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# Adrenal Gland Disorders

## What are adrenal glands?

Your adrenal glands are two small organs that sit on top of each kidney. The adrenal glands make different types of hormones [<https://medlineplus.gov/hormones.html>] you need to stay alive and healthy. Hormones are chemicals that travel in your bloodstream and control how different parts of your body work.

The adrenal glands make the hormones cortisol, aldosterone, adrenaline, and noradrenaline. They also make hormones that your body uses to make sex hormones (estrogen and testosterone). All of these hormones do many important jobs, including:

- Turning food into energy and managing blood sugar [<https://medlineplus.gov/bloodglucose.html>] levels
- Balancing salt and water
- Keeping blood pressure normal
- Responding to illness and stress (your "fight or flight" response)
- Timing when and how fast a child develops sexually
- Supporting pregnancy

## What are adrenal gland disorders?

When you have an adrenal gland disorder, your body makes too much or too little of one or more hormones. The symptoms depend on the type of problem you have and how much it affects the hormone levels in your body.

There are many types of adrenal gland disorders, including:

- **Addison's Disease** [<https://medlineplus.gov/addisondisease.html>] - a condition in which the adrenal glands don't make enough cortisol
- **Cushing's Syndrome** [<https://medlineplus.gov/cushingssyndrome.html>] - a condition caused by too much cortisol in the body, often from taking steroid medicines [<https://medlineplus.gov/steroids.html>] for a long time
- **Aldosterone-producing adenoma** [<https://medlineplus.gov/genetics/condition/aldosterone-producing-adenoma/>] - a benign tumor [<https://medlineplus.gov/benigntumors.html>] (not cancer) that makes too much aldosterone and may cause serious high blood pressure [<https://medlineplus.gov/highbloodpressure.html>]
- **Hereditary paraganglioma-pheochromocytoma** [<https://medlineplus.gov/genetics/condition/hereditary-paraganglioma-pheochromocytoma/>] - an inherited condition causing different types of tumors that make adrenaline and other hormones. Some tumors may become cancerous.
- **Adrenal gland cancer** [<https://medlineplus.gov/adrenalglandcancer.html>] - cancerous tumors, including adrenocortical carcinoma and neuroblastoma [<https://medlineplus.gov/neuroblastoma.html>]
- **Congenital Adrenal Hyperplasia (CAH)** - a group of inherited disorders in which the adrenal glands don't make enough cortisol. The most common type is 21-hydroxylase deficiency (also called CAH1) [<https://medlineplus.gov/genetics/condition/21-hydroxylase-deficiency/>]. In the United States, newborn babies get a blood test [<https://medlineplus.gov/lab-tests/17-hydroxyprogesterone/>] to see if they have CAH. People born with CAH may not have symptoms until childhood or later in life.

## What causes adrenal gland disorders?

The cause of adrenal gland disorders depends on the type of disorder you have. Causes can include:

- Medicines such as steroids
- A problem in another gland, such as the **pituitary gland** [<https://medlineplus.gov/pituitarydisorders.html>] . The pituitary gland releases hormones that affect how the adrenal glands work.
- Changes in genes (mutations). These changes can cause the adrenal glands to make too much or too little of one or more hormones.
- Infections

In many cases the cause of the problem isn't clear.

## How are adrenal gland disorders diagnosed?

Health care providers use different tests to check for adrenal disorders depending on your symptoms and health history. For example, you may have tests of your blood, urine (pee), or saliva (spit). These tests check your hormone levels. Your provider may order x-rays [<https://medlineplus.gov/xrays.html>] , CT scans [<https://medlineplus.gov/ctscans.html>] , or MRI scans [<https://medlineplus.gov/mriscans.html>] to look for tumors.

## What are the treatments for adrenal gland disorders?

Different types of adrenal gland disorders have different treatments. They include medicines and surgery. Radiation therapy [<https://medlineplus.gov/radiationtherapy.html>] is sometimes a treatment for tumors. There are treatments to cure certain adrenal gland disorders. For other disorders, treatments can manage your symptoms.

*NIH: National Institute of Child Health and Human Development*

## Start Here

- About Adrenal Gland Disorders [<https://www.nichd.nih.gov/health/topics/adrenalgland/conditioninfo>]

 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Also in Spanish [<https://espanol.nichd.nih.gov/salud/temas/adrenalgland/informacion>]

## Symptoms

- What Are the Symptoms of Adrenal Gland Disorders?

[<https://www.nichd.nih.gov/health/topics/adrenalgland/conditioninfo/symptoms>]

 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Also in Spanish [<https://espanol.nichd.nih.gov/salud/temas/adrenalgland/informacion/sintomas>]

## Diagnosis and Tests

- 17-Hydroxyprogesterone [<https://medlineplus.gov/lab-tests/17-hydroxyprogesterone/>]  (National Library of Medicine)

Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/17-hidroxiprogesterona/>]

- Aldosterone Test [<https://medlineplus.gov/lab-tests/aldosterone-test/>]  (National Library of Medicine)

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

- Cortisol Test [<https://medlineplus.gov/lab-tests/cortisol-test/>]  (National Library of Medicine)

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

- DHEA Sulfate Test [<https://medlineplus.gov/lab-tests/dhea-sulfate-test/>]  (National Library of Medicine)

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

- How Do Health Care Providers Diagnose Adrenal Gland Disorders?

[<https://www.nichd.nih.gov/health/topics/adrenalgland/conditioninfo/diagnosed>]

 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

Also in Spanish [<https://espanol.nichd.nih.gov/salud/temas/adrenalgland/informacion/diagnostican>]



- Renin Test [<https://medlineplus.gov/lab-tests/renin-test/>]  (National Library of Medicine)

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



- X-Ray Exam: Bone Age Study (For Parents) [<https://kidshealth.org/en/parents/xray-bone-age.html>] (Nemours Foundation)

Also in Spanish [<https://kidshealth.org/es/parents/xray-bone-age.html>]

## Treatments and Therapies

- Adrenal Gland Removal (Adrenalectomy) [<https://www.sages.org/publications/patient-information/adrenal-gland-removal-adrenalectomy-patient-information-from-sages/>] (Society of American Gastrointestinal and Endoscopic Surgeons)
- What Are the Treatments for Adrenal Gland Disorders?  
[<https://www.nichd.nih.gov/health/topics/adrenalgland/conditioninfo/treatment>]  
 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)  
Also in Spanish [<https://espanol.nichd.nih.gov/salud/temas/adrenalgland/informacion/tratamientos>]
- What Are the Treatments for Congenital Adrenal Hyperplasia (CAH)?  
[<https://www.nichd.nih.gov/health/topics/cah/conditioninfo/treatments>]  
 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)  
Also in Spanish [<https://espanol.nichd.nih.gov/salud/temas/cah/informacion/tratamientos>]











## Related Issues

- Adrenal Fatigue [<https://www.endocrine.org/patient-engagement/endocrine-library/adrenal-fatigue>] (Endocrine Society)
- Adrenal Fatigue: What Causes It? [<https://www.mayoclinic.org/diseases-conditions/addisons-disease/expert-answers/adrenal-fatigue/faq-20057906?p=1>] (Mayo Foundation for Medical Education and Research)  
Also in Spanish [<https://www.mayoclinic.org/es/diseases-conditions/addisons-disease/expert-answers/adrenal-fatigue/faq-20057906?p=1>]
- Endocrine Related Hypertension [<https://www.endocrine.org/patient-engagement/endocrine-library/endocrine-related-hypertension>] (Endocrine Society)
- Health Alert: Adrenal Crisis Causes Death in Some People Who Were Treated with hGH [<https://www.niddk.nih.gov/health-information/endocrine-diseases/national-hormone-pituitary-program/health-alert-adrenal-crisis-causes-death-people-treated-hgh>]  (National Institute of Diabetes and Digestive and Kidney Diseases)
- How Do I Find an Experienced Adrenal Surgeon?  
[[https://www.nichd.nih.gov/health/topics/adrenalgland/more\\_information/other-faqs](https://www.nichd.nih.gov/health/topics/adrenalgland/more_information/other-faqs)]  
 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)

## Specifics

- Adrenal Gland Cancer: MedlinePlus Health Topic [<https://medlineplus.gov/adrenalglandcancer.html>]  
 (National Library of Medicine)  
Also in Spanish [<https://medlineplus.gov/spanish/adrenalglandcancer.html>]
- Adrenal Incidentaloma [<https://www.endocrine.org/patient-engagement/endocrine-library/adrenal-incidentaloma>]  
(Endocrine Society)
- Adrenal Insufficiency [<https://www.endocrine.org/patient-engagement/endocrine-library/adrenal-insufficiency>]  
(Endocrine Society)
- Adrenal Insufficiency and Addison's Disease [<https://www.niddk.nih.gov/health-information/endocrine-diseases/adrenal-insufficiency-addisons-disease>]  (National Institute of Diabetes and Digestive and Kidney Diseases)  
Also in Spanish [<https://www.niddk.nih.gov/health-information/informacion-de-la-salud/enfermedades-endocrinas/insuficiencia-suprarrenal-enfermedad-addison>]
- Congenital Adrenal Hyperplasia (CAH) [<https://www.nichd.nih.gov/health/topics/cah>]  
 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)  
Also in Spanish [<https://espanol.nichd.nih.gov/salud/temas/cah>]
- Virilization (Adrenogenital Syndrome) [<https://www.merckmanuals.com/home/hormonal-and-metabolic-disorders/adrenal-gland-disorders/virilization>] (Merck & Co., Inc.)  
Also in Spanish [<https://www.merckmanuals.com/es-us/hogar/trastornos-hormonales-y-metab%C3%B3licos/trastornos-de-las-gl%C3%A1ndulas-suprarrenales/virilizaci%C3%B3n>]
- What Are Some Types of Adrenal Gland Disorders?  
[<https://www.nichd.nih.gov/health/topics/adrenalgland/conditioninfo/types>]  
 (Eunice Kennedy Shriver National Institute of Child Health and Human Development)  
Also in Spanish [<https://espanol.nichd.nih.gov/salud/temas/adrenalgland/informacion/tipos>]

# Genetics

- 17 alpha-hydroxylase/17,20-lyase deficiency: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/17-alpha-hydroxylase-17-20-lyase-deficiency>]  (National Library of Medicine)
- 21-hydroxylase deficiency: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/21-hydroxylase-deficiency>]  (National Library of Medicine)
- 3-beta-hydroxysteroid dehydrogenase deficiency: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/3-beta-hydroxysteroid-dehydrogenase-deficiency>]  (National Library of Medicine)
- Aldosterone-producing adenoma: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/aldosterone-producing-adenoma>]  (National Library of Medicine)
- Congenital adrenal hyperplasia due to 11-beta-hydroxylase deficiency: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/congenital-adrenal-hyperplasia-due-to-11-beta-hydroxylase-deficiency>]  (National Library of Medicine)
- Corticosterone methyloxidase deficiency: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/corticosterone-methyloxidase-deficiency>]  (National Library of Medicine)
- Familial hyperaldosteronism: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/familial-hyperaldosteronism>]  (National Library of Medicine)
- Intrauterine growth restriction, metaphyseal dysplasia, adrenal hypoplasia congenita, and genital anomalies: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/image-syndrome>]  (National Library of Medicine)
- Primary macronodular adrenal hyperplasia: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/primary-macronodular-adrenal-hyperplasia>]  (National Library of Medicine)
- X-linked adrenal hypoplasia congenita: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/x-linked-adrenal-hypoplasia-congenita>]  (National Library of Medicine)
- X-linked adrenoleukodystrophy: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/x-linked-adrenoleukodystrophy>]  (National Library of Medicine)

# Clinical Trials

- ClinicalTrials.gov: Adrenal Gland Diseases [<https://clinicaltrials.gov/search?cond=%22Adrenal+Gland+Diseases%22&aggFilters=status:not%20rec>]  (National Institutes of Health)
- ClinicalTrials.gov: Adrenal Hyperplasia, Congenital [<https://clinicaltrials.gov/search?cond=%22Adrenal+Hyperplasia,+Congenital%22&aggFilters=status:not%20rec>]  (National Institutes of Health)

# Journal Articles



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

- Article: Determination of human urinary cortisol, cortisone and relative phase II metabolites... [<https://www.ncbi.nlm.nih.gov/pubmed/40262705>]
- Article: Adrenal infections update: how radiologists can contribute to patient care. [<https://www.ncbi.nlm.nih.gov/pubmed/39932870>]
- Article: Impact of Obesity on Short-Term Outcomes in Patients Undergoing Retroperitoneal Laparoscopic/Retroperitoneoscopic... [<https://www.ncbi.nlm.nih.gov/pubmed/39859089>]
- Adrenal Gland Disorders -- see more articles [<https://pubmed.ncbi.nlm.nih.gov/?term=%22Adrenal+Gland+Diseases%22%5Bmajr%3Anoexp%5D+AND+humans%5Bmh%5D+AND+english%5Bla%5D+AND+%22last+2+Years%22+%5Bedat%5D+NOT+%28letter%5Bpt%5D+OR+case+reports%5Bpt%5D+OR+editorial%5Bpt%5D+OR+comment%5Bpt%5D%29+AND+free+full+text%5Bsb%5D+>]

# Reference Desk

- Endocrine System [<https://kidshealth.org/en/parents/endocrine.html>] (Nemours Foundation)  
Also in Spanish [<https://kidshealth.org/es/parents/endocrine.html>]

# Find an Expert

- Endocrine Society [<https://www.endocrine.org/>]
- Eunice Kennedy Shriver National Institute of Child Health and Human Development [<https://www.nichd.nih.gov/>]   
Also in Spanish [<https://espanol.nichd.nih.gov/>]
- National Institute of Diabetes and Digestive and Kidney Diseases [<https://www.niddk.nih.gov>] 

## Children

- Adrenal Insufficiency (For Parents) [<https://kidshealth.org/en/parents/adrenal-insufficiency.html>] (Nemours Foundation)  
Also in Spanish [<https://kidshealth.org/es/parents/adrenal-insufficiency.html>]
- Blood Test: 17-Hydroxyprogesterone (For Parents) [<https://kidshealth.org/en/parents/test-hydroxyprogesterone.html>]  
(Nemours Foundation)  
Also in Spanish [<https://kidshealth.org/es/parents/test-hydroxyprogesterone.html>]
- Congenital Adrenal Hyperplasia (For Parents) [<https://kidshealth.org/en/parents/congenital-adrenal-hyperplasia.html>]  
(Nemours Foundation)  
Also in Spanish [<https://kidshealth.org/es/parents/congenital-adrenal-hyperplasia.html>]

## Teenagers

- Endocrine System (For Teens) [<https://kidshealth.org/en/teens/endocrine.html>] (Nemours Foundation)  
Also in Spanish [<https://kidshealth.org/es/teens/endocrine.html>]

## Patient Handouts

- 17-hydroxycorticosteroids urine test [<https://medlineplus.gov/ency/article/003459.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003459.htm>]
- 17-OH progesterone [<https://medlineplus.gov/ency/article/003713.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003713.htm>]
- 24-hour urinary aldosterone excretion rate [<https://medlineplus.gov/ency/article/003621.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003621.htm>]
- ACTH blood test [<https://medlineplus.gov/ency/article/003695.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003695.htm>]
- ACTH stimulation test [<https://medlineplus.gov/ency/article/003696.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003696.htm>]
- Acute adrenal crisis [<https://medlineplus.gov/ency/article/000357.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/000357.htm>]
- Adrenal gland removal [<https://medlineplus.gov/ency/article/007437.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/007437.htm>]
- Adrenal glands [<https://medlineplus.gov/ency/article/002219.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/002219.htm>]
- Aldosterone blood test [<https://medlineplus.gov/ency/article/003704.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003704.htm>]
- Congenital adrenal hyperplasia [<https://medlineplus.gov/ency/article/000411.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/000411.htm>]
- Primary and secondary hyperaldosteronism [<https://medlineplus.gov/ency/article/000330.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/000330.htm>]





## MEDICAL ENCYCLOPEDIA

17-hydroxycorticosteroids urine test [<https://medlineplus.gov/ency/article/003459.htm>]

17-OH progesterone [<https://medlineplus.gov/ency/article/003713.htm>]

24-hour urinary aldosterone excretion rate [<https://medlineplus.gov/ency/article/003621.htm>]

ACTH blood test [<https://medlineplus.gov/ency/article/003695.htm>]

ACTH stimulation test [<https://medlineplus.gov/ency/article/003696.htm>]

Acute adrenal crisis [<https://medlineplus.gov/ency/article/000357.htm>]

Adrenal gland removal [<https://medlineplus.gov/ency/article/007437.htm>]

Adrenal glands [<https://medlineplus.gov/ency/article/002219.htm>]

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

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

Congenital adrenal hyperplasia [<https://medlineplus.gov/ency/article/000411.htm>]

Cortisol blood test [<https://medlineplus.gov/ency/article/003693.htm>]

Cortisol urine test [<https://medlineplus.gov/ency/article/003703.htm>]

DHEA-sulfate test [<https://medlineplus.gov/ency/article/003717.htm>]

Ovarian overproduction of androgens [<https://medlineplus.gov/ency/article/001165.htm>]

Potassium urine test [<https://medlineplus.gov/ency/article/003600.htm>]

Primary and secondary hyperaldosteronism [<https://medlineplus.gov/ency/article/000330.htm>]

Waterhouse-Friderichsen syndrome [<https://medlineplus.gov/ency/article/000609.htm>]

## Related Health Topics

Addison Disease [<https://medlineplus.gov/addisondisease.html>]

Adrenal Gland Cancer [<https://medlineplus.gov/adrenalglandcancer.html>]

Cushing's Syndrome [<https://medlineplus.gov/cushingssyndrome.html>]

Pheochromocytoma [<https://medlineplus.gov/pheochromocytoma.html>]

The primary NIH organization for research on *Adrenal Gland Disorders* is the National Institute of Diabetes and Digestive and Kidney Diseases [<https://www.niddk.nih.gov>]

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