

Water Quality for Wellness

Part 1: Importance of water to wellness. We cover how much water we need to drink and why. Also how pure that water needs to be?

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It is an essential component of all living things. It is a force that shapes the earth. It is a rarity in the universe yet abundant on this blue planet Earth. It is water – the key to life.

Unfortunately the importance of water for our day-to-day wellness is so often overlooked. Maybe it's because it is so ubiquitous and we take it for granted. Maybe it's because so many of us rarely drink plain water. Maybe because in this high tech world the sheer simplicity of just drinking more and better water is anathema to most people. In this article I want to consider some of the important questions that are so often asked about water. I'm sure you will see that there is more to water than our everyday experience would have us believe.

Why does the body need water?

Water has several roles in the human body. It gives structure and form to cells and tissues. It provides the medium for movement of heat from the core of the body to the surface. It is the matrix within which occurs all of the biochemical reactions that together make up cellular metabolism. Last, it is the transport mechanism for all internal movements of all nutrients and biomolecules, exchange of nutrients between the environment and cells and clearance of waste products. Therefore supplying the body with sufficient high quality water to satisfy all of these requirements should be the goal. The process of providing water to all levels of metabolism from the gastrointestinal tract to the circulation, into tissues and cells and then out of the body via various excretion pathways is called hydration. Optimal hydration requires adequate uptake, not just intake, of water. But how much and what kind of water?

How much should we drink?

How much of it should we drink? Much has been said about the need to drink some set number of "glasses of water" a day. Articles have been published where that number is 12 and in a recent article from the United States, a medical professional said the number is zero as we get all the water we need from the food we eat! The usual standard is 8 but let's consider where this figure comes from. The average (adult but not elderly) 120 lb / 55 kg female is composed of about 70 lb / 32 kg of water. For a 155 lb / 70 kg male that figure is 90 lb / 42 kg. A component of that water is exchanged each day and if that woman or man is well but sedentary that component is about 4.2-4.8 pints / 2-2.5 litres and 6.3-7.4 pints / 3-3.5 litres respectively. That means this amount of water is excreted

each day; 60% in urine, 5% in faeces, 5% in basal sweating and 30% in exhaled air. That water must be replaced and that will come as follows: 10% from the burning of carbohydrate fuel, 30% from ingested food and 60% from ingested fluids.

On these figures it would appear that the baseline requirement is more like 5 glasses but this is baseline only. The figures will all vary according to factors including the amount of exercise (exercise increases respiration, metabolism and sweating), the ambient temperature (the hotter it gets the more you sweat), humidity (the more humid it is the less water you expire) and several other factors. In addition it has been shown in several studies that many factors quickly increase the kidney's requirement for water to facilitate clearance of waste products including use of prescription and recreational drugs (including caffeine), exercise and exposure to environmental toxins. Taking all of this into consideration leads towards supporting 8 glasses a day as a good rule of thumb.

What is even better, however, is to let the body itself set the correct intake on a moment to moment basis by maintaining an accurate and effective thirst reflex. Put simply the thirst reflex is the mechanism by which our body regulates its water intake. The accuracy of the reflex is easily damaged but attention to appropriate intake of water over the long term will tend to maintain the integrity of the reflex and ensure that it's an effective regulator of water intake.

How important is the purity of the water we should drink?

While water is on face value a simple molecule, composed of one oxygen atom bound with two hydrogen atoms (hence "H₂O"), it is in fact one of the most complex and remarkable compounds in nature. Water possesses many properties that, given its simple structure, are unexpected. Science knows much about water and volumes have been written about its importance in chemistry, physics, biology, geology, botany and economics and yet there are mysteries about water that are only now being unravelled.

Water is a difficult substance to obtain in its pure form, and that arises from one of water's important characteristics – the tendency to form chains, clusters and higher order structures. In liquid water, the individual H₂O molecules associate to form clusters in sizes ranging from six to hundreds of molecules. This is because the hydrogen atoms attach to the oxygen atoms in a

precise arrangement with the two hydrogens at 107° to each other – looking rather like a set of Mickey Mouse ears. This arrangement means that, while each water molecule is electrically neutral (with the singly positive hydrogens neutralising the doubly negative oxygen) there is an uneven charge distribution on the water molecule. This gives a slight negative charge in the region of the oxygen and a slight positive charge on the side nearest the two hydrogens. This uneven charge distribution allows one of the wonders of nature – the hydrogen bond – to occur.

Hydrogen bonds arise from the slight positive charge on one water molecule attracting the slight negative charge on another and allow chains, networks and even three-dimensional lattices to form. The hydrogen bonds hold water together in structures giving rise to characteristics such as surface tension and the ability of water to wrap around other molecules in "hydration sheaths". Water can be thought of as a "liquid crystal" and just as solid crystals can trap other atoms so water can lock impurities into cages from which they are difficult to break free. These structures can also hold electrical charge in the form of isolated ions, and are also responsible for many of the important but unexpected characteristics of water such as its ability to reduce its density upon solidification resulting in solid ice floating on liquid water.

In the next part of this article we will look at how we can purify water and what impact that can have on its energetic properties.

Note: Some of the material presented in this article has been published previously by the author in *Diversity – The Journal of the Australian Complementary Health Association* Vol 2 No 7, pp 2-9 2002.

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