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: Carbohydrates; Dietary role; Health e ects; Metabolism; Fiber; Metabolic health

Carbohydrates are fundamental macronutrients essential for human health, serving as the primary source of energy and playing crucial roles in various physiological functions. is introduction provides an overview of carbohydrates, emphasizing their importance in nutrition, metabolism, and overall health. ey exist in diverse forms, including sugars, starches, and dietary ber, each with unique properties and roles in the human diet. Dietary sources of carbohydrates encompass a wide array of foods such as grains (e.g., wheat, rice), fruits, vegetables, legumes, and dairy products [1]. ese sources provide glucose, which is essential for fueling cellular activities through aerobic respiration and supporting physiological processes [2].

Physiologically, carbohydrates ful ll several essential functions beyond energy provision. ey contribute to maintaining blood glucose levels within a narrow range, crucial for brain function and overall metabolic stability. Additionally, dietary ber aids in digestive health by promoting regular bowel movements, enhancing satiety, and modulating cholesterol levels [3]. e quality of carbohydrate intake is critical, as di erent types of carbohydrates have varying e ects on metabolic health. Complex carbohydrates from whole foods, such as whole grains and vegetables, o er sustained energy release and bene cial nutrients, while excessive consumption of simple carbohydrates from sugars and re ned grains can contribute to metabolic disturbances. Public health guidelines recommend a balanced approach to carbohydrate consumption, emphasizing whole foods and limiting added sugars and re ned carbohydrates [4]. is dietary pattern supports optimal metabolic health, weight management, and reduces the risk of chronic diseases such as Type-2 diabetes and cardiovascular disorders. is introduction sets the stage for exploring the multifaceted roles of carbohydrates in human nutrition and health. By understanding their sources, functions, and impact on metabolic health, individuals can make informed dietary choices to promote

observational and clinical studies [7]. Ensure compliance with ethical guidelines for conducting systematic reviews and meta-analyses, including proper citation and handling of data. Acknowledge potential limitations of the review, such as heterogeneity among study designs, variations in dietary assessment methods, and publication bias. Discuss how these limitations may impact the interpretation and generalizability of ndings [8]. is outline provides a structured approach to conducting a systematic review or meta-analysis on carbohydrates, focusing on their dietary role, metabolic impact, and health e ects. Adjustments may be made based on speci c research objectives and available literature [9,10].

In conclusion, carbohydrates play essential roles in human nutrition and health, serving as a primary source of energy and in uencing various metabolic processes. is review has synthesized current knowledge on the dietary role, metabolic impact, and health implications of carbohydrates, highlighting key ndings and implications for public health. Carbohydrates are found in a wide range of foods, including grains, fruits, vegetables, and dairy products, providing the body with glucose a vital fuel for cellular energy production. e type and quality of carbohydrates consumed in uence metabolic health outcomes, with complex carbohydrates from whole foods supporting stable blood glucose levels and overall metabolic function. Dietary ber, a non-digestible carbohydrate, contributes to digestive health, promotes satiety, and helps regulate cholesterol levels. Diets rich in ber from fruits, vegetables, and whole grains are associated with reduced risks of obesity, cardiovascular disease, and Type-2 diabetes mellitus. However, excessive consumption of re ned carbohydrates, such as sugars and processed grains, can contribute to metabolic disturbances, including insulin resistance and obesity. Public health guidelines advocate for a balanced approach to carbohydrate intake, emphasizing whole foods while limiting added sugars and re ned carbohydrates to promote optimal health outcomes.

None

None

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