

3533

Method for Study of Formation of Amino Acids in Animal Organism.

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The rate of growth of young white rats on a diet containing sodium benzoate has been used as an index of the rate of formation of the amino acid, glycine, which is required for the detoxication of benzoic acid, as well as for the synthesis of new tissue proteins. Normal growth occurred on a diet containing 2 per cent sodium benzoate and 12 per cent casein, but the rats failed to grow on diets containing 3 per cent sodium benzoate and 12, 35, or 50 per cent casein. The addition of one equivalent of glycine (1.56 gm.) to the diet containing 12 per cent casein and 3 per cent benzoate resulted in normal growth. In these experiments, 38 gm. of casein did not successfully replace 1.56 gm. of glycine, and it was, therefore, concluded that casein was unable to supply precursors of glycine. This investigation of the formation of amino acids in the animal organism is being continued and extended.

This is a preliminary report.

3534

Sympathetic and Parasympathetic Responses after Intradermal and Intracorneal Injections

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In a recent series of papers Luithlen and Molitor¹ have reported that following an intradermal or intracorneal injection of 0.1 cc. of 0.9 per cent NaCl solution in a cat, the response of the vagus either to an electrical stimulus or to a parasympathetic-stimulating drug (cholzyl) is greatly increased. Both vagus trunks were cut, the electrical stimulus being applied peripherally; the drug was injected intravenously. They report that they were able to get a constant series of control responses to electrical or drug stimulation before the intradermal or intracorneal injection. They find that the

enhancing effect is not obtained when the intradermal injection is made into a denervated area and conclude that it is due to a reflex heightening of vagus sensitivity, the afferent path being afferent fibers stimulated by the injected solution. It is difficult to see how peripheral manifestations of reflexly increased vagus tone can be elicited when both vagus trunks are cut. These workers also report an increased response to adrenalin after intradermal and more especially after intracorneal injection, attributing this to a reflexly increased sympathetic sensitivity. The increase in sympathetic response was less nearly constant than the increase in the parasympathetic response.

Since these results were so surprising it seemed worth while to repeat these experiments. The precautions prescribed by Luithlen and Molitor as essential to success were carefully observed, namely, proper preparation of the site of intradermal injection, maintenance of body temperature, anesthesia, etc. Shielded electrodes were used for nerve stimulation, the source of current being a chloride accumulator. The drug injections were made into a femoral vein, the injection time being 10 seconds. Arecoline was the parasympathetic drug employed, adrenalin the sympathetic. Adrenalin dilutions were made from a 1-1000 Parke-Davis preparation, no dilution more than 12 minutes old being used. A threshold electrical or drug stimulus was established, the criterion for parasympathetic stimulation being a just perceptible fall in blood pressure, that for sympathetic stimulation (by adrenalin) a just perceptible rise. One-fifth to one mgm. of atropin sulphate was given intravenously before the adrenalin injections, to abolish any possible increase of vagus response from the intradermal or intracorneal injection which might mask an increase of sympathetic response. The pressor effect of such small doses of adrenalin is of course followed by a marked depressor effect. No change in blood pressure resulted from the intradermal or intracorneal injections themselves. In a given experiment the interval between successive electrical or drug stimulations was constant, being 3 minutes in some cases, 5 in others.

Satisfactory records were obtained on 13 cats. After the threshold stimulus was established a series of 5 to 10 such stimuli at constant intervals was given, the intradermal or intracorneal injection then made and the series of threshold stimuli continued. Our results may be expressed briefly by the statement that no greater changes in the responses to the stimuli following an intradermal or intracorneal injection were obtained than could occur spontaneously in the control series. Usually a quite constant series of responses to a

series of equal drug and as nearly as possible equal electrical stimuli was obtained. On one occasion, however, an electrical stimulation of the vagus of apparently the same strength as its predecessors evoked a markedly greater response, without any intradermal or intracorneal injections having been made. And on only one occasion did the vagus response to electrical stimulation increase markedly after intradermal injection. In all the other cases the vagus response to electrical stimulation was unaltered by an intradermal or intracorneal injection. In no case was the vagus response to arecoline or the sympathetic response to adrenalin affected by the intradermal or intracorneal injection. We are thus unable to confirm Luithlen and Molitor's findings of an increased sympathetic and parasympathetic response after intradermal or intracorneal injections of 0.1 cc. of 0.9 per cent NaCl solution.

¹ Luithlen, F., and Molitor, H., *Arch. f. Exp. Path. u. Pharm.*, 1925, cviii, 248; 1926, exi, 246; 1926, cxiv, 47.

3535

The Action of Mineral Oil per Os on the Organism.

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Leitch¹ has shown that mineral oils applied repeatedly to the skin of animals induce cancer. It is known that these same oils are responsible for cancers in man. This is well illustrated by the studies of the so-called "mule spinners cancer" and the prevalence of cancers of the skin among the workers of the paraffin mines of Scotland. Several paraffin cancers have also been described in America and in other parts of Europe.¹

Our studies have shown that many animal and vegetable oils^{2, 3} are not absorbed when introduced under the skin of animals, but produce lesions quite identical to those produced by various mineral oils and tar.^{4, 5}

Our analyses of cancer have shown that it is directly the result of the removal of the excess of the ergusia (fat soluble vitamins) from local areas of the tissues.⁶ Such a removal of this lipoid substance or substances leads to a disappearance of the blood vessels, a crowd-