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Professor Maria Isabel Correia, MD, PhD

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Balancing Energy and Protein Utilization for Optimal Health Outcomes

Speaker biography

Prof Maria Isabel Toulson Davisson Correia, MD, obtained her medical degree from the prestigious Universidade Federal de Minas Gerais in Brazil. She completed her Master's in Sciences in Surgery at the Universidade Federal de Minas Gerais in 1999. She further pursued her academic journey and obtained a Ph.D. in Gastrointestinal Surgery from the Universidade de São Paulo in 2002. In 2007, she conducted post-doctoral research at the University of Pittsburgh in the United States, supported by a CAPES fellowship.

She has served as a retired professor of surgery at the Universidade Federal de Minas Gerais Medical School. She is also the head of the Nutrition Therapy Team at Rede Mater Dei and Hospital Semper.

Throughout her career, Prof. Correia has made significant contributions to the field of nutrition and surgery. She serves as the Deputy Editor-in-Chief for Nutrition and member of the editorial boards of prestigious journals such as Clinical Nutrition, JPEN (Journal of Parenteral and Enteral Nutrition), and NCP (Nutrition in Clinical Practice), President of the Brazilian Society of Parenteral and Enteral Nutrition for the term 2024/2025 and she is honorary member of the European Society for Clinical Nutrition and Metabolism.

Prof. Correia has authored over 232 publications in top international and national journals. Her research focuses on various aspects of general surgery and nutrition, with special emphasis on topics such as disease-related malnutrition, surgical, cancer, liver transplantation, metabolism, and specific nutrients like arginine, glutamine, citrulline, and probiotics.

Her research contributions continue to shape the understanding and practice of these disciplines, benefiting patients and healthcare professionals alike.



Abstract

Plato and Aristotle were certainly pioneers in emphasizing the importance of fire and earth as fundamental elements involved in the production of heat and energy. Centuries later, Dr. Ancel Keys demonstrated the essential role of energy balance in maintaining the nutritional status of healthy volunteers during the Minnesota Experiment in the mid-1940s¹. However, it is important to once again go back in time and mention Antoine Lavoisier, who, at the behest of the King of France, conducted experiments to measure energy and protein requirements with the goal of improving nutrition for hospital patients. Much later, in the United States, Wilbur Atwater invented the first closed calorimeter, which significantly advanced the field of nutritional science. This invention facilitated the work of Drs. Francis G. Benedict and James A. Harris, who developed a formula that has been widely used in clinical practice for many years to estimate energy expenditure². In the early 2000, the Food and Agriculture Organization published a report of a joint expert consultation on human energy requirements, which are those attaining and maintaining optimal health, physiological function and well-being³. A very recent publication by Drs. Heymsfield and Shapes provides guidance on energy and macronutrients across the lifespan⁴. The authors highlight the importance of a balanced intake of macronutrients, recommending an average daily intake for adults of 130g of carbohydrates, 0.8g/kg/day of protein, and fat constituting 20% to 35% of total energy intake. This aligns closely with most clinical guidelines, although higher protein content is often recommended under disease conditions.

Protein requirements have been a matter of high controversy since the reports that followed Lavoisier's studies, with a few authors recommending above 100g per day, while others defended much lower doses⁵. The higher protein recommendation prevailed, leading to the great protein fiasco of the mid-1950s⁶. However, in current clinical nutrition, there is still a significant debate among experts. Guidelines from recognized societies continue to delve into this discussion, with conflicting opinions.

Balancing energy requirements may remind us of similar controversies in physics from Newton's era up to Einstein's. Nonetheless, the topic must be discussed, as energy balance significantly impacts health outcomes. These outcomes are defined as events resulting from an intervention and may be measured clinically by physical examination, laboratory testing, imaging, or even self-reported or observed methods. To promote positive health outcomes, interventions must be adequate and based on sound scientific evidence.

Undoubtedly, the best current method for assessing energy requirements is indirect calorimetry. However, it is not available in the majority of institutions worldwide, necessitating the use of formulas. We have demonstrated that, after surgery, despite the significant physiological response to surgical stress, patients do not require more than 20



kcal/kg/day in the first five days⁷. A minor increase in energy requirement may be observed as a result of inflammation markers. In critically ill patients, the use of tailored nutrition therapy according to a tight calorimetry protocol, as shown in the TICACOS study, did not produce better outcomes. Nonetheless, this does not mean that indirect calorimetry should be abandoned, as the authors highlighted the study's difficulties⁸.

Similarly, the controversy over the appropriate amount of protein has been discussed by several authors. Retrospective data indicate that a higher protein intake of about 1.5 g/kg/day increased survival in critical care patients⁹, while other authors showed no advantage¹⁰. In the latter study, although a high prescribed amount of 2.2 g/kg/day was recommended, the patients ended up receiving only 1.6 g/kg/day. A recent large international database analysis of 12,930 patients concluded that protein intake does not appear to influence the duration of mechanical ventilation, but a standard protein intake may improve survival¹¹.

Amidst so many controversies, where does the individual patient stand? Under severe clinical conditions, self-cannibalism, autophagy, and metabolomic disorders occur, influencing overall energy requirements. Nutrition is not like an antibiotic but rather a mixture of many nutrients. It is of utmost importance to consider the uniqueness of each patient regarding sex, age, previous nutritional status, and body composition, as well as the disease and comorbidities, to plan an adequate individualized approach, which will eventually change across the treatment . Patients are not merely guidelines. Nutrition is part of the holistic approach, as evidenced by the fact that individuals who underwent fasting for political reasons, after six weeks, several died¹². Conversely, nutrition therapy has been well documented to improve patient outcomes^{13, 14}.

In conclusion, we should heed Hippocrates' recommendations: "If we could give every individual the right amount of nourishment and exercise, not too little, not too much, we would have found the safest way to health, as everything in excess is opposed to nature." We ought to critically appraise the literature, as there is current evidence that beyond the controversies alone, there is also much to question regarding the scientific method¹⁵, particularly in the field of nutrition.



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Watch the 20:43 minutes conference talk with Professor Maria Isabel Correia and hear about BALANCING ENERGY AND PROTEIN UTILIZATION FOR OPTIMAL HEALTH OUTCOMES



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