The Essential Connection: Hydration and Well-Being”

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Objectives: Upon Completion of this presentation the learner will be able to:

- **1. Discuss the three forms of Dehydration in Adults.**
- **2. List 6 signs and symptoms of Dehydration in Adults.**
- **3. Discuss the history of beverages in the United States.**
- **4. List the 6 levels of Healthy Beverages according to the "Independent Beverage Guidance Panel".**
- **5. Identify the etiology of adult dehydration medical conditions and emergencies.**
- **6. List 5 Reasons Hydration is Important to our bodies.**
- **7. List 10 foods that provide a high water content when we consume them.**
- **8. List 6 guidelines for consumption of beverages we should follow every day.**

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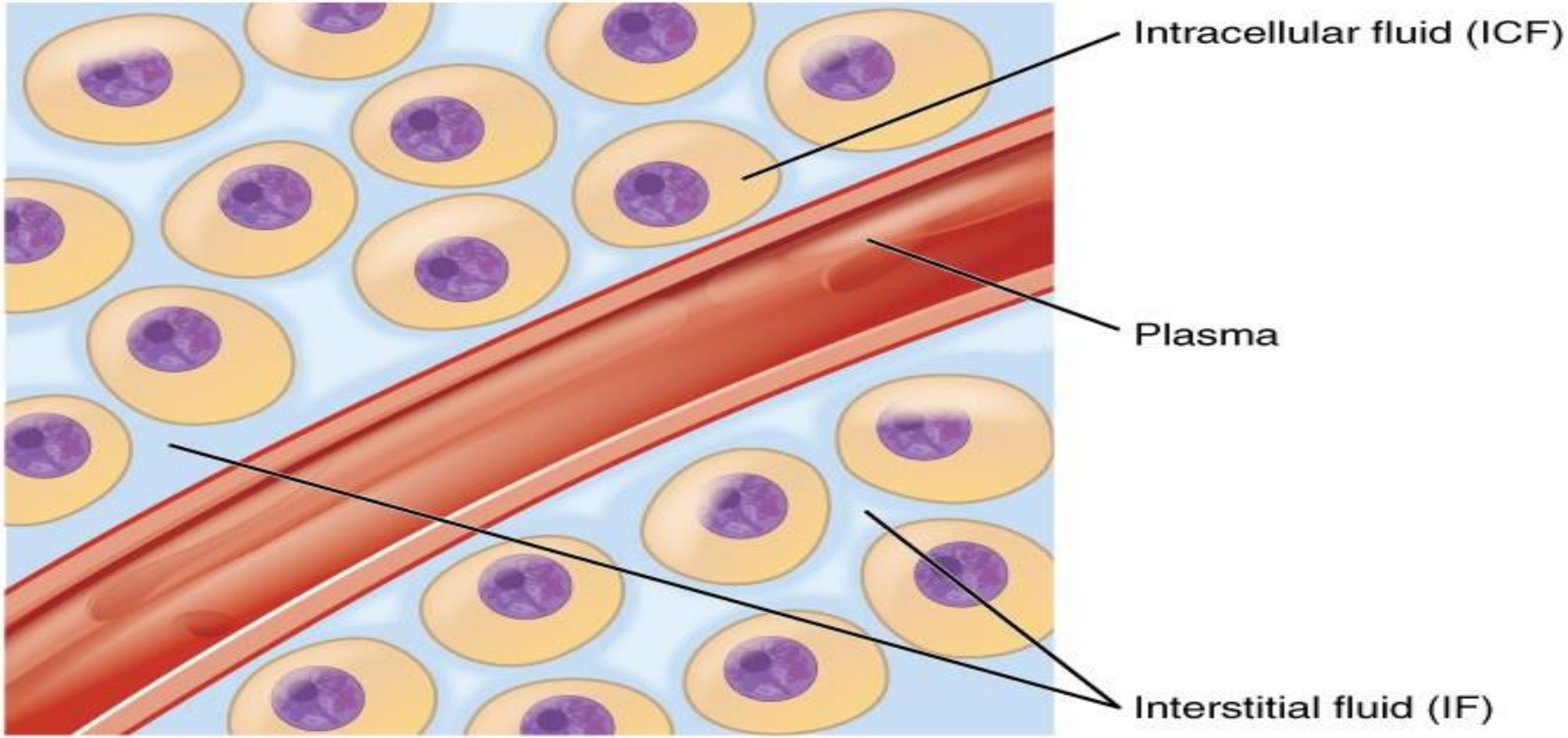
Terms to Review:

- **antidiuretic hormone (ADH): also known as vasopressin, a hormone that increases the volume of water reabsorbed from the collecting tubules of the kidney**
- **dehydration: state of containing insufficient water in blood and other tissues**
- **diuresis: excess production of urine**
- **plasma osmolality: ratio of solutes to a volume of solvent in the plasma; plasma osmolality reflects a person's state of hydration**



We lose water every day in the following ways:

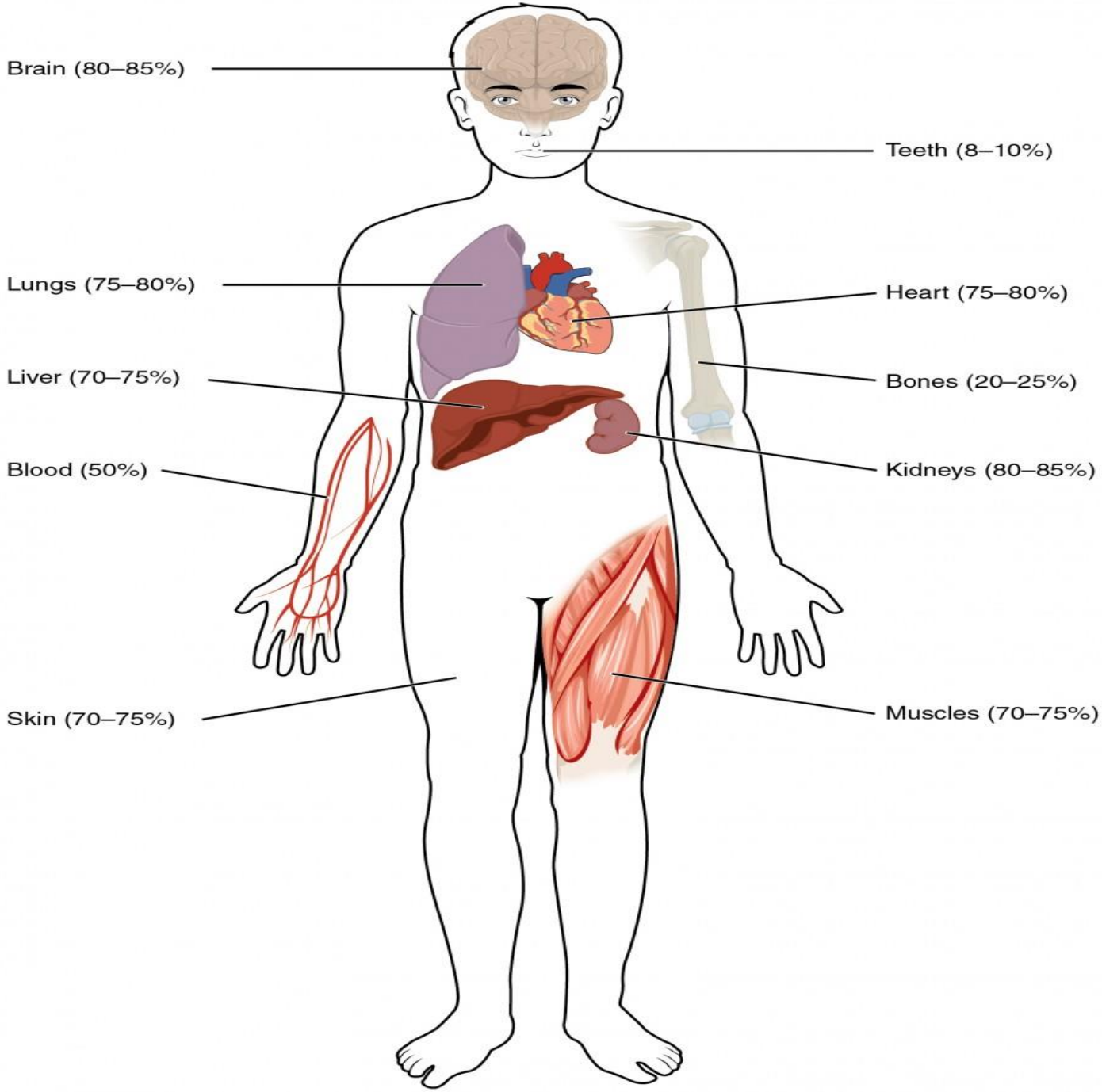
- **Body water is lost through the skin, lungs, kidneys and GI tract.**
- **The loss of body water without sodium causes dehydration.**

- **Dehydration results when water losses from the body exceed water replacement.**

- **When we urinate- Main source of loss of fluid in the body.**
- **Sweat**
- **When we breathe**
- **We lose water even faster in hot weather, when we are physically active, or if we have a fever.**
- **We lose water quickly with vomiting and diarrhea.**

- **Be sure to actively drink plenty of water to avoid becoming dehydrated.**

- Homeostasis requires that water intake and output be balanced. Most water intake comes through the digestive tract via liquids and food, but roughly 10 percent of water available to the body is generated at the end of aerobic respiration during cellular metabolism.
- Urine produced by the kidneys accounts for the largest amount of water leaving the body.
- The kidneys can adjust the concentration of the urine to reflect the body's water needs, conserving water if the body is dehydrated or making urine more dilute to expel excess water when necessary.
- ADH is a hormone that helps the body to retain water by increasing water reabsorption by the kidneys.



Dehydration in Adults

- Statistics:

- **75% of Americans are chronically dehydrated.**
- **Dehydration is common in the elderly and occurs 17% to 28% in adults in the United States.**
- **Dehydration is a frequent cause of hospital admission.**
- **Dehydration can cause morbidity and mortality on its own and complicates many other medical conditions.**
- **Dehydration is often overlooked, leading to misdiagnosis.**
- **Dehydration can be easily treated and prevented with education from the interprofessional team.**
- **The elderly population is also 20% to 30% more prone to dehydration due to immobility, impaired thirst mechanism, diabetes, renal disease, and falls.**

Different Forms of Dehydration

- **1. Isotonic Water Loss Dehydration occurs when sodium and water are lost together.**
- **Isotonic water loss occurs with:**
- **vomiting**
- **diarrhea**
- **sweating**
- **burns**
- **intrinsic kidney disease**
- **hyperglycemia**
- **hypoaldosteronism.**

Different Forms of Dehydration

- **2. Hypertonic Dehydration occurs when water losses exceed sodium losses.**

- **Hypertonic Dehydration results from excess pure water loss through the skin, lungs, and kidneys. Results in elevated sodium levels and osmolality.**

- **Causes for hypertonic dehydration are:**
- **Fever**
- **Increased respiration**
- **Diabetes insipidus**

Different Forms of Dehydration

- **3. Hypotonic Dehydration is mostly caused by diuretics, which cause more sodium loss than water loss. Results in low sodium levels and low osmolality.**

- **The main cause of hypotonic dehydration is:**
- **Diuretics**

Health Care Providers need to know the source of the water loss

- **1. Failure to replace water loss: altered mentation, immobility, impaired thirst mechanism, drug overdose leading to coma.**
- **2. Excess water loss from the skin: heat, exercise, burns, severe skin diseases.**
- **3. Excess water loss from the kidneys: medications and diuretics, acute and chronic renal disease,**
- **post-obstructive diuresis, salt-wasting tubular disease, Addison's Disease, hypoaldosteronism, hyperglycemia.**
- **4. Excess water loss from the GI tract: vomiting, diarrhea, laxatives, gastric suctioning, fistulas.**
- **5. Intraabdominal losses: pancreatitis, new ascites, peritonitis.**
- **6. Excess insensible loss: sepsis, medications, hyperthyroidism, asthma, chronic obstructive pulmonary disease (COPD), drugs.**

- **(KoryTaylor, Alok K. Tripathi, Elizabeth B. Jones, " Adult Dehydration", NIH October 3, 2022)**

Pathophysiology of Dehydration

- **The human body is 55% to 65% water.**
- **2/3 of that water is intracellular.**
- **1/3 of that water is extracellular.**
- **1/5 of extracellular water is intravascular.**

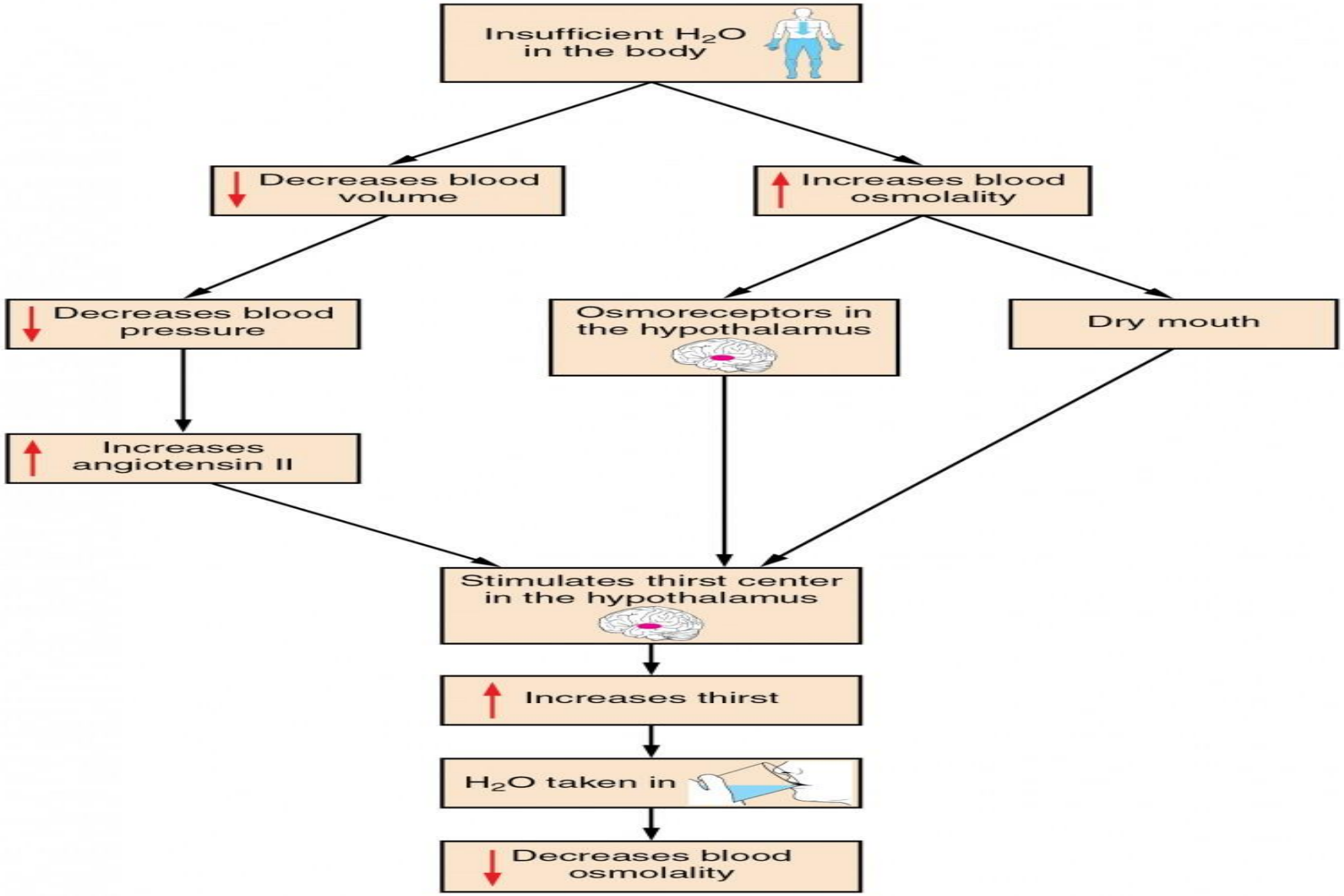
- **The body has a complex system designed to maintain euvolemia/normovolemia.**
- **Euvolemia/normovolemia is the state of having the normal volume of fluids and blood in the body, including the interstitial, intracellular, and blood volume (intravascular).**

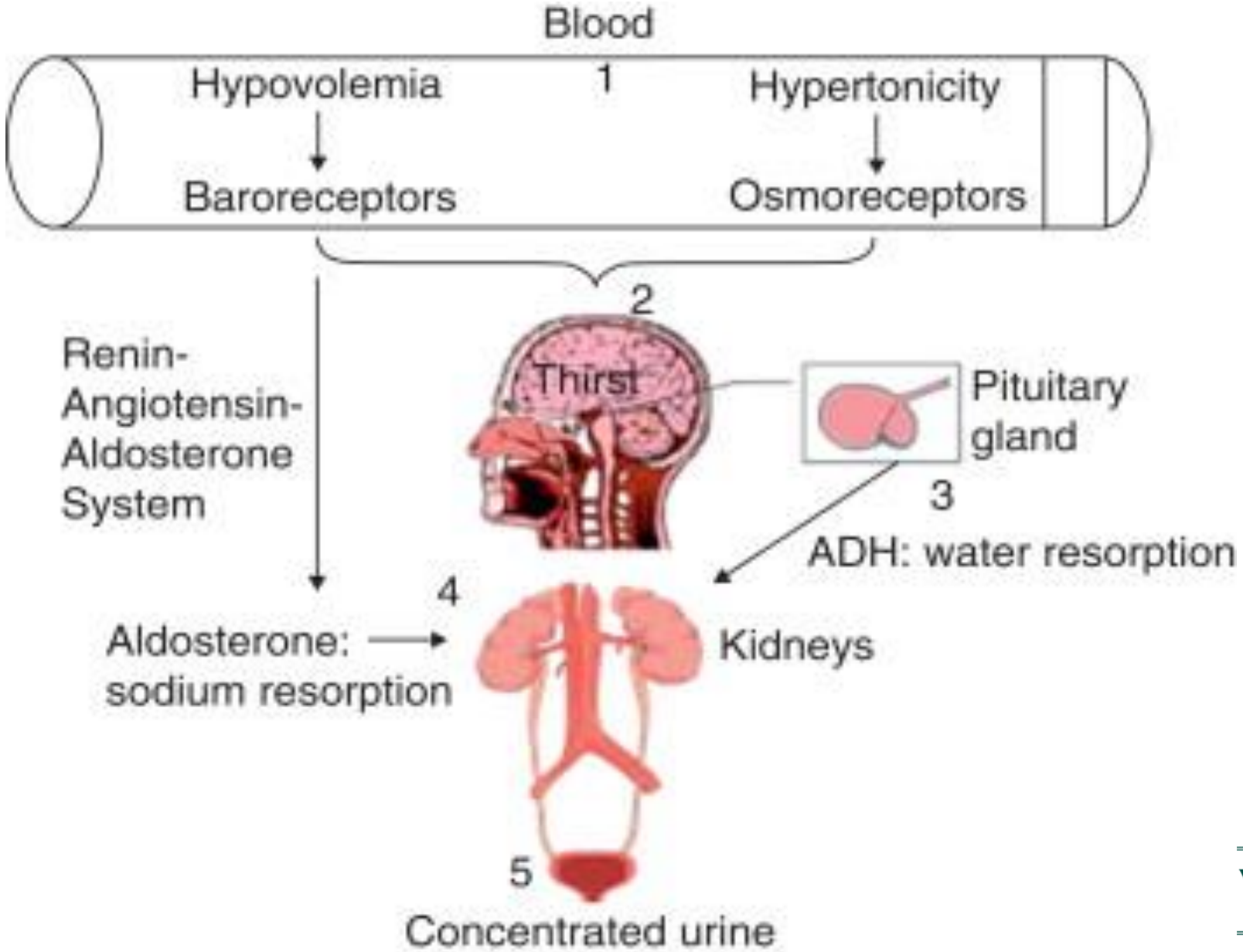
Pathophysiology of Dehydration

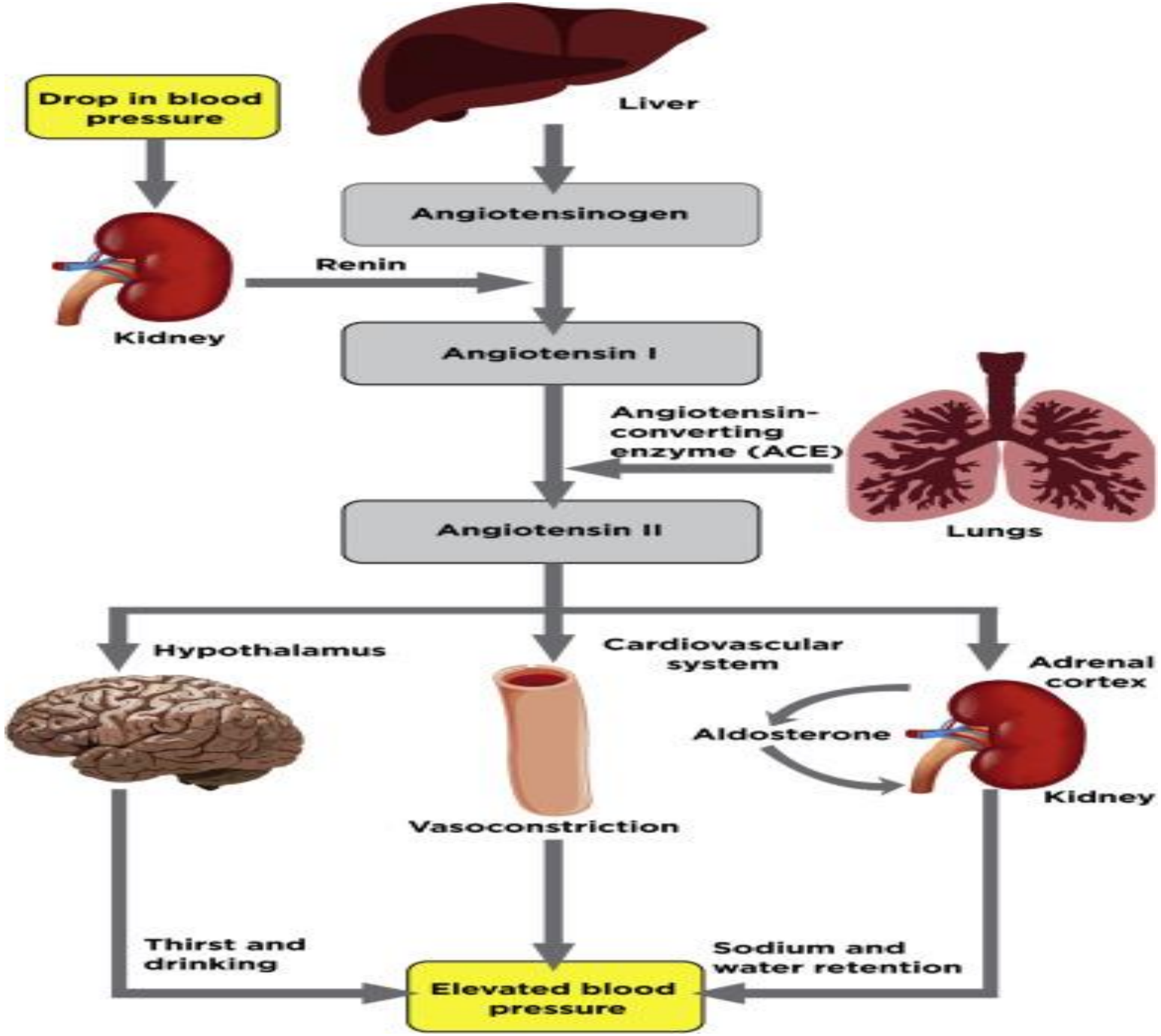
- **Water is absorbed through the GI tract.**
- **The Primary control of water homeostasis is through osmoreceptors in the brain.**
- **As perceived by these osmoreceptors, dehydration stimulates the thirst center in the hypothalamus, which leads to water consumption. (thirst).**
- **These osmoreceptors can also help the kidneys to conserve water, (less urination).**
- **When the hypothalamus detects lower water concentration, it causes the posterior pituitary to release the antidiuretic hormone, which stimulates the kidneys to reabsorb more water.**
- **Decreased blood pressure, which often accompanies dehydration, triggers renin secretion from the kidneys.**
- **Renin converts angiotensin 1 to angiotensin 11, which increases aldosterone release from the adrenal glands.**
- **Aldosterone increases the absorption of sodium and water from the kidneys.**
- **The body uses these mechanisms to regulate volume and sodium and water concentration.**

- **(Kory, Taylor, Alok K. Tripathi, Elizabeth B. Jones, "Adult Dehydration", NIH October 3, 2022)**

What Happens When We are Dehydrated







Symptoms of Dehydration

- **Fatigue, lethargic, obtunded,**
- **Thirst**
- **Dry skin and lips, poor skin turgor, sunken eyes**
- **Dark urine or decreased urinary output**
- **Headaches**
- **Muscle cramps**
- **Lightheadedness**
- **Dizziness**
- **Syncope**
- **Orthostatic hypotension**
- **Palpitations**
- **Vital signs: hypotension, tachycardia, fever, tachypnea.**

Evaluation of Dehydration

- **H and P, vital signs**
- **Serum and plasma osmolality tests**
- **Dehydration due to water loss is a serum osmolality greater than or equal to 295 mOsm/kg.**
- **Cochrane Review uses serum osmolality of 294 ,Osm/kg to define dehydration.**
- **Weight loss equal to or greater than 3% over 7 days may indicate dehydration.**
- **Blood urea nitrogen to creatinine ratio should be higher than 10:1 in dehydration.**
- **Urine tests may suggest volume depletion.**
- **Ultrasound can assess a patient's fluid volume by measuring the collapsibility of the inferior vena cava (IVC) with respiration. A variation in the IVC diameter greater than 50% with respiration indicates a collapsible IVC.**

Treatment and Management of Dehydration

- **Goal: rapid fluid replacement and identification of the cause of fluid loss.**
- **Patients with fluid deficits should be given isotonic fluid boluses tailored to the**
- **Individual circumstance.**
- **Patients with severe dehydration get larger boluses of isotonic saline (0.9%).**
- **Elderly patients needs a careful approach if they have heart failure and kidney failure. Require small boluses of isotonic saline fluid (0.9%).**
- **Treat the cause.**
- **Isotonic crystalloid fluid should be used in most cases of dehydration. Colloids such as albumin may be used in specific situations but do not improve outcomes.**
- **Normal saline lactated ringer solution and a balanced crystalloid solution may also be used.**
- **Lactated Ringers contains potassium, so it should not be used in renal failure or hyperkalemia.**
- **The patient's volume status and serum sodium must be followed closely.**

Hydration: Why It's So Important

- **Our bodies need water to survive.**
- **Water makes up more than half our body weight. 55% to 65%.**
- **Every cell, tissue, organ in your body needs water to work properly.**
- **Not drinking enough water can lead to dehydration, fatigue, headaches, skin problems, muscle cramps, low blood pressure and a rapid heart beat.**
- **Prolonged dehydration can lead to organ failure.**

- **Our body uses water to maintain its:**
- **Temperature**
- **Remove waste**
- **Lubricate our joints**
- **Organ functions**
- **Maintain Blood Volume**

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In the Beginning there was water, abundant, refreshing, providing everything the body needs to replenish the fluids it loses.

- **Water was the only beverage for humans for millions of years.**
- **Milk came next, with the advent of agriculture and the domestication of animals.**
- **Then beer, wine, coffee and tea. All drunk for pleasure and taste, as well as the fluids they provide.**
- **The Newcomers-soft drinks, sports and energy drinks, and the like-offer hydration, but with a hefty dose of unnecessary calories that the body may have a hard time regulating.**
- **What are the "BEST" beverages for health?**
- **US developed the "Independent Beverage Guidance Panel", with six researchers.**
- **Dr. Walter C. Willett of the Harvard School of Public Health's Department of Nutrition.**
- **Ranked categories into six levels, based on calories delivered, contribution to intake of energy and essential nutrients, and positive and negative effects on health.**
- **The Winner was WATER, as number one!**

Best Beverages for Health- 6 levels

- **Level 1: Water**

- **Provides everything the body needs.**
- **Pure water is needed to restore fluids lost through metabolism, breathing, sweating and removal of waste.**
- **Water is perfect beverage for rehydrating your system.**
- **When come from tap is costs a fraction of a penny per glass.**
- **The amount of water you need every day depends on:**
- **How much you eat**
- **Weather temperature**
- **How active you are**

- **Institute of Medicine guideline is 125 ounces (about 15 cups) for men, and 91 ounces for women(about 11 cups) per day.**
- **In most people 80% of fluids come from beverages, and 20% from the foods we eat.**

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Best Beverages- 6 levels

- **Level 2: Tea and Coffee**

- **Plain, calorie free**
- **Contain antioxidants, flavonoids good for health and other biologically active substances.**
- **Green tea, Japan, may protect against heart disease?**
- **Coffee may protect against type 2 diabetes?**
- **When adding sugar, whipped cream, flavorings turns helpful beverage into not-so-healthy beverage.**
- **16ounce Mint Mocha Chip Frappuccino with Chocolate Whipped Cream contains 470 calories. 12 Grams fat, 71 grams sugar (17 teaspoons sugar).**
- **Caffeine and pregnant women may increase risk of miscarriage. Should limit to 1 cup per day if pregnant.**

Best Beverages -6 levels

- **Level 3: Low-Fat and Skim Milk and Soy Beverages**

- **For children milk is key source of calcium and vitamin D.**
- **Soy milk, good alternative to cows milk.**
- **Low-Fat Milk, 1% or 1.5% milk, skim milk virtually Fat Free.**
- **Reduced- Fat Milk or Whole Milk contain 2% and 4 % milk fat. High in calories, and high consumption related to increased prostate and ovarian cancer.**
- **Adults limit milk and milk products to 1 or 2 glasses per day.**
- **Children 2 glasses of milk per day provides sufficient Calcium and nutrition.**

Best Beverages -6 levels

- Level 4: Non-Calorically Sweetened Beverages

- **Diet sodas and other Diet Drinks are sweetened with calorie-free artificial sweeteners such as:**
- **Aspartame (Equal, NutraSweet, others).**
- **Saccharin (Sweet N Low, Necta Sweet, others).**
- **Sucralose (Splenda) .**
- **Stevia (from shrubs in South and Central America).**
- **May all contribute you weight gain.**
- **Occasional treat rather than daily beverage.**

Best Beverages- 6 levels

- Level 5: Caloric Beverages with Some Nutrients
- **This category includes:**
- **Fruit juice- (100% has most nutrients of fruit itself, delivers more energy). 4 ounces per day.**
- **Vegetable juice- lower in calories than fruit juice. May contain a lot of sodium.**
- **Whole Milk- Calcium and Vitamin D, has twice the calories as skim milk. 4.5 grams per glass, saturated fat then skim milk.**
- **Sports Drinks- fewer calories than soft drinks, offer small amounts of sodium, chloride, and potassium. Not needed by causal athletes or daily walkers.**
- **Vitamin-enhanced waters- Not necessary for anyone who takes a daily vitamin. Add vitamins to a sugary drink does not make it healthy.**
- **Alcoholic Beverages-**
- **Fruit Smoothies high in calories , not recommended as daily beverage.**

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Best Beverages- 6 Levels

- Level 6: Calorically Sweetened Beverages

- **The Beverage Guidance Panel gave its "least recommended" designation to beverages that are sweetened with sugar, high-fructose corn syrup, or other high-calorie sweeteners that have few other nutrients.**
- **Include:**
- **Carbonated and noncarbonated soft drinks**
- **Fruit drinks**
- **Lemonade**
- **Other "Ades"**
- **Fruit Smoothies**
- **Many flavored coffee and tea drinks**
- **Energy drinks**

- **Thumbs down, provide high calories and no other nutrients.**
- **Leads to weight gain and increased risk of type 2 diabetes.**

Putting it Together: A Sample Beverage Plan

- **Your body would be perfectly content if you drank nothing but water.**
- **You would get all the fluid you need and all of your nutrients would come from food.**
- **Many choices, variety of beverages.**
- **Guidelines:**
- **At least half of your daily fluid should come from water.**
- **For example, for a person who needs 12 cups of fluid a day, 6 cups should come from water.**
- **1/3- (3 to 4 cups) can come from unsweetened coffee or tea. If you flavor your coffee with a lot of sugar, cream or whole milk, then drinking less would help manage weight.**
- **Low-fat milk can make up another 20%, or about two 8-ounce glasses. Less is fine. Get calcium from another source.**
- **One small glass (4 ounces) of 100% fruit juice daily.**
- **No more than 1 to 2 alcoholic drinks for men, and no more than 1 for women per day.**
- **Ideally, "Zero" diet drinks made with artificial sweeteners, but up to 1 to 2 glasses (8 to 16 ounces) a day.**
- **Ideally, zero drinks sweetened with sugar or high-fructose corn syrup, but up to a maximum**
- **of 8 ounces.**

Pathway to Improved Health

Different People need different amounts of water each day to maintain their normal volume.

Most people drink 6 to 8 –ounce glasses of water every day. Reasonable goal.

Most healthy people can stay well hydrated by drinking water and other fluids when they are thirsty.

For some people, fewer than 8 glasses may be enough.

Other people need more.

Plain, Pure water is best for staying hydrated.

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Water can be Found in these 19 Fruits and Vegetables

- **Approximately 1 cup serving. Each of these fruits and vegetables provides additional fiber, antioxidants, vitamins, and minerals, Plus hydration!**

- **Watermelon- has 92% water content**
- **Strawberries- has 91% water content**
- **Cantaloupe-has 90% water content**
- **Peaches-has 89% water content**
- **Oranges-has 88% water content**
- **Skim Milk-has 91% water content**
- **Cucumber-has 95% water content**
- **Lettuce-has 96% water content**
- **Zucchini – has 94% water content**
- **Tomatoes-has 94% water content**

Water can be found in these 19 Fruits and Vegetables

- **Celery –has 95% water content**
- **Plain Yogurt-has 88% water content**
- **Soup and Broths- have 92% water content**
- **Bell Peppers-has 92% water content**
- **Cauliflower-has 92% water content**
- **Cabbage-has 92% water content**
- **Grapefruit-has 88% water content**
- **Coconut water-has 95% water content**
- **Cottage Cheese-has 80% water content**

Water content in food is often overlooked.

- **While drinking water is important, 6-8 glasses of water per day, you can still consume a significant amount of water by including a variety of water-rich fruits, vegetables and dairy products in your diet.**

- **As long as you are eating plenty of water-rich foods and drinking water when you are thirsty, you will not have a problem staying hydrated.**

Hydration and Caffeine

- **Some caffeinated drinks(for example, coffee, tea, soda) can contribute a little to your daily water intake. A moderate amount of caffeine (400 Milligrams) is not harmful for most people. Here are the caffeine amounts found in popular drinks:**

- **12 ounces of soda: 30-50 milligrams (MG) of caffeine**
- **8 ounces of green or black tea: 30-50 mg of caffeine**
- **8 ounces of black coffee: 80-100 mgs of caffeine**
- **8 ounce energy drink: 45-80 mg of caffeine**

- **It is best to limit caffeinated drinks. Caffeine will cause you to urinate more frequently.**
- **This can make it difficult to stay hydrated.**
- **It can also make you feel anxious, nervous, and jittery.**

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Sports Drinks

- **Sports drinks can be helpful if you are planning on exercising at higher-than-normal levels for more than an hour.**
- **Sports drinks contain carbohydrates and electrolytes that can increase your energy.**
- **They help your body absorb water.**

- **However, some sports drinks are high in calories from added sugar.**
- **They also may contain high levels of sodium(salt).**
- **Read your sports drinks label and serving size information.**
- **One bottle often contains more than 1 serving.**
- **Some sport drinks also contain caffeine, remember the safe amount of caffeine to consume each day is 400 mgs.**

Energy Drinks are Different than Sports Drinks

- **Energy Drinks and Sports Drinks are not the same.**
- **Energy Drinks usually contain large amounts of caffeine.**
- **Energy Drinks contain ingredients that overstimulate us (Guarana, ginseng, or taurine).**
- **Your body does not need these stimulants.**
- **Energy Drinks are also high in added sugar.**
- **According to Doctors, children and teens should not have energy drinks.**
- **Energy Drinks because of the high caffeine levels do not offer good hydration.**

- **(Familydoctor.org/hydration)**

In Summary

- **We discussed the importance of Hydration for our bodies.**
- **We discussed the foods that have a high water content that can supplement our daily hydration needs.**
- **The dangers of dehydration were discussed and how the body compensates for dehydration and increased blood viscosity.**

- **Thank you for spending your time with me today.**

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