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Water as an essential nutrient: the physiological basis of hydration.

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A basic principle that is often forgotten in nutritional recommendations is that water is the major constituent of the human body (60% of body weight in adults and up to 75% in newborns). Therefore, an adequate hydration is vital. As the body cannot be self-sufficient for the production of water or obtain enough water by food ingestion to fulfil its own needs, an external intake is essential to cover it and to avoid several serious adverse effects if those needs are not reached.

As we well know, water has unique properties in the human body. It acts as a building material; as a solvent, reaction medium and reactant; as a carrier for nutrients and waste products; in thermoregulation; and as a lubricant and shock absorber. Under usual conditions, body water remains relatively constant, which implies a precise regulation of water balance. Indeed, it has been estimated that a loss of 1% of body water is usually compensated within 24 hours. Both water intake and water losses are controlled to reach water balance, in a hormonal process resulting in the sensation of thirst. Healthy adults regulate water balance with accuracy, but young infants and elderly people are at greater risk of dehydration.

Signs of mild-to-moderate dehydration are: dry mouth, tiredness, thirst, headache, increased urine colour and so on. Dehydration, as mild as 1 to 2% of body weight loss, can affect cognitive functions (alertness, short-term memory, concentration) and physical performance. It is therefore essential to be able to assess the degree of hydration of at risk patients.

Human water requirements depend on numerous factors that modify water needs (gender, age, climate, physical activity, diet). Water needs, as stated in both the American Dietary Reference Intakes of the Food and Nutrition Board 2004, and in the European Food Safety Authority guidelines 2008, are based on experimentally derived intake levels that are expected to meet nutritional adequacy of a healthy population. Differences in these guidelines are based on different dietary habits and as a consequence, water requirements have to be adapted to each population.

Key Messages: this article reviews the principles of water physiology and properties, as well as the causes and the consequences of dehydration conditions.

On an average, a sedentary adult living in temperate climate should drink 1.5 L of water per day as water is the only liquid nutrient which is really essential for body hydration and is vital for the body to function properly.