



## MODULE 8 OBJECTIVES

- 1** State the Big Idea for Hydration
  - 2** Understand the many important roles of water in the body
  - 3** Know the signs of dehydration; early and mature
  - 4** State the formula for calculating the appropriate daily intake of water
  - 5** Name at least three diuretic beverages and explain how to stay hydrated if you drink a diuretic beverage
  - 6** Describe and perform the Functional Evaluation for Hydration and the Kidneys
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# *Water and The Body*

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## **WATER**

- Water is the most important nutrient in the body
  - You can go ~8 weeks without food, but only days without water
- Water makes up 55 – 60% of our total body mass
  - In an average adult, that equates to 10 – 13 gallons of water
  - Most of the volume of cells and body fluids is water



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## ROLES OF WATER IN THE BODY

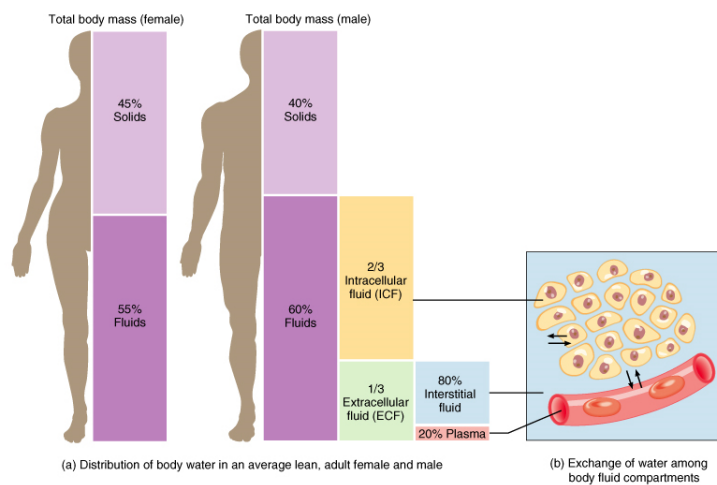
Water plays numerous important roles in the body, including:

- Improves oxygen delivery to cells
- Transports nutrients
- Enables cellular hydration
- Moistens oxygen for easier breathing
- Cushions bones and joints
- Absorbs shocks to joints and organs
- Regulates body temperature
- Removes wastes
- Flushes toxins
- Prevents tissues from sticking
- Lubricates joints
- Improves cell-to-cell communications
- Maintains normal electrical properties of cells
- Empowers the body's natural healing process

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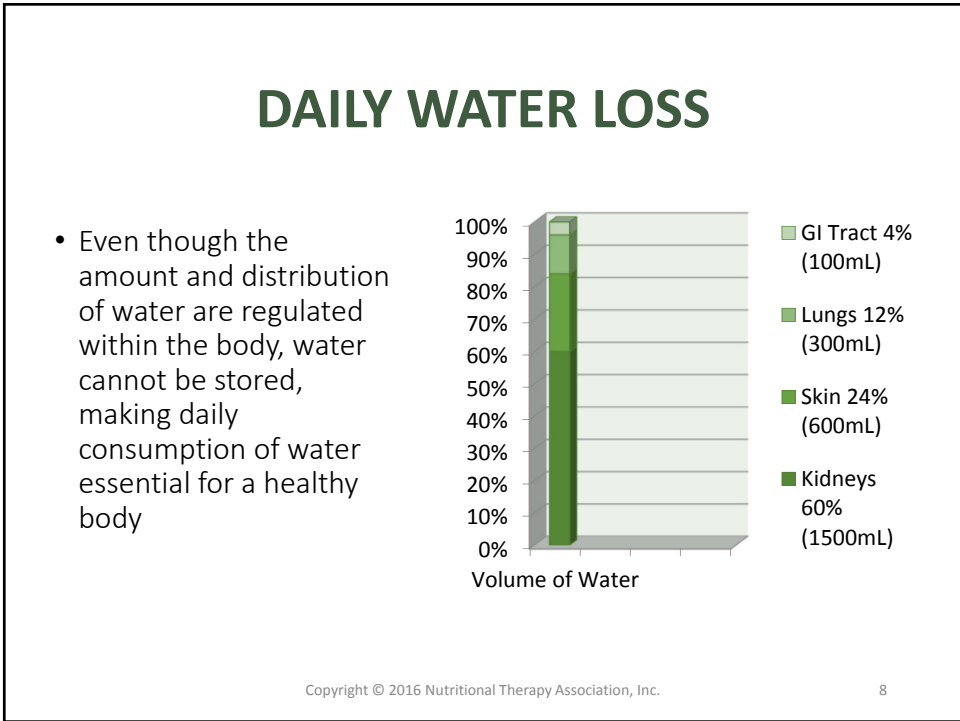
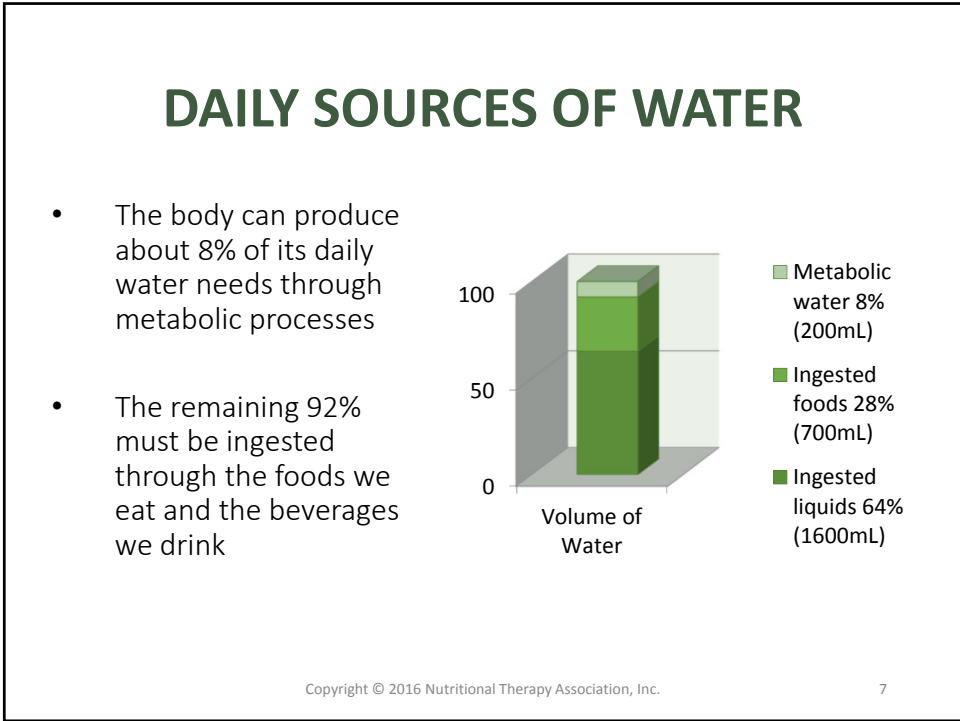
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## DISTRIBUTION OF WATER



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## ABSORPTION OF WATER

The total volume of fluids ingested or secreted into the GI tract is about 9.3 liters (*close to 10 quarts*). Most of the water in these fluids is absorbed from the GI tract through osmosis.

Osmosis is the passage of water through a membrane from an area of higher water concentration to an area of lower water concentration.

- ~8.3 liters of water is absorbed in the small intestine
- ~0.9 liters is absorbed in the large intestine
- The rest is excreted in feces

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## ELECTROLYTES AND WATER

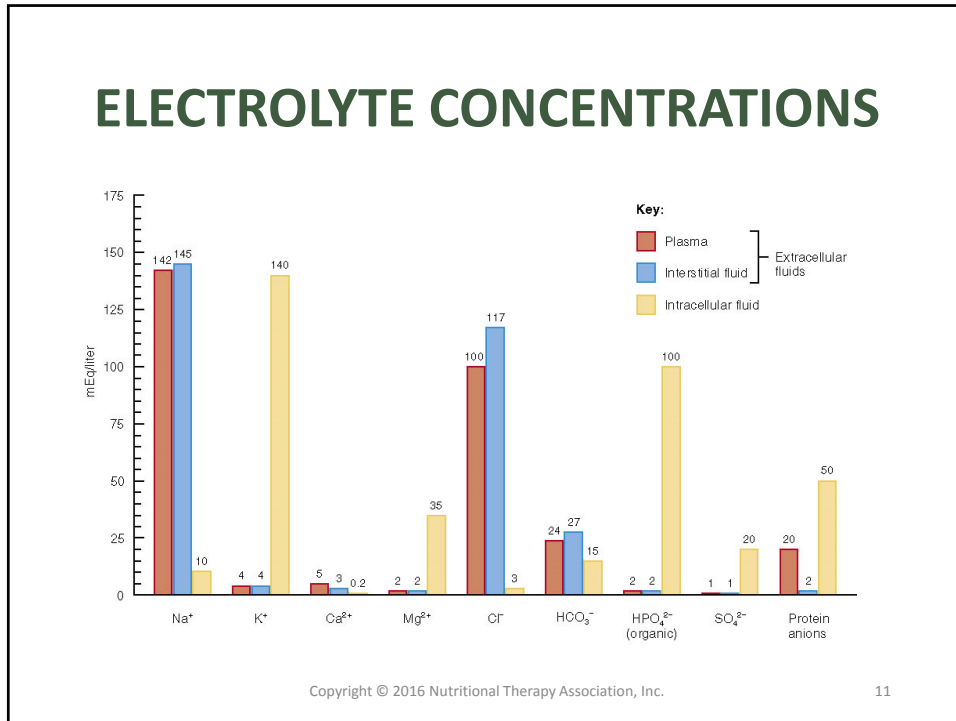
Water depends on electrolytes for proper absorption. Electrolytes are minerals that become capable of conducting electricity when dissolved in water.

Electrolytes have four general functions:

- Control the osmosis of water between fluid compartments
- Help to maintain the pH balance
- Carry electrical current
- Serve as cofactors needed for optimal activity of enzymes

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# Dehydration

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## THE BIG IDEA



Water is the most common nutritional deficiency in the American population

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## DAILY BEVERAGE CONSUMPTION

Beverage	Quantity (8oz. Serving)
Water	4.6
Coffee	1.8
Juices*	1.4
Milk	1.3
Caffeinated Soda	1.3
Tea*	1.0
Decaffeinated Soda	0.6
Beer	0.5
Other Alcoholic Beverages	0.3

*\*Denotes beverages that may or may not be hydrating depending on the type*

Excerpt from "Water the Ultimate Cure"

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## THE WORST OFFENDER

**Table 201. Per Capita Consumption of Selected Beverages by Type: 1980 to 2003**

[In gallons. See headnote, Table 202. Per capita consumption uses U.S. resident population, July 1, for all beverages except coffee, tea, and fruit juices which use U.S. total population, July 1]

Commodity	1980	1985	1990	1995	1999	2000	2001	2002	2003
Nonalcoholic	(NA)	(NA)	128.3	129.2	141.3	(NA)	(NA)	(NA)	(NA)
Milk (plain and flavored)	27.6	25.7	25.7	23.9	22.9	22.5	22.0	21.9	21.8
Whole	17.0	14.3	10.5	8.6	8.2	8.1	7.8	7.7	7.6
Reduced-fat, light, and skim	10.5	12.3	15.2	15.3	14.8	14.4	14.2	14.2	13.9
Tea	7.3	7.1	6.9	7.9	8.2	7.8	8.2	7.8	7.6
Coffee	26.7	27.4	26.8	20.2	25.1	26.3	24.2	23.6	24.3
Bottled water	2.4	4.5	8.0	12.1	16.4	17.4	18.8	20.7	22.0
Carbonated soft drinks	35.1	35.7	46.2	47.4	49.7	49.3	46.7	46.6	46.4
Diet	5.1	7.1	10.7	10.9	11.4	11.6	11.2	11.2	11.1
Regular	29.9	28.7	35.6	36.5	38.2	37.7	35.5	35.4	35.3
Fruit juices	7.4	7.8	7.0	8.1	9.0	8.9	9.1	8.4	8.4
Fruit drinks, cocktails, and ades.	(NA)	(NA)	6.3	7.7	7.7	(NA)	(NA)	(NA)	(NA)
Canned iced tea	(NA)	(NA)	0.1	0.7	0.7	(NA)	(NA)	(NA)	(NA)
Vegetable juices	(NA)	(NA)	0.3	0.3	0.3	(NA)	(NA)	(NA)	(NA)
Alcoholic	28.3	28.0	27.5	24.7	25.0	24.9	25.0	25.2	25.1
Beer	24.3	23.8	23.9	21.8	21.8	21.7	21.8	21.8	21.6
Wine <sup>1</sup>	2.1	2.4	2.0	1.7	2.0	2.0	2.0	2.1	2.2
Distilled spirits	2.0	1.8	1.5	1.2	1.2	1.3	1.3	1.3	1.3

NA Not available. <sup>1</sup> Beginning 1985, includes wine coolers.

Source: U.S. Department of Agriculture, Economic Research Service, *Food Consumption, Prices, and Expenditures, 1970-1997*; online at <<http://www.ers.usda.gov/data/foodconsumption/>>.

Source: U.S. Census Bureau, *Statistical Abstract of the United States: 2006*

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## INTERESTING NOTE

The 2011 Statistical Abstract below shows that there was a .02 decline in consumption of carbonated beverages from 2002-2003 but as of 2004 the US Census Bureau stopped compiling or listing the consumption of carbonated soft drinks.

**Table 211. Per Capita Consumption of Selected Beverages by Type**

[In gallons. See headnote, Table 213. Per capita consumption uses U.S. resident population, July 1, for all beverages except coffee, tea, and fruit juices which use U.S. total population (Resident plus Armed Forces overseas), July 1]

Beverages	1980 /1	1985	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Nonalcoholic	132.5	132.6	140.2	132.4	139.8	134.7	133.6	133.4	(NA)	(NA)	(NA)	(NA)	(NA)
Milk (plain and flavored)	27.5	26.6	25.7	23.9	22.5	22.0	21.9	21.6	21.3	21.0	21.0	20.6	20.8
Whole	17.0	14.3	10.5	8.6	8.1	7.8	7.7	7.6	7.3	7.0	6.7	6.4	6.1
Reduced fat, light, and at	10.5	12.3	15.2	15.3	14.4	14.2	14.2	14.0	14.0	14.1	14.2	14.3	14.6
Tea	7.3	7.1	6.9	7.9	7.8	8.2	7.8	7.5	8.0	8.0	8.4	8.4	8.0
Coffee	26.7	27.4	26.8	20.2	26.3	24.2	23.6	24.3	24.7	24.3	24.4	24.6	24.2
Carbonated soft drinks	35.1	35.7	46.2	47.4	49.3	46.7	46.6	46.4	(NA)	(NA)	(NA)	(NA)	(NA)
Diet	5.1	7.1	10.7	10.9	11.6	11.2	11.2	11.1	(NA)	(NA)	(NA)	(NA)	(NA)
Regular	29.9	28.7	35.6	36.5	37.7	35.5	35.4	35.3	(NA)	(NA)	(NA)	(NA)	(NA)
Fruit juices	7.4	7.7	7.0	8.1	8.9	8.5	8.4	8.4	8.5	8.1	8.0	7.9	6.9
Alcoholic	28.5	28.1	27.6	24.9	25.0	25.0	25.3	25.2	25.3	25.2	25.6	25.7	25.7
Beer	24.4	23.9	24.1	21.9	21.7	21.8	21.8	21.6	21.7	21.5	21.8	21.8	21.7
Wine W1	2.1	2.4	2.0	1.8	2.0	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.5
Distilled spirits	2.0	1.8	1.5	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4

SYMBOL:  
NA Not available.

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## KEY INGREDIENTS

Soda has ZERO nutritional value

### Phosphoric Acid

- Impedes the production of HCl
- May interfere with body's ability to use calcium

### Sugar

- Increases insulin levels

### Aspartame

- Has at least 92 different side effects
- Eventually changes to methanol, which converts to formaldehyde and formic acid

### Caffeine

- Causes numerous health problems

### Tap Water

- Carries any number of chemicals
- The number one ingredient in soft drinks

[www.mercola.com/2003/jul/9/soda\\_dangers.htm](http://www.mercola.com/2003/jul/9/soda_dangers.htm)

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## DEHYDRATION

- If the body's water content drops by as little as 2%, it will cause fatigue
- A drop of 10% will cause significant health problems:
  - Digestive
  - Cardiovascular
  - Immune
  - Musculoskeletal
- Losses greater than 10% can cause death

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## SIGNS OF DEHYDRATION

### Early Signs

- Fatigue
- Anxiety
- Irritability
- Depression
- Cravings
- Cramps
- Headaches

### Mature Signs

- Heartburn
- Joint Pain
- Back Pain
- Migraines
- Fibromyalgia
- Constipation
- Colitis

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## F. BATMANGHELIDJ, M.D.

“Chronic cellular dehydration of the body is the primary etiology of painful degenerative disease.”

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## DEHYDRATION TEST

- Instruct the client to stand with their hands by their side
- Visually check and palpate the veins on the right hand
- Put the client's left hand at heart level (*5<sup>th</sup> intercostal space*)
- Slowly raise the right hand so it is level with the left
- Visually check and palpate the veins again

## DEHYDRATION TEST

### Two Qualifying Questions:

1. How much water do you drink daily?
2. What is your daily intake of diuretic beverages?

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## SCORING THE RESULTS

### Excellent

- Veins are the same

### Fair

- The veins are reduced

### Poor

- The veins are no longer visible or palpable

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# *Hydration: Solutions*

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## **PURE WATER**

- Do your research to find a good source of water
- If you want to drink your tap water, have it tested to see what you are ingesting
- Research good filtration systems for both your drinking water and your shower



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## DAILY WATER CONSUMPTION



Body Weight (lbs)

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Represents the minimum number of ounces you should drink each day

*Ex: A person weighing 150 pounds should drink at least 75 ounces of water each day*

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## GOOD HYDRATION

- Avoid diuretic beverages:
  - Coffee
  - Caffeinated Teas as well as some herbal teas such as peppermint
  - Soda
  - Alcoholic Beverages
  - Packaged Fruit Juices
- If you drink an 8-ounce diuretic beverage, add 12 - 16 ounces of water to your daily intake
- Make sure to get adequate electrolytes
  - Electrolyte solutions
  - Unrefined sea salt

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## DIURETICS CALCULATION

$$\text{(Oz of Diuretics x 1.5) + } \frac{\text{Body Weight (lbs)}}{2}$$

= Daily Minimum H<sub>2</sub>O Intake

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## *The Kidneys*

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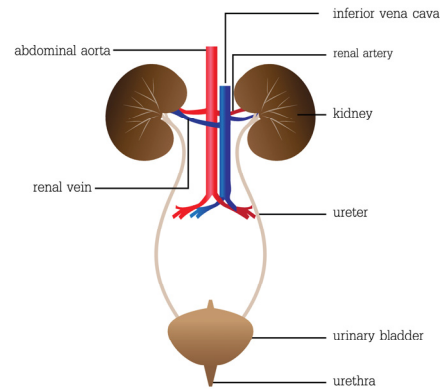
## THE URINARY SYSTEM

- The Urinary System consists of 4 structures:

- Two kidneys
- Two ureters
- Urinary bladder
- Urethra

- Functions include:

- Producing, storing, and eliminating urine
- Eliminating wastes from the blood
- Maintaining body's mineral balance
- Helping regulate red blood cell production



Urinary system

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## THE KIDNEYS

- The Kidneys do most of the work within the Urinary System

- The ureters, bladder, and urethra function primarily as passageways and storage areas

- The Kidneys are a filtration system

- They filter the blood to remove cellular wastes, such as some water and bile pigments
- Most of the water and many of the solutes are returned to the bloodstream
- The rest is excreted as urine

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## THE KIDNEYS (CONTINUED)

**Table 21.1 / Substances Filtered, Reabsorbed, and Excreted in Urine Per Day**

Substance	Filtered* (enters glomerular capsule)	Reabsorbed (returned to blood)	Excreted in Urine
Water	180 liters	178–179 liters	1–2 liters
Chloride ions (Cl <sup>-</sup> )	640 g	633.7 g	6.3 g
Sodium ions (Na <sup>+</sup> )	579 g	575 g	4 g
Bicarbonate ions (HCO <sub>3</sub> <sup>-</sup> )	275 g	275 g	0.03 g
Glucose	162 g	162 g	0
Urea	54 g	27 g	27 g <sup>†</sup>
Potassium ions (K <sup>+</sup> )	29.6 g	29.6 g	2.0 g <sup>‡</sup>
Uric acid	8.5 g	7.7 g	0.8 g
Proteins	2.0 g	1.9 g	0.1 g
Creatinine	1.6 g	0	1.6 g

\*Assuming GFR is 180 liters per day.

<sup>†</sup>In addition to being filtered and reabsorbed, urea is secreted.

<sup>‡</sup>After virtually all filtered K<sup>+</sup> is reabsorbed in the convoluted tubules and loop of Henle, a variable amount of K<sup>+</sup> is secreted in the collecting duct.

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## REGULATORY FUNCTIONS

- While a major job of the Kidneys is to remove wastes from the blood and create urine, the Kidneys also play a key role in homeostasis:
  - Regulate blood pressure by adjusting blood flow into and out of the kidneys
  - Regulate blood pH by excreting hydrogen ions and conserving bicarbonate ions
  - Help regulate the blood levels of several ions, including sodium, potassium, calcium, chloride, and phosphate

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## REGULATORY FUNCTIONS (CONTINUED)

- The Kidneys also regulate blood volume by conserving or eliminating water
  - They conserve water if your urine becomes concentrated
  - They eliminate water if your urine is diluted
- Diuretics slow the reabsorption of water by the Kidneys
  - Water that should be moving back into the bloodstream is now excreted, increasing the flow of urine

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## COMMON DIURETICS

- Prescription Drugs are a common diuretic along with the others we've already mentioned:

- Coffee
- Teas (*Caffeinated & some Herbal*)
- Soda
- Alcoholic Beverages
- Packaged Fruit Juices



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# *Kidneys: Functional Evaluation*

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## **DYSFUNCTION**

Kidneys are very late to complain. Often people don't have symptoms until they are near pathological problems. Functional tests, including the Chapman Reflex, show up years before the symptoms indicating a pathology appear. Be careful not to overlook kidney support when evaluating the nutritional weaknesses of your clients.

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## HYDRATION: KIDNEYS

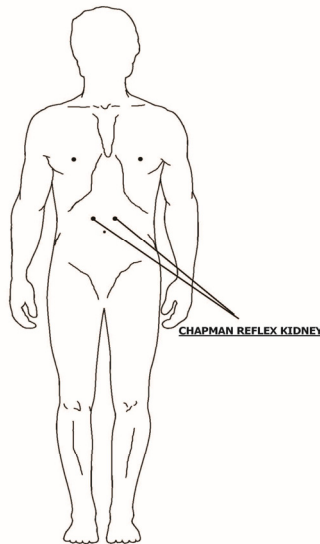
### Chapman Reflex Kidney (1" →↑ umbilicus)

With client on their back, ask them to tighten their abdominal muscles by lifting their head slightly. The Chapman Reflex Kidney points are 1" lateral and 1" superior to the umbilicus. They are tiny "pea-size" points that sit on top of the abdominal muscle. These are each a single finger palpation, **A>P**.

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### Functional Evaluation of the Kidneys



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# *The Kidneys: Solution*

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## **LNT: KIDNEYS**

- MULTIPLE NUTRIENTS FOR SUPPORTING RENAL FUNCTION (*GLANDULAR*)
- MULTIPLE NUTRIENTS FOR SUPPORTING RENAL FUNCTION (*NON-GLANDULAR*)
- KIDNEY TISSUE (*BOVINE NEONATAL*)
- CULTURE OF BEET JUICE CONTAINING ARGINASE
- ALKALINE ASH MINERALS (*CALCIUM, MAGNESIUM, AND POTASSIUM*) (*to alkalize*)
- MICROEMULSIFIED OREGANO OIL
- BETAINE HCL AND PEPSIN (*to acidify*)
- NUTRITIONAL PHOSPHORUS LIQUID

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## **WORKSHOP 8A**

Using your Workshop 8a pages work with a partner to complete the Functional Evaluation and LNT for Hydration and the Kidneys.

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## **PROTOCOL LIST - KIDNEYS**

- Kidney Support
- Kidney Stones
- Bladder Infection
- Leaky Bladder

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## MODULE 8 SUMMARY

- 1 State the Big Idea for Hydration
- 2 Understand the many important roles of water in the body
- 3 Know the signs of dehydration; early and mature
- 4 State the formula for calculating the appropriate daily intake of water
- 5 Name at least three diuretic beverages and explain how to stay hydrated if you drink a diuretic beverage
- 6 Describe and perform the Functional Evaluation for Hydration and the Kidneys

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