DEHYDRATION
AS A ROOT CAUSE FOR DISEASE

The body needs both water and electrolytes to function properly, and intracellular hydration depends on these charged minerals (e.g. sodium, chloride, potassium, and magnesium) to regulate the flow of water across cell membranes. Together, potassium (intracellular electrolyte) and sodium (extracellular electrolyte) regulate the osmotic balance of fluid in the body. Magnesium is required for optimal cellular uptake of potassium, and therefore also plays a critical role in maintaining hydration at the cellular level.

How much water intake an individual needs depends on many factors (e.g. caffeine intake, diet, medications, physical activity, temp, humidity, metabolic rate, and body weight, etc), and dehydration may be caused by a variety of things beyond simply not drinking enough water. We lose water and electrolytes in bodily fluids (loose stool/diarrhea, vomit, sweat, and urine), and medications and illness that increase fluid and electrolyte loss may naturally lead to dehydration. Diuretics, for example, increase urination, as does high blood sugar by increasing the demand on kidney filtration. Stress may, all by itself, impair water retention as suboptimally high and low cortisol skew the balance of sodium, chloride and potassium, and dehydration in turn further increases stress.

It is important to remember to rehydrate with plain clean water from a non-toxic container in between meals, so as to not dilute your much needed digestive secretions!

Dehydration begins to affect bodily functions even before thirst mechanisms are triggered. Here are a few ways in which dehydration may contribute to downstream challenges and disease.

- **Brain fog and headaches:** About 75% of the brain is composed of water, which brings nutrients to the brain and removes toxins. Prolonged dehydration may cause brain cells to shrink in size and mass, as well as decrease their metabolic activity.
- **Joint pain and arthritis:** Water is a major component of cartilage and synovial fluid in joints (e.g. hips, knees, feet, shoulders, and hands), and it provides the joint with lubrication, nutrition, and shock absorption. Decreased circulation also allows immune complexes and waste to build up in joints causing oxidative stress and inflammation, which may eventually lead to oxidative damage and pain in these areas.
- **Lab markers that represent a concentration may be high:** Lab markers that are measured via their relative concentration to blood volume will be higher when blood volume is low (e.g. Albumin, BUN, RBC, Hemoglobin). Since dehydration lowers blood volume, and thus increases the concentration of substances in the blood, an elevation in these markers may be a sign of dehydration.
- **Kidney dysfunction:** Insufficient water in the blood inhibits the filtration of toxins by the kidneys, and leads to a higher concentration of minerals, which may harden into crystals and promote kidney stones, and may eventually precipitate into kidney disease.
- **Gout:** An increased concentration of uric acid in the blood may precipitate into urate crystals that can get trapped in areas of low circulation, such as joints.

DEHYDRATION AS A ROOT CAUSE FOR DISEASE

- **Urinary Tract Infections:** An increased concentration of toxins and infrequent voiding may allow bacteria to grow in the urinary tract.
- **Bad breath:** Saliva has antibacterial properties, and a dry mouth may allow bacteria to overgrow in the mouth.
- **Nausea, dizziness, blurred vision:** Low blood volume decreases blood pressure, and thus inhibits blood supply to organs and the brain. Decreased blood flow also increases heart rate and can contribute to anxiety.
- **Hypertension:** Low blood pressure and a higher sodium concentration increases secretion of the hormone vasopressin, causing vasoconstriction and reabsorption of water by the kidneys, both of which increase blood pressure and puts strain on the heart.
- **Muscle cramps/spasms and fatigue:** Insufficient electrolytes affects muscle contraction (including the heart), nerve transmission, and intracellular hydration. Decreased blood volume inhibits delivery of nutrients, oxygen and fluid to cells.
- **Dry skin and wrinkles:** Water is essential for maintaining cell structure and collagen fibers.
- **Snoring:** Dry nasal passages thicken mucus and may lead to congestion and interrupted sleep.
- **Decreased metabolism:** Water is essential to maintain the conformation and flexibility of enzymes for catalyzing biochemical reactions.
- **Allergies and asthma:** Histamine levels may increase to conserve intracellular hydration.
- **Inflammation:** A build-up of toxins and cellular metabolic waste may create localized and systemic inflammation.
- **Constipation:** Water softens the stool and prevents slow transit time so that bowel movements are easier to pass.
- **Toxicity:** Constipation and decreased urination may allow toxins to reabsorb back into circulation rather than being excreted from the body.
- **Mood disorders:** Mood disorders can also be secondary to many dehydration mediated diseases. Dehydration may also dramatically reduce neurotransmitter synthesis and activity.