sideration would seem justified. In these series we have made use of white mice, having by preliminary observations determined that a diet made up on the basis of Mendel and Osborne's work, of a combination of glutenin and gliadin, would effectively retard the growth of young white mice. One series of fifty mice inoculated with the tumor obtained through the courtesy of Dr. Rous, of the Rockefeller Institute, gave twenty-three tumors out of twenty-five mice on a normal control diet, but only four out of twenty-five on a vegetable protein diet, of which three tumors later disappeared. In another series of fifty males, all again inoculated with the same tumor, eighteen out of twenty-five on normal diet developed tumors, with three out of twenty-five on a vegetable protein diet; a third series of fifty females gave fifteen tumors out of twenty-five on normal diet with seven out of twenty-five on a vegetable protein diet. Expressed in percentage, 75 per cent. of seventy-five mice developed a tumor under normal conditions; 19 per cent. of seventy-five mice developed a tumor when fed on a vegetable protein diet, and further the tumors in the latter series at thirty days were hardly larger than the tumors in the normal fed mice at ten days.

By referring to the work of Mendel and Osborne it will be seen that it is not a question of starvation in the ordinary sense of the word nor of anemia, but that the most probable conclusion is that the tumor cell is subject to the same laws of growth as is the normal somatic cell.

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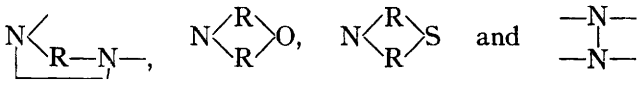
On the inhibitory action of certain anilin dyes upon bacterial development.

By **CHARLES E. SIMON, B.A., M.D.**, assisted by **MARTHA A. WOOD, M.D.**

The triamino triphenyl methanes possess a well-marked inhibitory power over the development of certain pathogenic organisms, notably staphylococci, streptococci, pneumococci and meningococci, besides the anthrax bacillus and actinomyces. This is quite pronounced, even in a dilution of 1 : 100,000. The common pathogenic *bacilli* are not affected by the dyes in question, in this concentration.

The inhibitory effect is referable to the underlying chromophoric group, and the presence of the basic auxochromic groups. If the basicity of the dye is diminished by the replacement of the basic by acid auxochromic groups, or if such groups are introduced in addition to the basic groups, the inhibitory effect is destroyed.

Of the other classes of anilin dyes an inhibitory effect is produced only by those which contain the chromophonic radicles:



and here also, only by those which contain basic auxochromic radicles. Acid dyes possess no inhibitory properties. The most active inhibitory dyes are the triamino triphenyl methanes, while the indamins, the oxazins, the thiazins and azins are on the whole less active in this respect.

The inhibitory effect does not depend upon the color of the dye, as there are violet acid dyes which are non-inhibitory, and red basic dyes which are markedly inhibitory; similarly there are green dyes which are active and others which are inactive in this respect. The essential common factor evidently is the absence of acid and the presence of basic auxochromic groups. Not all representatives of the sensitive groups of organisms are equally influenced by the dyes in question, nor even by a single dye, nor are the different groups affected to the same extent. Certain dyes will inhibit the growth of all the different sensitive groups, while the effect of others is less extensive.

The inhibitory action of the dyes in question is most readily explained on the assumption that the susceptible organisms combine with the dyes by means of corresponding nutriceptors, but are unable to cause the cleavage of the anchored molecules, the death of the organism resulting from interference with its normal nutritional (sc. reproductive) functions. Upon this basis a directly toxic effect on the part of the dye need not be assumed. It is in accord with the validity of this hypothesis that dye-resistant strains of susceptable groups exist in nature as such, or may be produced artificially. This was accomplished in the case of certain hay bacilli, staphylococci and streptococci. Upon this

basis adaptation of this order would be due to the production of receptors different from those found in dye susceptible strains, by which the nutrition (sc. reproduction) of the organism could be carried on, and which either possesses no affinity for the dye in question or through which the organism can bring about its cleavage. A limited number of observations would suggest that in the treatment of certain infections, with staphylococci and streptococci more especially, certain dyes might be used to advantage. In two cases of erysipelas the repeated local application of the concentrated solution of dahlia seemed to restrict the extension of the infection.

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Waxy degeneration of muscle in venom intoxication.

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In connection with the discussion by Beneke[1] and Wells[2] of waxy degeneration of muscle occurring in anaphylactic poisoning, and especially in view of Beneke's reference to the action of " brasilianischen Schlangengift " (*Crotalus terrificus*) the following notes on waxy degeneration in the rabbit following the intravenous injection of the venom of *Crotalus adamanteus* may be of interest.

In the course of three series[3] of experiments on a total of about 45 rabbits it was noted that the intravenous injection of venom was followed in three instances by waxy degeneration so well-marked as to be evident macroscopically. In two of the

[1] Beneke, R., "Ueber den Kernikterus der Neugeborenen," *Münch. med. Wochenschr.*, 1912, LIX, 387; "Ueber Muskelveränderungen bei akuten Vergiftungen mit Klapperschlangengift sowie bei Anaphylaxie," *Münch. med. Woch.*, 1912, LIX, 729; Beneke, R., and Steinschneider, E., "Zur Kenntnis der anaphylaktischen Giftwirkungen," *Centralb. f. allg. Path. u. path. Anat.*, 1912, XXIII, 529.

[2] Wells, H. Gideon, "Anaphylaxie und Wachsartige Degeneration der Muskeln," *Centralb. f. allg. Path. u. path. Anat.*, 1912, XIII, 945.

[3] Pearce, R. M., "An Experimental Study of the Relative Importance of Renal Injury, Vascular Injury and Plethoric Hydremia in the Production of Edema," *Arch. f. Int. Med.*, 1909, III, 422; "An Experimental Glomerular Lesion Caused by Venom (*Crotalus Adamanteus*), *Jour. Exper. Med.*, 1909, XI, 532; "Experimental Studies of the Influence of Crotalus Venom on the Kidney," *Jour. Exper. Med.*, in press.