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Fluid and Electrolyte Balance

What are electrolytes?

Electrolytes are minerals [<https://medlineplus.gov/minerals.html>] that have an electric charge when they are dissolved in water or body fluids, including blood. The electric charge can be positive or negative. You have electrolytes in your blood, urine (pee), tissues, and other body fluids.

Electrolytes are important because they help:

- Balance the amount of water in your body
- Balance your body's acid/base (pH) level
- Move nutrients into your cells
- Move wastes out of your cells
- Support your muscle and nerve function
- Keep your heart rate and rhythm steady
- Keep your blood pressure stable
- Keep your bones and teeth healthy

What are the different types of electrolytes in your body?

The main electrolytes in your body include:

- Bicarbonate, which helps maintain the body's acid and base balance (pH). It also plays an important role in moving carbon dioxide through the bloodstream.
- Calcium [<https://medlineplus.gov/calcium.html>], which helps make and keep bones and teeth strong.
- Chloride, which also helps control the amount of fluid in the body. In addition, it helps maintain healthy blood volume and blood pressure.
- Magnesium, which helps your muscles, nerves, and heart work properly. It also helps control blood pressure and blood glucose [<https://medlineplus.gov/bloodglucose.html>] (blood sugar).
- Phosphate, which works together with calcium to build strong bones and teeth.
- Potassium [<https://medlineplus.gov/potassium.html>], which helps your cells, heart, and muscles work properly.
- Sodium [<https://medlineplus.gov/sodium.html>], which helps control the amount of fluid in the body. It also helps your nerves and muscles work properly.

You get these electrolytes from the foods you eat and the fluids you drink.

What is an electrolyte imbalance?

An electrolyte imbalance means that the level of one or more electrolytes in your body is too low or too high. It can happen when the amount of water in your body changes. The amount of water that you take in should equal the amount you lose. If something upsets this balance, you may have too little water (dehydration [<https://medlineplus.gov/dehydration.html>]) or too much water (overhydration). Some of the more common reasons why you might have an imbalance of the water in your body include:

- Certain medicines
- Severe vomiting [<https://medlineplus.gov/nauseaandvomiting.html>] and/or diarrhea [<https://medlineplus.gov/diarrhea.html>]
- Heavy sweating [<https://medlineplus.gov/sweat.html>]
- Heart [<https://medlineplus.gov/heartdiseases.html>] , liver [<https://medlineplus.gov/liverdiseases.html>] or kidney [<https://medlineplus.gov/kidneydiseases.html>] problems
- Not drinking enough fluids, especially when doing intense exercise or when the weather is very hot
- Drinking too much water

What are the different types of electrolyte imbalances?

The names of the different types of electrolyte imbalances are:

Electrolyte	Too low	Too high
Bicarbonate	Acidosis	Alkalosis
Calcium	Hypocalcemia	Hypercalcemia
Chloride	Hypochloremia	Hyperchloremia
Magnesium	Hypomagnesemia	Hypermagnesemia
Phosphate	Hypophosphatemia	Hyperphosphatemia
Potassium	Hypokalemia	Hyperkalemia
Sodium	Hyponatremia	Hypernatremia

How are electrolyte imbalances diagnosed?

A test called an electrolyte panel [<https://medlineplus.gov/lab-tests/electrolyte-panel/>] can check the levels of your body's main electrolytes. A related test, the anion gap blood test [<https://medlineplus.gov/lab-tests/anion-gap-blood-test/>] , checks whether your electrolytes are out of balance or if your blood is too acidic or not acidic enough.

What are the treatments for electrolyte imbalances?

The treatment for an electrolyte imbalance depends on which electrolytes are out of balance, if there is too little or too many, and what is causing the imbalance. In minor cases, you may just need to make some changes to your diet. In other cases, you may need other treatments. For example:

- If you don't have enough of an electrolyte, you may get electrolyte replacement therapy. This involves giving you more of that electrolyte. It could be a medicine or supplement that you swallow or drink, or it may be given intravenously (by IV).
- If you have too much of an electrolyte, your provider may give you medicines or fluids (by mouth or by IV) to help remove that electrolyte from your body. In severe cases, you may need dialysis [<https://medlineplus.gov/dialysis.html>] to filter out the electrolyte.

Start Here

- About Body Water [<https://www.merckmanuals.com/home/hormonal-and-metabolic-disorders/water-balance/about-body-water>] (Merck & Co., Inc.)
Also in Spanish [<https://www.merckmanuals.com/es-us/hogar/trastornos-hormonales-y-metab%C3%B3licos/equilibrio-h%C3%ADrico/introducci%C3%B3n-al-agua-corporal>]

Diagnosis and Tests

- Anion Gap Blood Test [<https://medlineplus.gov/lab-tests/anion-gap-blood-test/>]  (National Library of Medicine)
Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/analisis-de-sangre-de-la-brecha-anionica/>]
- Basic Metabolic Panel (BMP) [<https://medlineplus.gov/lab-tests/basic-metabolic-panel-bmp/>]  (National Library of Medicine)
Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/panel-metabolico-basico/>]

• Carbon Dioxide (CO₂) in Blood [<https://medlineplus.gov/lab-tests/carbon-dioxide-co2-in-blood/>]  (National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/dioxido-de-carbono-co2-en-la-sangre/>]

• Chloride Blood Test [<https://medlineplus.gov/lab-tests/chloride-blood-test/>]  (National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/prueba-de-cloruro-en-sangre/>]

• Comprehensive Metabolic Panel (CMP) [<https://medlineplus.gov/lab-tests/comprehensive-metabolic-panel-cmp/>] 

(National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/panel-metabolico-completo-pmc/>]

• Electrolyte Panel [<https://medlineplus.gov/lab-tests/electrolyte-panel/>] 

(National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/ionograma/>]

• Magnesium Blood Test [<https://medlineplus.gov/lab-tests/magnesium-blood-test/>] 

(National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/prueba-de-magnesio-en-la-sangre/>]

• Osmolality Tests [<https://medlineplus.gov/lab-tests/osmolality-tests/>] 

(National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/pruebas-de-osmolalidad/>]

• Sodium Blood Test [<https://medlineplus.gov/lab-tests/sodium-blood-test/>] 

(National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/prueba-de-sodio-en-la-sangre/>]

Related Issues

• Hydrating for Health: Why Drinking Water Is So Important [<https://newsinhealth.nih.gov/2023/05/hydrating-health>] 

(National Institutes of Health)

Also in Spanish [<https://salud.nih.gov/recursos-de-salud/nih-noticias-de-salud/hidratarse-para-estar-sano>]

• Nutrition and Healthy Eating: How Much Water Should You Drink Each Day? [<https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/water/art-20044256?p=1>] (Mayo Foundation for Medical Education and Research)

Also in Spanish [<https://www.mayoclinic.org/es/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/water/art-20044256?p=1>]

Genetics

• Autosomal dominant hypocalcemia: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/autosomal-dominant-hypocalcemia>] 

(National Library of Medicine)

• Hypomagnesemia with secondary hypocalcemia: MedlinePlus Genetics

[<https://medlineplus.gov/genetics/condition/hypomagnesemia-with-secondary-hypocalcemia>] 

(National Library of Medicine)

• Isolated hyperchlorhidrosis: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/isolated-hyperchlorhidrosis>] 

(National Library of Medicine)

• Pseudohypoaldosteronism type 1: MedlinePlus Genetics

[<https://medlineplus.gov/genetics/condition/pseudohypoaldosteronism-type-1>] 

(National Library of Medicine)

Clinical Trials

• ClinicalTrials.gov: Water-Electrolyte Imbalance [[https://clinicaltrials.gov/search?cond=%22Water-](https://clinicaltrials.gov/search?cond=%22Water-Electrolyte+Imbalance%22&aggFilters=status:not%20rec)

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Journal Articles

References and abstracts from MEDLINE/PubMed (National Library of Medicine)

• Article: Hydration Strategies in Older Adults. [<https://www.ncbi.nlm.nih.gov/pubmed/40732881>]

• Article: Effects of dapagliflozin on urinary output, fluid balance, and biochemistry in... [<https://www.ncbi.nlm.nih.gov/pubmed/40646628>]

• Article: Brain natriuretic peptide and all-cause mortality in patients treated with haemodialysis. [<https://www.ncbi.nlm.nih.gov/pubmed/40551146>]

• Fluid and Electrolyte Balance -- see more articles [[https://pubmed.ncbi.nlm.nih.gov/?term=%22Water-](https://pubmed.ncbi.nlm.nih.gov/?term=%22Water-Electrolyte+Balance%22%5Bmajr%3Aexp%5D+OR+%22Water-)

[Electrolyte+Balance%22%5Bmajr%3Aexp%5D+OR+%22Water-](https://pubmed.ncbi.nlm.nih.gov/?term=%22Water-Electrolyte+Balance%22%5Bmajr%3Aexp%5D+OR+%22Water-)

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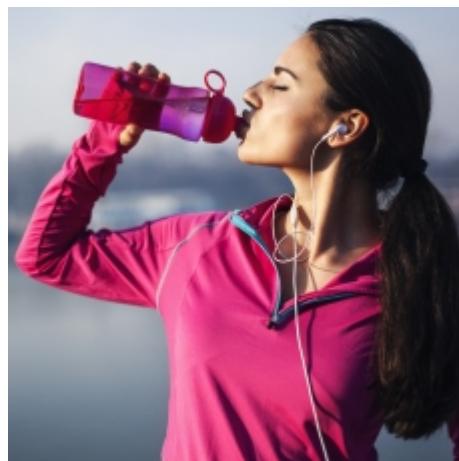
- Centers for Disease Control and Prevention [<https://www.cdc.gov/>]
Also in Spanish [<https://www.cdc.gov/spanish/>]
- Food and Nutrition Information Center [<https://www.nal.usda.gov/programs/fnic>]
- National Institutes of Health, Office of Dietary Supplements [<https://ods.od.nih.gov/>] 

Children

- Basic Blood Chemistry Tests (For Parents) [<https://kidshealth.org/en/parents/labtest5.html>] (Nemours Foundation)

Patient Handouts

- Aldosterone blood test [<https://medlineplus.gov/ency/article/003704.htm>] (Medical Encyclopedia)
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003704.htm>]
- Antidiuretic hormone blood test [<https://medlineplus.gov/ency/article/003702.htm>] (Medical Encyclopedia)
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- Fluid imbalance [<https://medlineplus.gov/ency/article/001187.htm>] (Medical Encyclopedia)
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- Magnesium deficiency [<https://medlineplus.gov/ency/article/000315.htm>] (Medical Encyclopedia)
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- Osmolality blood test [<https://medlineplus.gov/ency/article/003463.htm>] (Medical Encyclopedia)
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- Urine specific gravity test [<https://medlineplus.gov/ency/article/003587.htm>] (Medical Encyclopedia)
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MEDICAL ENCYCLOPEDIA

Aldosterone blood test [<https://medlineplus.gov/ency/article/003704.htm>]

Antidiuretic hormone blood test [<https://medlineplus.gov/ency/article/003702.htm>]

Basic metabolic panel [<https://medlineplus.gov/ency/article/003462.htm>]

Capillary nail refill test [<https://medlineplus.gov/ency/article/003394.htm>]

Chloride - urine test [<https://medlineplus.gov/ency/article/003601.htm>]

Chloride test - blood [<https://medlineplus.gov/ency/article/003485.htm>]

CO2 blood test [<https://medlineplus.gov/ency/article/003469.htm>]

Electrolytes [<https://medlineplus.gov/ency/article/002350.htm>]

Fluid imbalance [<https://medlineplus.gov/ency/article/001187.htm>]

Hypophosphatemia [<https://medlineplus.gov/ency/article/000307.htm>]

Low blood sodium [<https://medlineplus.gov/ency/article/000394.htm>]

Magnesium blood test [<https://medlineplus.gov/ency/article/003487.htm>]

Magnesium deficiency [<https://medlineplus.gov/ency/article/000315.htm>]

Milk-alkali syndrome [<https://medlineplus.gov/ency/article/000332.htm>]

Osmolality blood test [<https://medlineplus.gov/ency/article/003463.htm>]

Osmolality urine test [<https://medlineplus.gov/ency/article/003609.htm>]

Phosphorus blood test [<https://medlineplus.gov/ency/article/003478.htm>]

Skin turgor [<https://medlineplus.gov/ency/article/003281.htm>]

Sodium urine test [<https://medlineplus.gov/ency/article/003599.htm>]

Thirst - absent [<https://medlineplus.gov/ency/article/003086.htm>]

Urine concentration test [<https://medlineplus.gov/ency/article/003608.htm>]

Urine output - decreased [<https://medlineplus.gov/ency/article/003147.htm>]

Urine specific gravity test [<https://medlineplus.gov/ency/article/003587.htm>]

Water in diet [<https://medlineplus.gov/ency/article/002471.htm>]

Related Health Topics

Dehydration [<https://medlineplus.gov/dehydration.html>]

NIH MedlinePlus Magazine

H2O for Healthy Aging [<https://magazine.medlineplus.gov/article/h20-for-healthy-aging>]

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