Epinephrine Encyclopedia Article

Epinephrine

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Epinephrine

Epinephrine is a hormone that is produced by the medulla of the adrenal glands that is an important component in the regulation of the sympathetic branch of the **autonomic nervous system**. Epinephrine is also known as adrenaline in some publications, especially those using British English.

Both norepinephrine (a neurotransmitter) and epinephrine are derived from the amino acid tyrosine.

In general, epinephrine causes and elevation of **blood** pressure, **heart** rate, and oxygen consumption, all important components in the fight or flight response.

Within the **liver**, epinephrine causes the release of stored **glycogen** sugars and results in an elevation in blood glucose. Within intact liver cells, epinephrine stimulates enzyme activity (e.g., the activity of glycogen phosphorylase) that cause the breakdown of liver glycogen to blood glucose. At the **tissue** level, epinephrine also acts to increase the rate of **metabolism** of glycogen.

American physiologist **Earl Sutherland** and others, in a series of experiments conducted in the 1950s, demonstrated *in vitro* (in the laboratory) the effects of epinephrine on liver tissue. Research on epinephrine led to the identification of the biologic role of cyclic AMP (adenylic acid) and adenylate cyclase.

There are specific disorders that can lead to diminished production or deficits of epinephrine (e.g., Addison's disease of the adrenal glands). Other adrenal irregularities and **tumors** may result in the overproduction of epinephrine.

Epinephrine can also be produced synthetically and can be given to patients as a vasoconstrictor to constrict blood vessels and reduce blood loss. Epinephrine is used to counter the effects of anaphylactic **shock** (a severe allergic reaction) during which blood pressure falls to low levels and there is a loss of blood flow to vital **organs**. Epinephrine is also used as a cardiac stimulant.