

## Difference Between Glucocorticoids and Corticosteroids

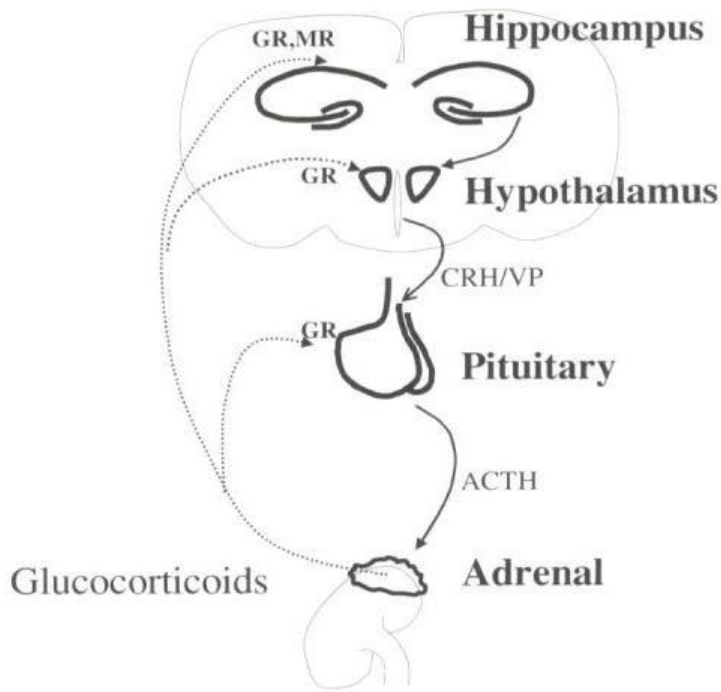
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### Key Difference - Glucocorticoids vs Corticosteroids

The corticosteroids are highly specific class of [steroids hormones](#) that are produced by the adrenal cortex of the [vertebrates](#). Nowadays synthetic analogues for these steroid hormones are profoundly found in the market. There are two main types of corticosteroids namely Glucocorticoids and Mineralcorticoids. These hormones are having range of [physiological](#) functions in the human body. These include [stress](#) response, [immune response](#), regulation of [inflammation](#) process, [carbohydrate metabolism](#), and [protein](#) metabolism, balancing blood [electrolyte](#) levels and regulating behavioral characters. Cortisol (C<sub>21</sub>H<sub>30</sub>O<sub>5</sub>), corticosterone (C<sub>21</sub>H<sub>30</sub>O<sub>4</sub>) and [cortisone](#)(C<sub>21</sub>H<sub>28</sub>O<sub>5</sub>) are some of the naturally occurring glucocorticoids. On the other hand [aldosterone](#) (C<sub>21</sub>H<sub>28</sub>O<sub>5</sub>) is a naturally occurring mineralcorticoid. Though cortisone and aldosterone have same chemical formula they are found to be structurally different. Therefore, the **key difference between glucocorticoids and corticosteroids is glucocorticoids referred to an only one type of corticosteroid. And on the other hand corticosteroids referred to the both glucocorticoids and mineralcorticoids collectively.**

### What are Glucocorticoids?

Glucocorticoids are the class of steroids hormones that are produced from Zona Fasciculata of adrenal cortex of vertebrate. These hormones bind to the glucocorticoid receptor (GR-receptor) in vertebrate animal cells. This specific binding (GR complex) activates anti-inflammatory proteins in the [nucleus](#). And represses the pro anti-inflammatory proteins in the [cytosol](#) by preventing translocation of other transcription factors from the cytosol into the nucleus.



**Figure 01: Glucocorticoids secretion from the Adrenals**

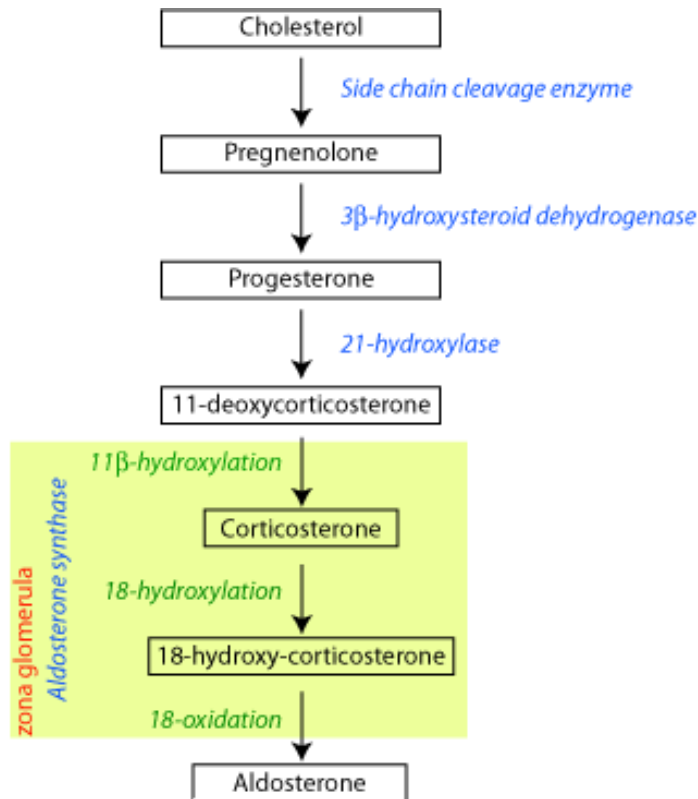
The glucocorticoids are different from mineralocorticoids and sex steroids because of their distinguished receptors, target cells, and physiological function. Cortisol, cortisone, and corticosterone are some of the naturally occurring glucocorticoids. Glucocorticoids are under the tight control of ACTH of the adenohypophysis. Dexamethasone (using in skin diseases, [asthma](#)) and Hydrocortisone (using in adrenal insufficiency and congenital adrenal hyperplasia) are pure derivatives of glucocorticoids.

Glucocorticoids are shown following specific functions,

- These hormones are regulating carbohydrates, fat and protein metabolism.
- They stimulate gluconeogenesis.
- They stimulate anti-inflammatory and anti-allergic effect.
- These hormones are involving in repairing injuries and managing stress response.
- They usually dull pain.

### **What are Corticosteroids?**

Corticosteroids are the class of steroids hormones that are generated from both Zona Fasciculata and Zona glomerulosa of the adrenal cortex. These include glucocorticoids and mineralocorticoids. Glucocorticoids (Cortisol, cortisone, and corticosterone) stimulate and control carbohydrate, fat and protein metabolism. They also have anti-inflammatory, antiproliferative, immunosuppressive and vasoconstrictive effects. Anti-inflammatory effect is mediated by inducing anti-inflammatory mediators.



Legend: enzyme in blue, action performed in green, location in red.

Figure 02: Corticosteroids

The anti-proliferative effect is mediated by the inhibition of DNA synthesis. The immunosuppressive effect is mediated by suppressing delayed hypersensitivity reactions. The vasoconstrictive effect is mediated by inhibiting the inflammatory mediators such as histidine. Mineralocorticoids such as aldosterone control and regulate the electrolytes and water balance of the human body by modulating the ion transport in the epithelial cells of renal tubes of the kidney.

Fludrocortisone (that are used in adrenogenital syndrome and postural hypotension) is a derivative of mineralocorticoids. [Prednisone](#) (that are used in autoimmune diseases and allergic reactions) has both characters of glucocorticoids and mineralocorticoids.

### What are the Similarities Between Glucocorticoid and Corticosteroid?

- Glucocorticoid and corticosteroid are both steroids hormones.
- They are produced by the adrenal cortex of vertebrates.
- Glucocorticoid and corticosteroid are both helpful in repairing injuries and managing stresses.
- Glucocorticoid and corticosteroid are both having typical “Sterane” ring.

## What is the Difference Between Glucocorticoid and Corticosteroid?

Glucocorticoid vs Corticosteroid	
Glucocorticoid is an only one type of corticosteroid that is generated from Zona Fasciculata of adrenal cortex of vertebrate.	Corticosteroid referred to both glucocorticoid and mineralocorticoid that are produced from both Zona Fasciculata and Zona glomerulosa of adrenal cortex of vertebrate.
Physiological Function	
Glucocorticoid regulates carbohydrate, fat, and protein metabolisms.	Corticosteroids control all metabolic processes pertaining to carbohydrate, fat, protein and regulated electrolytes and water balance of human body.
Specific Function	
Glucocorticoids are anti-inflammatory and anti-allergic.	Corticosteroids are anti-inflammatory, anti-proliferative, immunosuppressive and vasoconstrictive.
Synthetic Derivatives	
Dexamethasone, Hydrocortisone are synthetic derivatives of glucocorticoids.	Fludrocortisone is a synthetic derivative of corticosteroids.

### Summary - Glucocorticoids vs Corticosteroids

Glucocorticoids are only one type of corticosteroid. On the other hand, corticosteroids are two types, 1. Glucocorticoid 2. Mineralocorticoid. They are distinguished based on the physiological function. Glucocorticoids regulate carbohydrate, fat and protein metabolism. Corticosteroids apart from regulating metabolism they also control electrolytes and water balance in the human body. Both glucocorticoids and corticosteroids are showing anti-inflammatory responses.

#### Reference:

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2. Coutinho, Agnes E., and Karen E. Chapman. "The anti-Inflammatory and immunosuppressive effects of glucocorticoids, recent developments, and mechanistic insights." Molecular and Cellular Endocrinology, North Holland Publishing, 15 Mar. 2011. [Available here](#)

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APA: Difference Between Glucocorticoids and Corticosteroids.(2017 November 15). Retrieved (date), from <http://differencebetween.com/difference-between-glucocorticoids-and-vs-corticosteroids/>

MLA: "Difference Between Glucocorticoids and Corticosteroids" Difference Between.Com. 15 November 2017. Web.

Chicago: "Difference Between Glucocorticoids and Corticosteroids". Difference Between.Com. <http://differencebetween.com/difference-between-glucocorticoids-and-vs-corticosteroids/> accessed (accessed [date]).



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