

# Cancer Association of South Africa (CANSA)



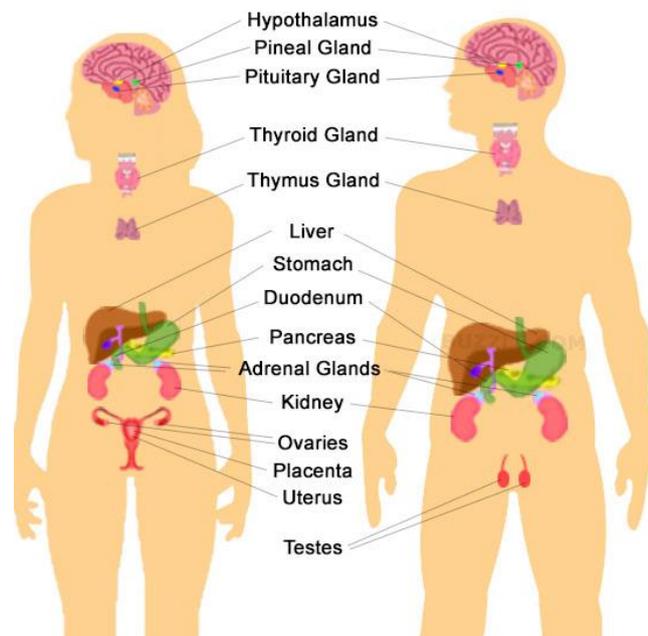
## Fact Sheet on Pituitary Gland Cancer

### Introduction

The endocrine system is a network of endocrine glands and nerves throughout the body. Endocrine glands produce and release hormones, which circulate around the body in the blood. Hormones keep an even balance of chemicals and fluid within the body and help the body respond to changes in the environment. Normally, the hormones released by endocrine glands are carefully balanced to meet the body's needs. There are many more organs in the body capable of secreting hormones than is popularly believed.

Endocrine organs (those capable of secreting hormones) include:

- Hypothalamus
- Pineal body
- Pituitary gland (anterior lobe)
- Pituitary gland (posterior lobe)
- Thyroid
- Alimentary system
  - Stomach
  - Duodenum
  - Liver
  - Pancreas
- Kidney
- Adrenal cortex
- Adrenal medulla
- Reproductive system
  - Testes
  - Ovaries
  - Placenta (during pregnancy)
  - Uterus (during pregnancy)
- Parathyroid
- Skin



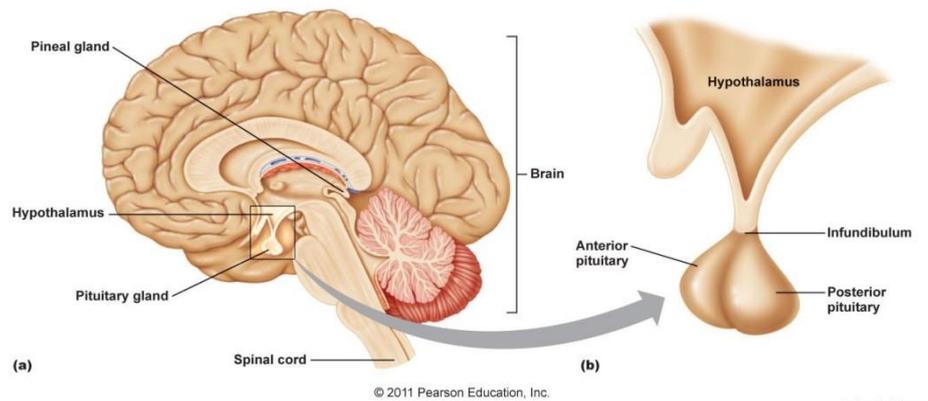
[Picture Credit: Major Endocrine Organs]

## Pituitary Gland Cancer

When normal cells change and grow uncontrollably, they can form a mass called a tumour. A pituitary gland tumour can be benign (noncancerous and located only in the pituitary gland) or malignant (cancerous, meaning it can spread to other parts of the body). Most often, pituitary gland tumours are noncancerous growths and are called pituitary adenomas. However, a pituitary gland tumour can occasionally act like a cancerous tumour by growing into nearby tissue and structures, or rarely, spreading to other parts of the body.

[Picture Credit: Pituitary Gland]

Pituitary gland tumours are NOT brain tumours, as the pituitary gland is located under the brain and is separate from the brain. However, a tumour in this gland can be very serious because a pituitary gland that does not work can cause problems with other organs. The tumour can also press on nearby structures, such as the optic nerves, limiting a person's sight.



**Mete, O. & Lopes, M.B. 2017.**

“This review focuses on discussing the main changes on the upcoming fourth edition of the WHO Classification of Tumors of the Pituitary Gland emphasizing histopathological and molecular genetics aspects of pituitary neuroendocrine (i.e., pituitary adenomas) and some of the non-neuroendocrine tumors involving the pituitary gland. Instead of a formal review, we introduced the highlights of the new WHO classification by answering select questions relevant to practising pathologists. The revised classification of pituitary adenomas, in addition to hormone immunohistochemistry, recognizes the role of other immunohistochemical markers including but not limited to pituitary transcription factors. Recognizing this novel approach, the fourth edition of the WHO classification has abandoned the concept of "a hormone-producing pituitary adenoma" and adopted a pituitary adenohypophyseal cell lineage designation of the adenomas with subsequent categorization of histological variants according to hormone content and specific histological and immunohistochemical features. This new classification does not require a routine ultrastructural examination of these tumors. The new definition of the Null cell adenoma requires the demonstration of immunonegativity for pituitary transcription factors and adenohypophyseal hormones. Moreover, the term of atypical pituitary adenoma is no longer recommended. In addition to the accurate tumor subtyping, assessment of the tumor proliferative potential by mitotic count and Ki-67 index, and other clinical parameters such as tumor invasion, is strongly recommended in individual cases for consideration of clinically aggressive adenomas. This classification also recognizes some subtypes of pituitary neuroendocrine tumors as "high-risk pituitary adenomas" due to the clinical aggressive behavior; these include the sparsely granulated somatotroph adenoma, the lactotroph adenoma in men, the Crooke's cell adenoma, the silent corticotroph adenoma, and the newly introduced plurihormonal Pit-1-positive adenoma (previously known as silent subtype

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III pituitary adenoma). An additional novel aspect of the new WHO classification was also the definition of the spectrum of thyroid transcription factor-1 expressing pituitary tumors of the posterior lobe as representing a morphological spectrum of a single nosological entity. These tumors include the pituicytoma, the spindle cell oncocytoma, the granular cell tumor of the neurohypophysis, and the sellar ependymoma.”

**De Sousa, S.M.C. & McCormack, A.I. 2018.**

“Aggressive pituitary tumors (APT) refer to pituitary adenomas exhibiting rapid growth, resistance to conventional treatments and/or early/multiple recurrences, with abandonment of the previous term ‘atypical pituitary adenoma’. Pituitary carcinomas (PC) are defined by non-contiguous craniospinal or distant metastasis. Whilst PC is exceedingly rare, comprising only 0.1-0.2% of all pituitary neoplasms, APT may account for up to 15% of all pituitary neoplasms, depending on the definition used. Typically evolving from known pituitary macroadenomas, APT/PC is most commonly diagnosed in the fifth decade of life with corticotroph and lactotroph neoplasms predominating. Diagnosis relies on MRI, hormonal studies and histological assessment including proliferative markers and immunohistochemistry for pituitary hormones and, most recently, transcription factors. Structural and molecular mechanisms have been proposed in the pathogenesis of APT/PC, although there appears to be no contribution from known familial pituitary tumor syndrome genes such as *MEN1*. Treatment is multimodal, ideally delivered by an expert team with a high-volume caseload. Surgical resection may be performed with the aim of either gross total resection or tumor debulking. Radiotherapy may be administered either as fractionated external beam radiation or stereotactic radiosurgery. Standard pituitary medical therapies such as somatostatin analogues have limited efficacy in APT/PC, whereas temozolomide yields a clear survival benefit. Evidence is emerging for the use of peptide receptor radionuclide therapy, tyrosine kinase inhibitors, VEGF inhibitors, and immunotherapy. Avenues for further research in APT/PC include molecular biomarkers, nuclear imaging, establishment of an international register, and routine pituitary tumor biobanking.”

**Incidence of Pituitary Gland Cancer in South Africa**

The National Cancer Registry (2014) does not provide any information on the incidence of pituitary gland cancer. It combines all the endocrine cancers together.

According to the National Cancer Registry (2014) the following number of endocrine cancer cases was histologically diagnosed in South Africa during 2014. The term ‘histologically diagnosed’ means that a biopsy specimen was forwarded to an approved laboratory where a specially qualified pathologist confirmed the diagnosis of cancer:

| Group - Males 2014 | Actual No of Cases | Estimated Lifetime Risk | Percentage of All Cancers |
|--------------------|--------------------|-------------------------|---------------------------|
| All males          | 24                 | 1:12 300                | 0,07%                     |
| Asian males        | 0                  | -                       | -                         |
| Black males        | 14                 | 1:15 371                | 0,13%                     |
| Coloured males     | 4                  | 1:13 558                | 0,10%                     |
| White males        | 6                  | 1:4 96                  | 0,03%                     |

| Group - Females<br>2014 | Actual<br>No of Cases | Estimated<br>Lifetime Risk | Percentage of<br>All Cancers |
|-------------------------|-----------------------|----------------------------|------------------------------|
| All females             | 21                    | 1:14 555                   | 0,06%                        |
| Asian females           | 1                     | 1:11 478                   | 0,08%                        |
| Black females           | 13                    | 1:22 930                   | 0,08%                        |
| Coloured females        | 2                     | 1:16 352                   | 0,05%                        |
| White females           | 5                     | 1:5 450                    | 0,003%                       |

The frequency of histologically diagnosed cases of endocrine cancer in South Africa for 2014 was as follows (National Cancer Registry, 2014):

| Group - Males<br>2014 | 0 – 19<br>Years | 20 – 29<br>Years | 30 – 39<br>Years | 40 – 49<br>Years | 50 – 59<br>Years | 60 – 69<br>Years | 70 – 79<br>Years | 80+<br>Years |
|-----------------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------|
| All males             | 9               | 1                | 1                | 5                | 2                | 4                | 2                | 0            |
| Asian males           | 0               | 0                | 0                | 0                | 0                | 0                | 0                | 0            |
| Black males           | 6               | 0                | 0                | 4                | 0                | 3                | 1                | 0            |
| Coloured males        | 1               | 1                | 1                | 0                | 0                | 0                | 1                | 0            |
| White males           | 2               | 0                | 0                | 1                | 2                | 1                | 0                | 0            |

| Group - Females<br>2014 | 0 – 19<br>Years | 20 – 29<br>Years | 30 – 39<br>Years | 40 – 49<br>Years | 50 – 59<br>Years | 60 – 69<br>Years | 70 – 79<br>Years | 80+<br>Years |
|-------------------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------|
| All females             | 8               | 2                | 2                | 3                | 3                | 2                | 1                | 0            |
| Asian females           | 0               | 0                | 1                | 0                | 0                | 0                | 0                | 0            |
| Black females           | 7               | 1                | 1                | 2                | 1                | 1                | 0                | 0            |
| Coloured females        | 0               | 1                | 0                | 0                | 1                | 0                | 1                | 0            |
| White females           | 1               | 0                | 0                | 1                | 1                | 1                | 1                | 0            |

N.B. In the event that the totals in any of the above tables do not tally, this may be the result of uncertainties as to the age, race or sex of the individual. The totals for 'all males' and 'all females', however, always reflect the correct totals.

### Signs and Symptoms of Pituitary Gland Cancer

A Pituitary Gland tumour can cause the pituitary gland to produce too much or too few hormones, which can cause problems in one's body. Large pituitary tumours - those measuring about 1cm - are known as macroadenomas. Smaller tumours are called microadenomas. Macroadenomas can put pressure on the rest of the pituitary gland and nearby structures.

Signs and symptoms of pressure from a pituitary tumour may include:

- Headache
- Vision loss, particularly loss of peripheral vision
- Nausea and vomiting
- Symptoms of pituitary hormone deficiency
- Weakness
- Less frequent or no menstrual periods
- Body hair loss
- Sexual dysfunction
- Increased frequency and amount of urination
- Unintended weight loss or gain

### Symptoms related to hormone level changes

Some Pituitary Gland tumours, called functioning tumours, also produce hormones, generally causing an overproduction of hormones. Different types of functioning tumours can develop in the pituitary gland, each causing specific signs and symptoms and sometimes a combination of them.

### Adrenocorticotrophic hormone-secreting (ACTH) tumours

ACTH tumours produce the hormone adrenocorticotropin, which stimulates the adrenal glands to make the hormone cortisol. Cushing's syndrome results from the adrenal glands producing too much cortisol.

Signs and symptoms of Cushing's syndrome may include:

[Picture Credit: Cushing's]

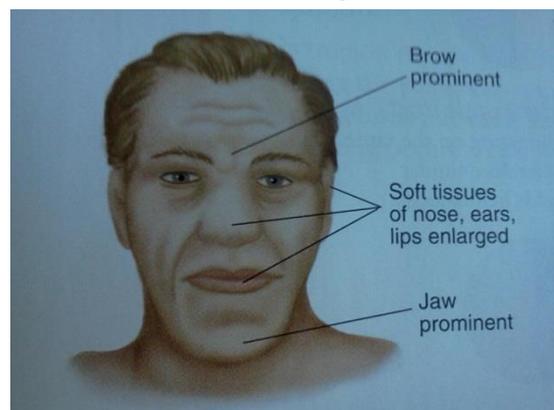
- Fat accumulation around the midsection and upper back
- Exaggerated roundness of face
- A characteristic hump on the upper part of the back
- High blood pressure
- High blood sugar
- Muscle weakness
- Bruising
- Stretch marks
- Thinning of your skin
- Anxiety, irritability or depression



### Growth hormone-secreting tumours

These tumours produce excess growth hormone. The effects from excess growth hormone (acromegaly) may include:

- Coarsened facial features
- Enlarged hands and feet
- Excess sweating
- High blood sugar
- Heart problems
- Joint pain
- Misaligned teeth
- Increased growth of body hair



[Picture Credit: Acromegaly]

Accelerated and excessive linear growth may occur in children and adolescents.

### Prolactin-secreting tumours

Overproduction of prolactin from a pituitary tumour (prolactinoma) can cause a decrease in normal levels of sex hormones — oestrogen in women and testosterone in men. Excessive prolactin in the blood can affect men and women differently.

In women, prolactinoma may cause:

- Irregular menstrual periods
- Lack of menstrual periods
- Milky discharge from the breasts

In men, a prolactin-producing tumour may cause male hypogonadism. Signs and symptoms may include:

- Erectile dysfunction (ED)
- Infertility
- Loss of sex drive

### Thyroid-stimulating hormone-secreting tumours

When a pituitary tumour overproduces thyroid-stimulating hormone, your thyroid gland makes too much of the hormone thyroxine. This is a rare cause of hyperthyroidism or overactive thyroid disease. Hyperthyroidism can accelerate your body's metabolism, causing:

- Sudden weight loss
- Rapid or irregular heartbeat
- Nervousness or irritability
- Frequent bowel movements
- Feeling warm or hot

### **Staging of Pituitary Gland Cancer**

Staging is a way of describing where a tumour is located, if or where it has spread, as well as whether it is affecting the functions of other organs in the body. Doctors use diagnostic tests to determine the tumour's stage, so staging may not be complete until all of the tests are finished. Knowing the stage helps the doctor to decide what kind of treatment is best and can help predict a patient's prognosis (chance of recovery). There are different stage descriptions for different types of tumours.

### **Diagnosis of Pituitary Gland Cancer**

Pituitary tumours are usually found when a person goes to the doctor because of symptoms they are having. If there is a reason to suspect that a person might have a pituitary tumour, the doctor will use one or more tests to find out. Signs and symptoms might suggest that the person could have a pituitary tumour, but tests are needed to confirm the diagnosis.

The symptoms and physical examination results may lead the doctor to believe that a patient might have a pituitary tumour. If the doctor suspects a hormone-producing tumour, hormone levels in the blood and/or urine will be measured.

### Imaging tests

Imaging tests use x-rays, magnetic fields, or other means to create pictures of the inside of your body. They may be done to look for pituitary tumours or to see if they have grown into nearby structures. In some cases, an imaging test of the head done for another reason may detect a pituitary tumour.

Magnetic Resonance Imaging (MRI) scan - MRI scans use radio waves and strong magnets to create detailed pictures of the inside of the body. The energy from the radio waves is absorbed and then released in a pattern formed by the type of tissue and by certain diseases. A computer translates the pattern into a very detailed image of parts of the body. A contrast material called *gadolinium* is sometimes injected into a vein to improve the quality of the image.

MRI scans are very helpful in looking at the brain and spinal cord and are considered to be the best way to identify pituitary tumours of all types. The images they provide are usually more detailed than those from CT scans (see below). MRI can show macroadenomas of the pituitary gland, as well as most microadenomas. But MRI may not be able to detect microadenomas that are smaller than 3 mm (about 1/8 inch) across. Sometimes the MRI scan will show a small abnormality in the pituitary that has nothing to do with the patient's symptoms. Between 5% and 25% of healthy people have some minor abnormality of the pituitary gland that shows up on an MRI scan.

Computed tomography (CT) scan - the CT scan is an x-ray test that creates detailed cross-sectional images of part of the body. Instead of taking one picture, like a standard x-ray, a CT scanner takes many pictures as the camera rotates around the patient while he/she lies on a table. A computer then combines these pictures into an image of a slice of the body. Unlike a regular x-ray, a CT scan creates detailed images of the soft tissues in the body.

CT scans can find a pituitary adenoma if it is large enough, but MRI scans are used much more often to look at the brain and pituitary gland.

Tests of pituitary tissue samples - in diagnosing tumours of most parts of the body, imaging tests and blood tests may strongly suggest a particular type of tumour, but a *biopsy* (taking a sample of the tumour to examine under the microscope) is usually the only way to be certain of that diagnosis. In many situations, doctors will not treat the tumour until a biopsy has been done.

A pituitary tumour is an exception to this general rule in that a biopsy is not usually needed before treatment. One reason is that the hormone tests for some types of adenomas are very accurate, so a biopsy is not likely to provide much more information. Biopsies in this part of the body can also pose a very small risk of serious side effects. On top of this, some types of adenomas can be treated without surgery, using medicines or radiation therapy.

## **Treatment of Pituitary Gland Cancer**

The prognosis (chance of recovery) depends on the type of tumour and whether the tumour has spread into other areas of the central nervous system (brain and spinal cord) or outside of the central nervous system to other parts of the body.

Treatment options depend on the following:

- The type and size of the tumour
- Whether the tumour is making hormones
- Whether the tumour is causing problems with vision or other symptoms
- Whether the tumour has spread into the brain around the pituitary gland or to other parts of the body
- Whether the tumour has just been diagnosed or has recurred (come back)

Treatment options and recommendations depend on several factors, including the type and stage of the tumour, possible side effects, and the patient's preferences and overall health. Learn more about making treatment decisions.

Active surveillance - active surveillance is an option for some people with a pituitary gland tumour who have no symptoms from the tumour and have hormones that work normally. During active surveillance, the tumour is monitored closely with periodic examinations and tests. Treatment would begin only if the tumour started causing symptoms.

Surgery - surgery is the removal of the tumour and surrounding tissue during an operation. It is the most common treatment for a pituitary gland tumour. Surgery for a pituitary gland tumour is often successful in removing the entire tumour. About 95% of surgeries to remove pituitary gland tumours are done by the transsphenoidal route (through the nasal passage, going along the septum that separates the two nostrils, then through the sphenoid sinus cavity located deep above the back of the throat to the pituitary gland immediately behind it). The rest are done through a craniotomy (an opening in the skull). This can be done using a microscope or an endoscope (a long flexible tube), or both, so the surgeon can see the tumour. Both of these methods are equally safe and effective when done by a skilled surgeon. Talk with your surgeon beforehand to learn about possible side effects based on the type of surgery you will have. Learn more about surgery for a tumour.

Radiation therapy - radiation therapy is the use of high-energy x-rays or other particles to kill tumour cells. A doctor who specializes in giving radiation therapy to treat a tumour is called a radiation oncologist. The most common type of radiation treatment is called external-beam radiation therapy, which is radiation given from a machine outside the body. A radiation therapy regimen (schedule) usually consists of a specific number of treatments given over a set period of time.

For some patients, stereotactic radiation therapy (delivering a high dose of radiation directly to the tumour) is used when any part of the tumour is left after surgery. Not all patients with part of a tumour remaining after surgery need radiation therapy because some noncancerous pituitary gland tumours do not grow back even when some tumour is left behind after surgery. If the entire tumour is removed, then radiation therapy is not needed.

Hormone replacement therapy (HRT) - HRT is often necessary for patients with a pituitary tumour, and this may include replacement of thyroid and adrenal hormones, growth hormone, and/or testosterone in men or estrogen in women.

Drug therapy – certain drugs may be used to treat the problem.

### **About Clinical Trials**

Clinical trials are research studies that involve people. They are conducted under controlled conditions. Only about 10% of all drugs started in human clinical trials become an approved drug.

Clinical trials include:

- Trials to test effectiveness of new treatments
- Trials to test new ways of using current treatments
- Tests new interventions that may lower the risk of developing certain types of cancers
- Tests to find new ways of screening for cancer

The South African National Clinical Trials Register provides the public with updated information on clinical trials on human participants being conducted in South Africa. The Register provides information on the purpose of the clinical trial; who can participate, where the trial is located, and contact details.

For additional information, please visit: [www.sanctr.gov.za/](http://www.sanctr.gov.za/)

### **Medical Disclaimer**

This Fact Sheet is intended to provide general information only and, as such, should not be considered as a substitute for advice, medically or otherwise, covering any specific situation. Users should seek appropriate advice before taking or refraining from taking any action in reliance on any information contained in this Fact Sheet. So far as permissible by law, the Cancer Association of South Africa (CANSA) does not accept any liability to any person (or his/her dependants/estate/heirs) relating to the use of any information contained in this Fact Sheet.

Whilst the Cancer Association of South Africa (CANSA) has taken every precaution in compiling this Fact Sheet, neither it, nor any contributor(s) to this Fact Sheet can be held responsible for any action (or the lack thereof) taken by any person or organisation wherever they shall be based, as a result, direct or otherwise, of information contained in, or accessed through, this Fact Sheet.



### **Sources and References Consulted or Utilised**

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January 2019

**American Cancer Society**

<http://www.cancer.org/cancer/pituitarytumors/detailedguide/pituitary-tumors-diagnosis>  
<http://www.cancer.org/cancer/pituitarytumors/detailedguide/pituitary-tumors-diagnosis>

**Cancer.Net**

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**Cushing's**

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**MacMillan Cancer Support**

<http://www.macmillan.org.uk/Cancerinformation/Cancertypes/Endocrine/Adrenalglands.aspx>

**Major Endocrine Organs**

[https://www.google.co.za/search?q=endocrine+system&source=lnms&tbn=isch&sa=X&ei=q9c2UtvmtJtSrhAex2ICQCw&sqi=2&ved=0CAcQ\\_AUoAQ&biw=1366&bih=614&dpr=1#facrc=\\_&imgdii=\\_&imgrc=5SC7Bq5sKebYrM%3A%3BF72pBXaoZEytX M%3Bhttp%253A%252F%252Fbuzzle.com%252Fimages%252Fdiagrams%252Fhuman-body%252Fendocrine-glands.jpg%3Bhttp%253A%252F%252Fwww.buzzle.com%252Farticles%252Fendocrine-system-facts.html%3B550%3B550](https://www.google.co.za/search?q=endocrine+system&source=lnms&tbn=isch&sa=X&ei=q9c2UtvmtJtSrhAex2ICQCw&sqi=2&ved=0CAcQ_AUoAQ&biw=1366&bih=614&dpr=1#facrc=_&imgdii=_&imgrc=5SC7Bq5sKebYrM%3A%3BF72pBXaoZEytX M%3Bhttp%253A%252F%252Fbuzzle.com%252Fimages%252Fdiagrams%252Fhuman-body%252Fendocrine-glands.jpg%3Bhttp%253A%252F%252Fwww.buzzle.com%252Farticles%252Fendocrine-system-facts.html%3B550%3B550)

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**MedLine Plus**

<http://www.nlm.nih.gov/medlineplus/ency/article/002351.htm>

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**National Cancer Institute**

<http://www.cancer.gov/cancertopics/pdq/treatment/pituitary/Patient/page1>  
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**Pituitary Gland**

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**Wikipedia**

[http://en.wikipedia.org/wiki/Endocrine\\_system](http://en.wikipedia.org/wiki/Endocrine_system)

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