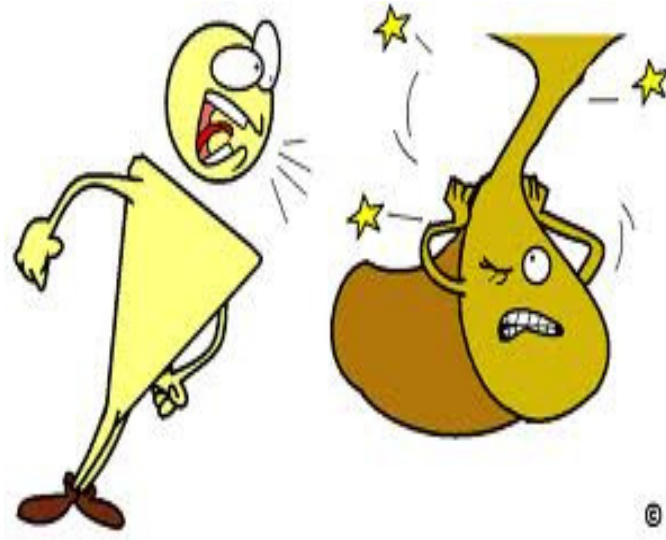


# Vancouver Neuroendocrine Program



UBC Division of  
Endocrinology  
& Metabolism



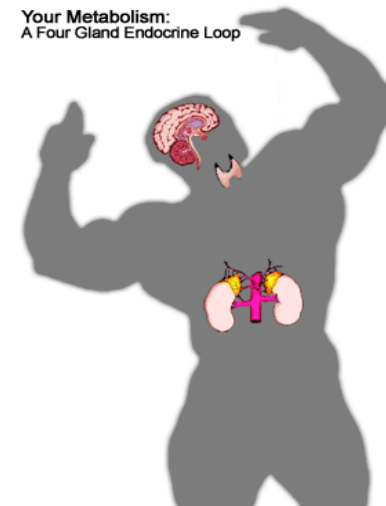
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Your Metabolism:  
A Four Gland Endocrine Loop



Diagnostic Lab Tests:

**Cushing's Disease**

## What is Cushing's Syndrome?

### Adrenal Glands

The adrenal glands, located on top of each kidney, secrete the hormone cortisol. The pituitary gland controls the release of cortisol by making a hormone called ACTH.

Cortisol is needed for the metabolism of sugar and protein, maintaining blood pressure, and it also helps the body recover from infection and stress.

In Cushing's syndrome, the adrenal glands produce too much cortisol. This is often caused by a hormone-secreting tumour in the pituitary. In the pituitary, the tumor produces too much ACTH—the hormone that tells the adrenal glands to make cortisol.

Too much cortisol can also be caused by glucocorticoid medications. Therefore it is important for you to tell your doctor if you are taking any type of glucocorticoid medicines (e.g. steroid inhalers, steroid skin creams, steroid injections, or naturopathic adrenal supplements).

### Pituitary Adenoma

A non-cancerous tumour in the pituitary gland is called a pituitary adenoma. This tumour produces too much ACTH which raises the level of cortisol in the blood. When the excess cortisol is caused by an ACTH secreting

## Contact Us: Neuroendocrine Clinics

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Also ask us for these materials:

- Cushing's disease brochure
- Cushing's disease record book
- Medication guidelines & coverage
- Transsphenoidal Surgery
- Endocrine links & support groups

remain lying flat for about half an hour before you are returned to the ward and gradually allowed to sit up in bed. Following a period of time, if all is satisfactory, you will be allowed to go home.

**Your doctor may order other tests depending on your situation and reaction to treatment.**

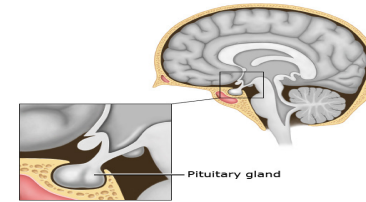
### **Follow-up: Other Tests**

In addition to periodically checking your cortisol levels, sometimes after treatments for Cushing's disease, such as surgery and/or radiation treatment, the body becomes deficient in hormones other than cortisol such as thyroid, prolactin, growth hormone, testosterone or estradiol. These hormones must be monitored regularly.

### **Other Pituitary Function Tests:**

Assesses thyroid (TSH, T4), prolactin, cortisol, testosterone, estradiol, FSH, LH, and glucose levels in the blood.

pituitary adenoma, it is called **Cushing's disease**.



Statistics show that there are about 2-3 new cases of Cushing's disease per million people each year.

### **How is Cushing's disease diagnosed?**

Your health-care provider will determine which of the following test(s) are needed for you.

There are several ways to first determine if your body is making too much cortisol.

#### **1) Urine-free Cortisol Test (UFC)**

The UFC tests only "circulating, free cortisol" levels.

### **24 HOUR URINE COLLECTION**

**Caution: Handle with Care! This bottle may contain a corrosive preservative. (DO NOT DISCARD).**

**DO NOT VOID DIRECTLY INTO THE BOTTLE. Use the plastic cup provided, and then transfer carefully into this bottle.**

**How It Is Done:**

1. Upon rising, empty bladder by urinating into toilet (e.g. 0800 hours). Mark this as the starting time on the container label.
2. After this, collect all urine passed for the next 24 hours in bottle provided. (If collection started at 0800 hours, it would finish the next day at 0800 hours.) Do not spill any urine.
3. Be sure to EMPTY bladder at the end of the collection period and add urine to bottle. Mark this as the finishing time on the label.
4. 24 hour urine must be brought to the laboratory as soon as possible after collection, preferably the day the collection is complete.
5. Keep urine in a cool place.  
[www.bcbio.com](http://www.bcbio.com)

**Special instructions:**

During the 24-hour testing period, don't drink a lot of fluids or use glucocorticoid medicines or products, such as hemorrhoid or skin creams that contain steroids. This test may need to be done

**How It Is Done**

You may have a light breakfast before coming for the test.

It is normal for patients to be admitted to hospital early on the day of the procedure and to go home later in the day if they are well.

The test involves threading a long, tiny plastic tube or catheter up through the veins of the body to measure the blood levels of ACTH directly from the veins that come from the pituitary. This is done through a small needle-stick in the groin area and is generally not painful.

X-rays are taken to make sure that the catheters are being guided to the correct place. Once the catheters are in their final position, this is checked by injecting some x-ray contrast.

A series of blood samples are then taken over a period of 10 minutes. During this time you will also be given an injection of a hormone, called CRH, through one of the catheters.

Once the necessary blood samples have been obtained and any bleeding has stopped, you will be asked to

may be asked to stop taking some medicines (such as birth control pills, aspirin, morphine, methadone, lithium, monoamine oxidase inhibitors [MAOIs], and diuretics) for 24 to 48 hours before your blood is drawn.

### **How It Is Done**

The night before your blood is drawn (usually at 11:00 p.m to midnight), you will swallow a pill containing **8 milligram** (mg) of dexamethasone. The next morning (usually at 8:00 a.m.), a health professional will draw a sample of your blood. Take the pill with milk or an antacid to help prevent an upset stomach or heartburn.

### **Imaging**

Once your doctor has confirmed that the excess cortisol is caused by an ACTH producing pituitary adenoma, the next step will be to perform a MRI of the pituitary. This is to be certain that the cause is an ACTH producing pituitary adenoma. However, you may also require an Inferior Petrosal Sampling Test.

### **Inferior Petrosal Sampling Test:**

This test will confirm that you have an ACTH producing tumour as opposed to an ectopic ACTH producing tumour.

up to 3 times to be certain the results are accurate.

## **2) Overnight Low-Dose Dexamethasone Suppression Test:**

### **How to Prepare**

You will not be able to eat or drink anything for 10 to 12 hours before the morning blood test. Many medicines can change the results of this test. You may be asked to stop taking some medicines (such as birth control pills, aspirin, morphine, methadone, lithium, monoamine oxidase inhibitors [MAOIs], and diuretics) for 24 to 48 hours before your blood is drawn.

### **How It Is Done**

The night before your blood is drawn (usually at 11:00 p.m.), you will swallow a pill containing **1 milligram** (mg) of dexamethasone. The next morning (usually at 8:00 a.m.), a health professional will draw a sample of your blood. Take the pill with milk or an antacid to help prevent an upset stomach or heartburn.

### 3) **2-Day Low Dose Dexamethasone Suppression Test:**

#### **How It Is Done**

You will be asked to take **0.5mg** of dexamethasone **every 6 hours for 2 days** (usually at 12 noon, 6pm, 1200 midnight, and 6am for two consecutive days). Your blood will be drawn for serum cortisol 2 hours after the last dose of dexamethasone at 800am.

### 4) **Late night salivary cortisol test:**

A saliva sample is obtained between 11 PM and midnight on 2 different nights. These are then given to a lab for testing.

#### **Special instructions:**

Don't eat licorice, smoke cigarettes, or chew tobacco on the days when samples are obtained. Avoid situations that create extreme stress or excitement. If bedtime is usually well past midnight, obtain samples at bedtime.

Once it has been determined that your body is making too much cortisol, the next step is additional testing to **diagnose the cause** of the excess cortisol:

#### **1) ACTH Test:**

This blood test measures the amount of ACTH (the hormone in the pituitary that controls the secretion of cortisol) in the body.

If ACTH levels are normal or high, then the excess cortisol may be caused by a tumour in the pituitary or another area of the body (**ectopic source**).

If ACTH levels are low, then the excess cortisol may be caused by a tumour in the adrenal glands.

#### **2) High Dose Overnight Dexamethasone Suppression Test:**

Your doctor may ask you to do this test to help differentiate between Cushing's syndrome caused by an ACTH producing pituitary tumour and an ectopic ACTH producing tumour.

#### **How to Prepare**

You will not be able to eat or drink anything for 10 to 12 hours before the morning blood test. Many medicines can change the results of this test. You