



# Homeostatic Imbalance:

## 1. ADH:

**Hyposecretion** of ADH leads to a condition of excessive urine output called **diabetes insipidus**. People with this problem are continually thirsty and drink huge amounts of water.

## 2. GH:

If untreated, both deficits and excesses of GH may result in structural abnormalities. **Hyposecretion** of GH during childhood leads to **pituitary dwarfism**. Body proportions are fairly normal, but the person as a whole is a living miniature (with a maximum adult height of 4 feet).

**Hypersecretion** during childhood results in **gigantism**. The individual becomes extremely tall; height of 8 to 9 feet is common. Again, body proportions are fairly normal.

If **hypersecretion** occurs **after** long-bone growth has ended, **acromegaly** results. The facial bones, particularly the lower jaw and the bony ridges underlying the eyebrows, enlarge tremendously, as do the feet and hands. Thickening of soft tissues leads to coarse or malformed facial features. Most cases of hypersecretion by endocrine organs (the pituitary and the other endocrine organs) result from tumors of the affected gland. The tumor cells act in much the same way as the normal glandular cells do; that is, they produce the hormones normally made by that gland. Pharmacological doses of GH have been used to reverse some of the effects of aging.

## 3. FSH & LH:

**Hyposecretion** of FSH or LH leads to **sterility** in both males and females.

In general, **hypersecretion** does not appear to cause **any problems**. However, some drugs used to promote fertility stimulate the release of the gonadotropic hormones, and multiple births (indicating multiple ovulations at the same time rather than the usual single ovulation each month) are fairly common after their use.

## 4. Thyroid gland:

**Without iodine, functional thyroid hormones cannot be made**. The source of iodine is our diet, and foods richest in iodine are seafoods. Years ago, many people who lived in the Midwest, in areas with iodine-deficient soil that were far from the seashore (and a supply of fresh seafood), developed **goiters**. So, that region of the country came to be known as the "goiter belt." A goiter is an **enlargement of the thyroid gland** that results when the diet is deficient in iodine. TSH "calls" for thyroxine, and the thyroid gland enlarges, but without iodine the thyroid makes only the peptide part of the molecule, which is non-functional and fails to provide negative feedback to inhibit TSH release. Simple goiter is uncommon in the United States today because most of our salt is iodized, but it is still a problem in some other areas of the world.

## -Thyroxine:

**Hyposecretion** of thyroxine may indicate problems other than iodine deficiency, such as lack of stimulation by TSH. If it occurs in early **childhood**, the result is **cretinism**. Cretinism **results in dwarfism** in which adult body proportions remain childlike. Together the head and trunk are about 1½ times the length of the legs rather than approximately the same length, as in normal adults. Untreated individuals with cretinism are **intellectually impaired**. **Their hair is scanty**, and their **skin is dry**. If the hyposecretion is discovered early, hormone replacement will prevent mental impairment and other signs and symptoms of the deficiency. **Hypothyroidism** occurring in **adults** results in **myxedema**, which is characterized by both **physical** and **mental** sluggishness (however, mental impairment does not occur). Other signs are **puffiness of the face, fatigue, poor muscle tone, low body temperature (the person is always cold), obesity, and dry skin**. Oral thyroxine is prescribed to treat this condition.

**Hyperthyroidism** generally results from a **tumor of the thyroid gland**. Extreme overproduction of thyroxine results in a high basal metabolic rate, intolerance of heat, rapid heartbeat, weight loss, nervous and agitated behavior, and a general inability to relax. **Graves' disease** is one form of **hyperthyroidism**. In addition to the symptoms of hyperthyroidism described earlier, the thyroid gland enlarges and the eyes may bulge, or protrude anteriorly (a condition called exophthalmos). Hyperthyroidism may be treated surgically by removal of part of the thyroid (and/or a tumor if present) or chemically with thyroid-blocking drugs or radioactive iodine, which destroy some of the thyroid cells.

## -Calcitonin:

Few effects of hypo- or hypersecretion of calcitonin are known, and calcitonin production is meager or ceases entirely in adults. This may help to explain (at least in part) the progressive decalcification of bones that accompanies aging.

## 5. Parathyroid Glands:

Before surgeons knew the importance of the tiny parathyroid glands on the backside of the thyroid, they would remove a hyperthyroid patient's thyroid gland entirely. Many times this resulted in death. Once it was revealed that the parathyroids are functionally very different from the thyroid gland, surgeons began to leave at least some parathyroid containing tissue (if at all possible) to take care of blood calcium homeostasis. Severe **hyperparathyroidism** causes **massive bone destruction**—an X-ray examination of the bones shows large punched-out holes in the bony matrix. The bones become very fragile, and spontaneous fractures begin to occur.

## 6. Adrenal cortex:

A generalized **hyposecretion** of all the adrenal cortex hormones leads to **Addison's disease**, characterized by a **peculiar bronze tone of the skin**. Because aldosterone levels are low, sodium and water are lost from the body, which leads to problems with electrolyte and water balance. This, in turn, causes the muscles to become weak and shock is a possibility. Other signs and symptoms of Addison's disease result from deficient levels of glucocorticoids, such as hypoglycemia, a lessened ability to cope with stress (burnout), and suppression of the immune system (and thereby increased susceptibility to infection). A complete lack of glucocorticoids is incompatible with life.

**Hypersecretion** problems may result from an **ACTH-releasing tumor** of the pituitary or from **adrenal cortical tumors**. The resulting condition **depends on the cortical area involved**. Hyperactivity of the **outermost** cortical area results in **hyperaldosteronism**. Excessive water and sodium are retained, leading to high blood pressure and edema. Potassium is lost to such an extent that the activity of the heart and nervous system may be disrupted. When the tumor is in the **middle** cortical area or the client has been receiving pharmacological doses (amounts higher than those released in the body) of glucocorticoids to counteract inflammatory disease, **Cushing's syndrome** occurs. Excessive glucocorticoids result in a swollen "moon face" and the appearance of a "buffalo hump" of fat on the upper back. Other common and undesirable effects include high blood pressure, **hyperglycemia** (steroid diabetes), weakening of the bones (as protein is withdrawn to be converted to glucose), and severe depression of the immune system.

**Hypersecretion** of the **sex** hormones leads to **masculinization**, regardless of sex. In adult males these effects may be masked, but in females the results are often dramatic. A beard develops, and a masculine pattern of body hair distribution occurs, among other effects.

## 7. Adrenal medulla:

Damage to or destruction of the adrenal medulla has no major effects as long as the sympathetic nervous system neurons continue to function normally.

However, **hypersecretion** of **catecholamines** leads to symptoms typical of **excessive sympathetic nervous system activity**—a rapidly beating heart, high blood pressure, and a tendency to perspire and be very irritable. Surgical removal of the catecholamine-secreting cells corrects this condition.

Keep doing guys



you will do it.