A Mediterranean dietary pattern and diets high in vegetables, fruit, and fish are associated with a decreased risk of breast cancer. With respect to malignancies of the gastrointestinal tract, mortality rates related to colorectal cancer (CRC) have been declining due to advances in screening and diagnostic technologies. However, CRC remains the third most common cancer diagnosis and fourth leading cause of cancer-related mortality worldwide. Inflammatory bowel diseases (IBD) have been linked to increased risk of CRC. In general, adherence to the Mediterranean dietary pattern has been associated with a decreased risk of IBD and CRC. Mediterranean bioactive food components that modify disease risk include those that affect epigenetic mechanisms and regulate gene expression. Understanding how dietary factors and dietary patterns participate in the regulation of gene expression through epigenetics is a complex task given the wide range of available food choices, diversity of nutrient intakes, individual differences in genetic backgrounds, and intestinal environments where foods are metabolized. Likely, major advances in disease prevention will stem from characterizing the role of numerous enzymes, protein complexes, and factors that participate in epigenetic regulation.

*Part V, Building a Mediterranean-like Pyramid*, attempts to translate into practice the research concepts presented in the introductory and health promotion chapters. The health benefits of physical activity are undisputed. Regular physical activity mitigates or reverses risk factors commonly associated with chronic diseases including impaired glucose metabolism, dyslipidemia, and low-grade inflammation. Population-based studies document reductions on the order of 30 % or more for incident chronic diseases in active individuals compared to their inactive peers. Physical activity has been associated with improved diet quality and with Mediterranean-like eating patterns in both men and women. This section highlights the need for conservation and improvement of biodiversity to protect and promote in modern era two of the foundational components of the Mediterranean pyramid: biodiversity and conviviality. However, a major challenge remains the implementation of strategies that help populations to transition from dietary practices associated with higher rates of obesity and diabetes to healthier ones. Achieving adherence to healthy eating will require major changes in food behavior and lifestyle. To this end, large-scale efforts are needed involving the coordinated participation of the food and restaurant industries working in collaboration with public health communities and consumers. Overall, the Mediterranean diet emerges as a viable dietary tool to help Americans and other communities around the world to reduce the burden of chronic diseases. However, to make the most of this health promotion opportunity, all stakeholders should participate in a concerted effort and commit to these dietary and lifestyle changes with dispatch.

Chapter 19 presents a compilation of selected recipes from the Mediterranean region. For each recipe, detailed information on the ingredients, quantities, and preparation is presented based on the instructional material developed by the editors for the Mediterranean Diet and Health Study Abroad Program sponsored by the University of Arizona. Recipes are not provided as a medical recommendation, but as examples of dishes that can be prepared without specific culinary training. The closing chapter (Chap. 20) presents estimates of nutrient composition for all recipes discussed in Chap. 19, and their inclusion into a weekly food program using dietary guidelines developed by the Prevención con Dieta Mediterránea (PREDIMED) study to assess adherence to a Mediterranean-like diet. In general, Mediterranean recipes and foods organized into a weekly food pyramid help to meet the requirements for target dietary reference intakes including energy and macronutrients (fat, carbohydrate, protein, and fiber) and for selected minerals (calcium, sodium, and potassium). In the Mediterranean diet, a major contributor to total energy is monounsaturated fatty acids from olive oil and nuts. In this context, concerns have emerged about the quality of olive oil commercially available. For example, in the USA, imported extra virgin olive oil often fails international and US qualitative standards. This suggests that regulatory efforts are needed to inform the consumer about the quality of commercially available olive oil based on standard chemical and biological parameters. Depending on dietary behavior, daily requirements for vitamin D may not be easily met through foods and recipes only.

Thus, endogenous production via skin exposure to sun and/or dietary supplementation may be necessary to achieve minimum vitamin D goals. Strategies useful to alleviate inadequacies in vitamin D include the intake ( $\geq 3$  times/week) of certain fish-based recipes, adequate sun exposure, and possibly supplemental doses. The usefulness of recipes and food pyramids in meeting nutrient requirements is clearly influenced by physical activity, body weight, height, gender, and age. Nevertheless, great opportunities exist for balancing our plates through adoption of a Mediterranean-like approach.

At the time of the publication of this volume, the US Department of Human and Health Services (HHS) and US Department of Agriculture (USDA) released the 2015–2020 Dietary Guidelines for Americans. As mentioned in various chapters in this volume, the intent of the US Dietary Guidelines for Americans is to translate into practice nutrition recommendations to prevent the incidence and/or reduce the burden of chronic diseases. Given the increased prevalence of overweight, obesity, and diabetes during the last two decades in the USA and other developed countries, and association of these conditions with food insecurity, the timely release of the 2015 Dietary Guidelines is a new opportunity to translate advancements in science into policies that promote health through nutrition. The publication of the Dietary Guidelines followed the submission of recommendations by the 2015 Dietary Guidelines Advisory Committee, which was composed of health and nutrition experts. Reference to these recommendations and a list of areas of investigations and research needs can be found in Chap. 2 and Table 2.1. In general, the Advisory Committee made recommendations for increasing consumption of fruits, vegetables, and whole grains and reducing intake of calories, saturated fat, sodium, refined grains, and added sugars. Moreover, underconsumption of vitamin D, calcium, potassium, and fiber was identified as a public concern for the majority of the US population. Importantly, the 2015 Dietary Guidelines Advisory Committee suggested that sufficient research data were available to model certain dietary patterns, including the Healthy Mediterranean-Style Pattern, and examine their nutritional adequacy. Detailed information about the 2015–2020 Dietary Guidelines for Americans can be found in the Appendix of this volume.

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