

Introduction

Whole Grains and Health: An Overview

Despite the efforts of early health advocates such as Sylvester Graham, grain intake decreased from about 36% of energy intake in 1900 to about 15% in 1970. In relative terms, whole grain intake decreased even more, to less than 1% of energy intake [1–3]. In about 1970, Trowell and Burkitt made the observation that native African people, who ate large quantities of whole plant foods, did not seem to get “Western diseases” such as coronary heart disease, cancer, and diverticulitis [4]. In our view, these observations mark the beginnings of a modern science—the study of whole grain and other whole plant foods in relation to chronic disease. The aim of a Symposium “Whole Grains, Cancer and Heart Disease,” conducted at the 1999 American College of Nutrition Meeting in Washington, DC, was to review the state of the scientific evidence relating to reduced risk for chronic disease, potential biological mechanisms, dietary intake and consumer issues. The major conclusions of the symposium are highlighted in the following paragraphs.

In the past several years, studies have strongly supported Trowell and Burkitt’s hypotheses, particularly with reference to whole grain intake [4]. Many of the recent studies of whole grain intake and health are observational; nevertheless, it seems likely that the health associations with eating higher levels of whole grain food are causal. There are a wide variety of mechanisms by which whole grains may causally influence health [5]. Among disease-causing mechanisms many people believe that oxidation plays a major role. Baublis *et al.* [6] and Miller *et al.* [7] report on studies that document the antioxidant potential of grain foods, particularly whole grain foods. Another popular theory is that insulin resistance is an important precursor of many chronic diseases. Hallfrisch *et al.* [8] provide evidence that intake of whole grain foods can help maintain insulin sensitivity.

A simplification of Trowell and Burkitt’s hypothesis was that dietary fiber is important to health. While reference to fiber may be important to the public for identification of whole grain foods, the emerging science of whole grain foods suggests that fiber alone may have less impact than was previously thought. Jacobs *et al.* [9] present evidence that it is necessary for health to eat the entire fiber complex (bran, germ, endosperm), not just the “fiber” portion of the plant food. These data strongly suggest that whole grain provides a health benefit with its fiber consumed in whole foods, with all their biologically active components [9].

Despite these findings, whole grain intake in the United States is low. Cleveland *et al.* carefully analyze whole grain intake in CSFII, and find that average intake is less than one serving per day [10]. Adams and Engstrom [11] suggest whole grain consumption may be low due to a lack of consumer understanding of the health benefits of whole grain and an inability to identify them at the point of purchase. Emphasis is also placed on industry’s role in creating and promoting whole grain products with appealing taste.

This is an important time to explore the effects of whole grain on health and risk for chronic disease. There is much to be learned about how whole grain may elicit health benefits through a multitude of potential biological mechanisms. Research should continue to be supported which will elucidate these areas more fully. It is also essential for academics, industry, government leaders, as well as public and private agencies, to work together to increase our understanding of whole grain and how we can successfully promote increased whole grain consumption among consumers. At this time it is prudent to recommend the consumption of at least three whole grains along with other minimally processed, nutrient-rich plant foods on a daily basis.

Leonard Marquart, PhD, RD

General Mills, Inc.
Minneapolis, Minnesota

David R. Jacobs, Jr, PhD

Division of Epidemiology
School of Public Health
University of Minnesota
Minneapolis, Minnesota

Joanne L. Slavin, PhD, RD

Department of Food Science and Nutrition
University of Minnesota
St. Paul, Minnesota

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