

In addition to chemical stimulation by substances of exogenous origin, the antagonistic autonomic nervous systems are constantly being influenced by substances of endogenous origin originating in the body metabolism. Among the sympathicotropic substances of endocrine origin may be mentioned: (1) epinephrin, (2) iodothyrim, and (3) pituitrin. Many believe that the epinephrin (adrenalin), which is being constantly formed in the medulla of the adrenals and in the chromaffine system generally, is responsible for a continuous excitation (or perhaps sensibilization) of the sympathetic system proper. At any rate, epinephrin produces effects in the body similar to the effects of electrical stimulation of the sympathetic; it is thus a "sympatho-mimetic" substance, in the sense of Barger and Dale. The exact place of action is still in dispute, though the evidence favors the view of Elliott that it is neither in the nerve itself nor in the end-organ, but in a special structure intercalated between the two—in the case of smooth muscle at the "myoneural junction." Less general in their effects, but also, apparently, sympathicotonic in nature, are the substances iodothyrim and pituitrin. Iodothyrim, a hormone originating in the thyroid gland, has an especial effect upon the thoracic and cervical sympathetic, and leads, when present in excess, to tachycardia, widened lid slits, exophthalmos and hypersusceptibility of the pupils to epinephrin. Pituitrin arising in the posterior lobe of the hypophysis, causes vaso-constriction (other than renal), polyuria, and vigorous contraction of the bladder and uterus.

Among the vagotonic drugs of endogenous (or endocrine) origin may be mentioned cholin, which is formed in the cortex of the adrenals. Experiments with cholin show that it possesses an action very similar to pilocarpin. It is certainly interesting that one small organ like the adrenal gland manufactures in its medulla the substance epinephrin (adrenalin) which is sympathicotonic (sympathomimetic) in its effects, and in its cortex another substance, cholin, which is vagatonic (vagomimetic) in its effects. Extracts of the whole adrenal would, therefore, contain two substances which, as far as the two autonomic systems are concerned, tend to neutralize one another.

There are probably other vagotropic hormones formed in the body, but our knowledge of them is as yet very meagre. We know, for example, that the internal secretion of the pancreas antagonizes epinephrin (or the formation of epinephrin), a fact doubtless of importance in connection with the pathology of some forms of diabetes mellitus. Again, in congenital insufficiency of the chromaffine