

Water, Water, I Need Water!

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All of us are aware of the importance of the intake of water. But perhaps we may not be aware of the demands our bodies place on this special ingredient.

The *American Heritage Dictionary* describes water as a clear, colorless, nearly odorless and tasteless liquid, H₂O, essential for most plant and animal life and the most widely used of all solvents.

Water? Clear, colorless, odorless, and tasteless. Why even consider it? And a chemical formula of two parts hydrogen and one part oxygen, does that even sound good? No way! Yet water is the substance our bodies most require. Here is a look at the medical side of the importance of water, according to the 2nd Edition of *Paramedic Emergency Care* by Bledsoe, Porter, and Shade.

Water is the most abundant substance in the human body. In fact, water comprises approximately 60% of total body weight. The total amount of water in the body at any given time is referred to as the total body water (TBW). The TBW of a person weighing 70 kilograms (154 pounds) is approximately 42 liters (11 gallons).

Water is usually distributed into various compartments of the body. These compartments are separated by cell membranes. Approximately 75% of all body water is found in the intracellular compartment, which contains all fluid found inside body cells. The extracellular compartment contains the remaining 25% of all body water, or extracellular fluid.

There are two divisions within the extracellular compartment. The first includes the intravascular fluid – the fluid found outside of cells and within the circulatory system. It is essentially the same as the blood plasma. The remaining compartment includes the interstitial fluid – all the fluid found outside of the cell membranes, yet not within the circulatory system.

Water is the universal solvent and is necessary for many of the biochemical reactions that occur. The water coming into the body is referred to as intake. The water excreted from the body is referred to as output. To maintain balance, the intake must equal the output.

Several mechanisms work to maintain a relative balance between input and output, i.e., when the fluid volume drops, the pituitary gland at the base of the brain secretes the hormone ADH (anti-diuretic hormone.) ADH causes the kidney tubules to reabsorb more water back into the blood and to excrete less urine. This process helps restore the fluid volume to normal values.

Thirst also regulates fluid intake. The sensation of thirst normally occurs when body fluids decrease, stimulating the person to take in more fluids orally. On the other hand, when too many fluids enter the body, the kidneys are activated and more urine is excreted, thus extra fluids are eliminated. The body also maintains fluid balance by shifting water from one body part to another.

An individual performing work in a hot environment will lose one to two liters of water per hour. Each liter lost contains 20-50 mellequivalents of sodium. The loss of water and sodium, combined with general vasodilation, leads to a decreased circulating blood volume, venous pooling, and reduced cardiac output.

Remember: even though all this medical knowledge about the importance of water may not mean that much to you, summer weather is upon us and dehydration might be just around the corner. Dehydration can lead to heat cramps, heat exhaustion, and heat stroke. So monitor yourself, your fellow cyclists, your workload, and the temperature. And never forget to practice what we preach:

Drink BEFORE you are thirsty.

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