Dehydration

When it comes to the human body, nothing could be more accurate. The system of fluids in the body that water affects controls everything from nerve impulse to movement; it is even part of the very structure of our bodies. The following will discuss the vital connection between different systems in the body and how they use water to maintain proper health and function. We will discuss what happens to the body when we intake too much water (water toxicity), likewise when we lose or intake too little (dehydration). Why is water essential to health maintenance?

Water Is the " great regulator" In the body. It has several functions: to dissolve nutrients and move them throughout the body, to flush and carry waste particles from the body, and to assist In regulating pressure across all systems within the body. So, where is the water In our bodies? It is estimated the over half your body weight is comprised of water. Men actually tend to carry more water as they tend to have higher muscle mass: about 60 to 65% water. Muscle tissue is comprised of about 75% water. Women fall somewhere between 50 nd 60% of water weight (Grosvenor, Smolin, 2006).

Water is in the cells that make up tissue and organs: even In our bones. The water Inside cells is called intracellular fluid and passes through the walls of cells with the assistance of proteins, sodium, and potassium which are dissolved In the body. This ebb and flow of intracellular fluid controls the levels of dissolved substances in the different compartments of the body. When particle concentrations are too high, water flows in to dilute, lowering the concentration to a proper level, When too low, water flows away from the ompartment, thus raising the concentration. This process of diffusion is called osmosis.

Osmosis is a mechanism In nature by which water in an organism Is used to balance dissolved particle concentrations. Osmosis is also responsible for moving water from the lining in the gastrointestinal tract or lumen, into the blood. The water in blood and which flows between cells Is called interstitial fluid. Think of this as the vehicle which moves critical nutrients and oxygen to vital organs. It also moves waste material to the lungs and kidneys and serves as a delivery system for all the chemical efense mechanism in the body such as antibodies which fight of infection and cancerous cells.

Just like we see in nature, water has several housekeeping functions. It is used as a flushing agent to cleanse internal and external surfaces and acts as a lubricant for and to assist in swallowing. The eyes tear up to remove dust. And not unlike the Tin Man in the Wizard of Oz, our Joints would creak or not move at all if it were not for water-based synovial fluids. Water even protects against shock in certain compartments by cushioning the eyes and Joints. When considering all this water, one would think we would have to be drinking it all day long in order to function.

However, the body has internal mechanisms that regulate water levels in the different compartments and lets us know when we need more or less of it. The primary intake of water for the average person comes from drinking water or other fluids like tea and soda pop. Water is also found in solid foods such as fruits, vegetables, and meats. So, if we are taking in all this water, where does it go? We pass water by way of urine and feces and also through evaporation from the lungs and skin via sweat. Have you ever breathed heavily on a mirror to fog it up?

That fog is actually water vapor from your lungs. Because water does not store in the body like fat cells, the daily intake and excretion must balance. Otherwise systems in the body begin to have problems. Initial loss of water in the system is regulated by the kidneys. Since most water loss occurs in urine, the kidneys tell the body when to reabsorb water and when to pass it if there is too much. Too much water, you say? Yes, in some situations the body can intake too much water. It is common following strenuous exercise for eople to drink large amounts of water to rehydrate.

Heavvy workouts, and extremely hot weather conditions cause the body to sweat excessively, passing large amounts of water. However, exercise burns up vital elements: sodium, potassium, and chloride which also have to be replaced. When drinking too much non-fortified water, we dilute further the already-low levels of these vital elements and can create a condition known as water toxicity. Oddly, the symptoms of too much water are not unlike the symptoms of not having enough water: nausea, muscle cramps, disorientation, confusion, and slurred speech.

When these elements fall out of balance, the body basically cannot talk to itself. The body relies on nerve impulses and muscle contractions to stay alive and moving. These activities are triggered by movement of electrically charges ions dissolved in water. Sodium, potassium and chloride make up the electrically charged ions more commonly known as electrolytes (Grosvenor, Smolin, 2006). Electrolytes conduct these body. This is important because all thought, movement and response to internal and external stimuli begin with an electrical impulse shooting through the body to a pecific targeted cell.

That's incredible to imagine. These impulses are created by positively charges ions of potassium and sodium. This is how the impulse is created. The action of sodium passing through the membrane into a nerve cell creates an electrical charge on the exterior of the membrane which is then transmitted to adjacent cells on to its destination. In the case of a muscle, when the charge arrives, the muscle contracts. Once discharged, the cell basically resets to original balances of ions for further use.

When we look at the entire process, we see that sodium, an xtracellular ion works on the exterior of the nerve membrane while potassium, an intracellular ion works from inside the nerve cell. In conjunction they are responsible for nerve transmission and muscle contractions. Now consider when the body is not receiving enough water. Hydration demands are stimulated by imbalances in electrolytes throughout the body. When the body recognizes a higher concentration of sodium, potassium in the body, it sends water to that compartment in order to dilute until the element is brought to acceptable levels.

First, the body sends a signal to stimulate thirst. If the demand for hydration is not met, the body secretes an antidiuretic hormone (ADH) which signals the kidneys to begin reabsorbing water to fill the demand. The kidneys ten, stop producing urine and back feed water into the system. Conversely, when levels of electrolytes are too low, the body first uses water to move more electrolytes to the affected area, then begins moves water away from the compartment to raise concentrations. And, how does the body know when it has too much water versus too much sodium or potassium?

This is where chloride comes into play. Salt is comprised of sodium and hloride. The chloride levels in a given compartment will tell the body if there is too much of a mineral or too much water. This amazing network of communication keeps individual compartments from running out of one element or another. The Mayo Clinic describes dehydration as commonly occurring when losing large amounts of fluid when a person stops drinking water, experiences diarrhea, vomiting, sweating or exercise (Mayo Clinic Staff, 2007).

In severe cases, you can experience: extremely dry eyes or mouth little or no excretion of urine for 12 hours or more impaired alertness Because dehydration inhibits the bodys ability to dissolve and distribute electrolytes, there can be a cascading affect on systems. Blood pressure is regulated by the amount of fluid in the bloodstream. When pressure is too high, water is forced through the arterial wall bringing pressure back down, and when to low, water is drawn into the bloodstream.

Water is the solvent that dissolves many minerals and nutrients which feed the bodys cells. And let's not forget how water controls body temperature. Through a process known as evaporative cooling, the body moves heat o the surface of the skin and rejects it as sweat evaporates into the air. Consumption of alcohol can contribute to dehydration because alcohol inhibits ADH production. When this happens, the kidneys continue to process and evacuate urine thinking that there is enough water in the body.

Similarly, high consumption of caffeine promotes higher production of urine, causing rapid dehydration (WebMD, 2010). As stated earlier, water cannot be

stored in the body and must be replenished regularly for healthy system functions. Dehydration can be easily prevented through egular intake of fluids. The DRIS recommend 3. 7 liters per day for men and 2. 7 liters per day for women, although these levels can vary depending on daily dietary habits, levels of exercise, physical environment, age, health considerations, and lifestyle choices (Grosvenor, Smolin, 2006).

Be cognoscente of increased exertion and be sure to replenish with fortified fluids such as sports drinks which are high in sodium and sugar blends. These will replace valuable electrolytes and balance out the systems for healthy function. In summary, we find that we can avoid many issues by simply eing aware of how water affect our bodies and what the consequences are when we intake too much or not enough of it. Water is life, so drink up!