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Perspective

The role of corticosteroids and its mechanism

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ABOUT THE STUDY

A class of corticosteroids, which are a class of steroid hormones, includes glucocorticoids (or, less frequently, glucocorticosteroids). Since the glucocorticoid receptor is found in practically all cells of vertebrate animals, glucocorticoids are corticosteroids that bind to it. The term "glucocorticoid" is a portmanteau made up of the words "glucose metabolism regulation," "adrenal cortex production," and "steroidal structure." Glucocorticoids are a component of the immune system's feedback loop, which lowers some elements of immunological activity like inflammation. As a result, they are employed in medical practise to treat conditions including allergies, asthma, autoimmune illnesses, and sepsis that are brought on by an overactive immune system. Glucocorticoids have a wide range of actions, including some that could be dangerous. They are used in high dosages to treat cancer because they also disrupt some of the aberrant pathways found in cancer cells. This involves reducing the negative effects of anticancer medications and inhibiting lymphocyte growth, as in the treatment of lymphomas and leukaemias. By attaching to the glucocorticoid receptor, glucocorticoids have an impact on cells. By preventing the translocation of additional transcription factors from the cytosol into the nucleus, the activated glucocorticoid receptor-glucocorticoid complex regulates the expression of anti-inflammatory proteins in the nucleus and suppresses the expression of proinflammatory proteins in the cytosol.

Due to their distinct receptors, target cells, and actions, glucocorticoids can be separated from mineralocorticoids and sex steroids. Technically, "corticosteroid" refers to both glucocorticoids and mineralocorticoids because they are both hormone mimics made by the adrenal cortex, although it is frequently used as a synonym for "glucocorticoid." While mineralocorticoids are mostly created in the *zona glomerulosa* of the adrenal cortex, glucocorticoids are primarily produced in the *zona fasciculata* of the adrenal cortex.

Mechanism of action

Transactivation: The nuclear receptor known as the cytosolic glucocorticoid receptor, which is activated by ligand binding, is the site of glucocorticoid binding. The newly created complex, which is produced when a hormone attaches to the appropriate receptor, moves into the cell nucleus and binds to glucocorticoid response elements in the promoter region of the target genes, thereby controlling the production of those genes. Transactivation or transcriptional activation are frequent names for this process.

Transrepression: Transrepression, also known as transcriptional repression, is the opposing mechanism. According to the traditional theory of this process, activated glucocorticoid receptor attaches to DNA in the same location as another transcription factor would, blocking the transcription of genes that would otherwise be transcribed to the activity of that factor. Although transrepression can occur, its effects can vary depending on the cell type and circumstances. It is important to note that there is no widely accepted, universal mechanism for transrepression.

Nongenomic effects: The effects of activated glucocorticoid receptor have been experimentally demonstrated to be independent of any impacts on transcription and can only be explained by direct binding of activated glucocorticoid receptor with other proteins or with mRNA. For instance, Src kinase, which binds to inactive glucocorticoid receptor and is released when a glucocorticoid binds to glucocorticoid receptor, phosphorylates a protein that, in turn, displaces an adaptor protein from the epidermal growth factor receptor, reducing its activity, which in turn leads to a decrease in the production of arachidonic acid, a key proinflammatory Glucocorticoids have an anti-inflammatory impact in part due to this mechanism.

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