

The medulla has very close relationship with that portion of the sympathetic nerve system that lies between the fore and hind limb plexus, from which arise the vasomotor and inhibitory nerves of the intestines. Adrenal stimulates unstriated muscle in like manner as do the sympathetic nerves or an electric current. This substance in the blood acts similarly to the sympathetic nerves, and they supplement each other. The amount of adrenalin thrown into the blood is controlled by the sympathetic nerves; and strong emotions, fright, violent effort, cause a marked increase in its output. This has the effect of constricting the vessels and strengthening the heart. It has also been shown to liberate sugar and thus supply a needed nourishment for the muscles that are called upon to perform some extraordinary task. The medullary cells that secrete the adrenalin are of the same origin as the cells of the sympathetic ganglia.

The cortical substance makes up 90 per cent. of the gland. It contains a brownish pigment and a special secretion of a fatty character. The cortex is not controlled by nerves, nor is it derived from the nervous system. It has very close affinities in origin with the ovaries and testes, and has much to do with sex characteristics. It is in this way that the cortex is related to the thyroid and pituitary bodies, and stimulates the growth of the genital organs. The only connection between the supra-renal cortex and the nervous system is revealed by its almost entire absence in the case of an encephalus fœtus.

Complete extirpation of these glands causes a loss of tone in the heart and blood vessels. This loss of tone steadily increases until death results. Stimulation of the sympathetic nerves causes no rise in the blood pressure. This can only be brought about by the administration of adrenalin. In Addison's disease pathological processes destroy both cortex and medulla. There is loss of tone in the cardiovascular system which goes on to a fatal issue. In these cases the administration of adrenalin has not proven of any material advantage. Occasionally there is a slight temporary rise of blood pressure, and some febrile reaction, but no stay in the progress of the disease has resulted from its use. It may be that sufficient has not been given or that its administration lacks the continuous character of the normal gland.

In severe infections and in heart failure the supra-renal glands fail in their function. In such conditions as pneumonia, diphtheria and cardiac dilatation this failure in function becomes a very serious feature in these cases. The usual cardio-vascular stimulants and tonics completely fail here. When the vascular system is deprived of its proper supply of adrenalin the patient is in the gravest danger, and the administration of this substance, as in Addison's disease, appears to be of very