



[Home](#) → [Health Topics](#) → Neuroblastoma

URL of this page: <https://medlineplus.gov/neuroblastoma.html>

# Neuroblastoma

## What is neuroblastoma?

Neuroblastoma is a type of cancer that forms in nerve cells called neuroblasts. Neuroblasts are immature nerve tissue. They normally turn into working nerve cells. But in neuroblastoma, they form a tumor.

Neuroblastoma usually begins in the **adrenal glands** [<https://medlineplus.gov/adrenalglanddisorders.html>] . You have two adrenal glands, one on top of each kidney. The adrenal glands make important hormones that help control heart rate, blood pressure, **blood glucose** [<https://medlineplus.gov/bloodglucose.html>] (blood sugar), and the way the body reacts to stress. Neuroblastoma may also begin in the neck, chest or spinal cord.

## What causes neuroblastoma?

Neuroblastoma is caused by changes in your genes

[<https://medlineplus.gov/genetics/understanding/mutationsanddisorders/genemutation/>] . Gene changes also called gene variants or mutations. In most cases, the cause of the mutation is unknown. In some other cases, the mutation is passed from the parent to the child.

## What are the symptoms of neuroblastoma?

Neuroblastoma often begins in **early childhood** [<https://medlineplus.gov/cancerinchildren.html>] . Sometimes it begins before a child is born. The most common symptoms are caused by the tumor pressing on nearby tissues as it grows or by cancer spreading to the bone. They include:

- A lump in the abdomen, neck, or chest
- Bulging eyes
- Dark circles around the eyes
- Bone pain
- Swollen stomach and trouble breathing [<https://medlineplus.gov/breathingproblems.html>] in babies
- Painless, bluish lumps under the skin in babies
- Weakness or paralysis [<https://medlineplus.gov/paralysis.html>] (loss of ability to move a body part)

## How is neuroblastoma diagnosed?

To diagnose neuroblastoma, your child's health care provider will do various tests and procedures, which may include:

- A medical history.
- A neurological exam [<https://medlineplus.gov/lab-tests/neurological-exam>] .
- Imaging test [<https://medlineplus.gov/diagnosticimaging.html>] s, such as x-rays [<https://medlineplus.gov/xrays.html>] , a CT scan [<https://medlineplus.gov/ctscans.html>] , an ultrasound [<https://medlineplus.gov/lab-tests/sonogram/>] , an MRI [<https://medlineplus.gov/mriscans.html>] , or an MIBG scan. In an MIBG scan, a small amount of a radioactive substance is injected into a vein. It travels through the bloodstream and attaches itself to any neuroblastoma cells. A scanner detects the cells.
- Blood and urine tests.

- Biopsy [<https://medlineplus.gov/biopsy.html>] , in which a sample of tissue is removed and examined under a microscope.
- Bone marrow aspiration and biopsy, in which bone marrow, blood, and a small piece of bone are removed for testing.

## What are the treatments for neuroblastoma?

The treatments for neuroblastoma include:



- Observation, also called watchful waiting, is where the health care provider does not give any treatments until your child's signs or symptoms appear or change.
- Surgery
- Radiation therapy [<https://medlineplus.gov/radiationtherapy.html>] .
- Chemotherapy [<https://medlineplus.gov/cancerchemotherapy.html>] .
- High-dose chemotherapy and radiation therapy with stem cell rescue. Your child will get high doses of chemotherapy and radiation. This kills the cancer cells, but it also kills healthy cells. So your child will get a **stem cell transplant** [<https://medlineplus.gov/stemcells.html>] , usually of his or her own cells collected earlier. This helps to replace the healthy cells that were lost.
- Iodine 131-MIBG therapy, a treatment with radioactive iodine. The radioactive iodine collects in neuroblastoma cells and kills them with the radiation that is given off.
- Targeted therapy, which uses drugs or other substances that attack specific cancer cells with less harm to normal cells.

*NIH: National Cancer Institute*



## Start Here

- Neuroblastoma [<https://www.cancer.org/cancer/types/neuroblastoma.html>] (American Cancer Society)

## Diagnosis and Tests

- Catecholamine Tests [<https://medlineplus.gov/lab-tests/catecholamine-tests/>]  (National Library of Medicine)  
Also in Spanish [<https://medlineplus.gov/spanish/pruebas-de-laboratorio/pruebas-de-catecolaminas/>]
- Neuroblastoma in Children: Just Diagnosed [<https://curesearch.org/Neuroblastoma-Just-Diagnosed>]  
(CureSearch for Children's Cancer)
- Neuroblastoma Screening [[https://www.cancer.gov/types/neuroblastoma/patient/neuroblastoma-screening-pdq#\\_19](https://www.cancer.gov/types/neuroblastoma/patient/neuroblastoma-screening-pdq#_19)]  
 (National Cancer Institute)  
Also in Spanish [<https://www.cancer.gov/espanol/tipos/neuroblastoma/paciente/deteccion-neuroblastoma-pdq>]
- Tests for Neuroblastoma [<https://www.cancer.org/cancer/types/neuroblastoma/detection-diagnosis-staging/how-diagnosed.html>] (American Cancer Society)

## Treatments and Therapies

- Drugs Approved for Neuroblastoma [<https://www.cancer.gov/about-cancer/treatment/drugs/neuroblastoma>]  
 (National Cancer Institute)
- Neuroblastoma Treatment [<https://www.cancer.gov/types/neuroblastoma/patient/neuroblastoma-treatment-pdq>]  
 (National Cancer Institute)  
Also in Spanish [<https://www.cancer.gov/espanol/tipos/neuroblastoma/paciente/tratamiento-neuroblastoma-pdq>]


## Genetics

- Neuroblastoma: MedlinePlus Genetics [<https://medlineplus.gov/genetics/condition/neuroblastoma>]  
 (National Library of Medicine)

## Statistics and Research

- Key Statistics for Neuroblastoma [<https://www.cancer.org/cancer/types/neuroblastoma/key-statistics.html>]  
(American Cancer Society)

## Clinical Trials


- ClinicalTrials.gov: Neuroblastoma [<https://clinicaltrials.gov/search?cond=%22Neuroblastoma%22&aggFilters=status:not%20rec>]  (National Institutes of Health)

## Journal Articles


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

- Article: Sensitive detection of minimal residual disease and immunotherapy targets by multi-modal... [<https://www.ncbi.nlm.nih.gov/pubmed/40753395>]
- Article: Epigenome and three-dimensional genome architecture remodeling during NDM29-mediated retro-transformation of neuroblastoma... [<https://www.ncbi.nlm.nih.gov/pubmed/40743051>]
- Article: Prognostic factors of neuroblastoma in limited-resource settings. [<https://www.ncbi.nlm.nih.gov/pubmed/40736099>]
- Neuroblastoma -- see more articles [<https://pubmed.ncbi.nlm.nih.gov/?term=%22Neuroblastoma%22%5Bmajr%3Anoexp%5D+AND+humans%5Bmh%5D+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1+Year%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

- Dictionary of Cancer Terms [<https://www.cancer.gov/publications/dictionaries/cancer-terms>]  (National Cancer Institute)  
Also in Spanish [<https://www.cancer.gov/espanol/publicaciones/diccionarios/diccionario-cancer/>]

## Find an Expert

- American Cancer Society [<https://www.cancer.org/>]
- Choosing a Cancer Doctor [<https://www.cancer.org/cancer/managing-cancer/finding-care/where-to-find-cancer-care/choosing-a-cancer-doctor.html>] (American Cancer Society)  
Also in Spanish [<https://www.cancer.org/es/cancer/como-sobrellevar-el-cancer/encontrar-tratamiento/como-elegir-un-medico-y-un-hospital/como-seleccionar-a-un-medico.html>]
- National Cancer Institute [<https://www.cancer.gov/>]   
Also in Spanish [<https://www.cancer.gov/espanol/>]

## Children

- Childhood Esthesioneuroblastoma Treatment [<https://www.cancer.gov/types/head-and-neck/patient/child/esthesioneuroblastoma-treatment-pdq>]  (National Cancer Institute)  
Also in Spanish [<https://www.cancer.gov/espanol/tipos/cabeza-cuello/paciente/infantil/tratamiento-estesioneuroblastoma-pdq>]
- MIBG Treatment for Neuroblastoma (For Parents) [<https://kidshealth.org/en/parents/mibg.html>] (Nemours Foundation)  
Also in Spanish [<https://kidshealth.org/es/parents/mibg.html>]
- Neuroblastoma (For Parents) [<https://kidshealth.org/en/parents/neuroblastoma.html>] (Nemours Foundation)

## Patient Handouts

- After chemotherapy - discharge [<https://medlineplus.gov/ency/patientinstructions/000012.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/patientinstructions/000012.htm>]
- Catecholamines - urine [<https://medlineplus.gov/ency/article/003613.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003613.htm>]
- MIBG scintiscan [<https://medlineplus.gov/ency/article/003830.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/003830.htm>]
- Neuroblastoma [<https://medlineplus.gov/ency/article/001408.htm>] (Medical Encyclopedia)  
Also in Spanish [<https://medlineplus.gov/spanish/ency/article/001408.htm>]



## MEDICAL ENCYCLOPEDIA

After chemotherapy - discharge [<https://medlineplus.gov/ency/patientinstructions/000012.htm>]

Catecholamine blood test [<https://medlineplus.gov/ency/article/003561.htm>]

Catecholamines - urine [<https://medlineplus.gov/ency/article/003613.htm>]

Ganglioneuroblastoma [<https://medlineplus.gov/ency/article/001436.htm>]

MIBG scintiscan [<https://medlineplus.gov/ency/article/003830.htm>]

Neuroblastoma [<https://medlineplus.gov/ency/article/001408.htm>]

## Related Health Topics

Cancer in Children [<https://medlineplus.gov/cancerinchildren.html>]

## National Institutes of Health

The primary NIH organization for research on *Neuroblastoma* is the National Cancer Institute [<http://www.cancer.gov/>]

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