

3.0 gm. of NaHCO_3 had been introduced. The "curare effect" did not reappear.

At the onset of muscle paralysis the pH and CO_2 capacity begin to fall. The acidosis produced evidently augments the effect of curare but is not, in itself, sufficiently pronounced to produce coma. Introduction of NaHCO_3 not only corrects anoxemia but also possibly neutralizes the curare effect at the myo-neural junction.

All controls died of respiratory paralysis within 20 minutes after receiving curare.

The following table gives the data from one of our experimental animals:

TABLE I. Dog No. 5, weight 7.5 kg.

Time	Amt. Curare given	Amt. NaHCO_3 given	Blood pH	CO_2 Capacity Vol. %	Remarks.
10:40	40.5 mg.		7.39	42.0	Injected intravenously. Muscle paralysis. Dog still breathing.
10:42			7.27	40.2	
10:50			7.27	40.2	
10:51 to 10:53		2.5 gm.			Injected intravenously. Reflexes returned. Complete recovery.
10:55			7.46	47.6	
11:15			7.46	47.6	

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Histolytic Influence of Atrophying Gills During Metamorphosis: Special Reference to Resistance of Fore-limb Integument.

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Helff¹ has shown that the perforations in the opercular integument are the end result of an orderly process of cellular histolysis, due to the histolytic action of the atrophying gills. The present investigation was designed to determine the stage of gill atrophy at which this histolytic influence is most effective.

Homoplastic transplants of gills in various stages of atrophy were made to regions beneath the back skin of metamorphosing *Rana pipiens* tadpoles. The following constitute the main stages

¹ Helff, O. M., *J. Exp. Zool.*, 1926, xlv, 1.

of gill atrophy investigated: (1) a stage showing the earliest macroscopic signs of atrophy; (2) a stage just prior to the release of the fore-limb; (3) a much later stage in which the integuments of the opercular region and the fore-limb had fused, following the release of the latter. Other atrophying gill transplants were made of stages intermediary to these, but the differences in the histolytic action were more clear cut when comparing the transplantation results of the 3 stages mentioned above.

Typical perforations were formed in the skin of the back directly in contact with the gill transplants. Histological sections of integument bounding such perforations showed that histolysis had taken place, identical to normal opercular integumentary histolysis. The stage of greatest histolytic influence of the atrophying gill was determined by the length of time necessary for the transplant to form a uniform sized perforation in the integument. This stage was found to be that just prior to the breaking through of the fore-limb. At this stage the gills are of a reddish hue, quite mushy in consistency, and capable of producing a perforation within 2 days.

The results indicate that the histolytic influence of the atrophying gills is cumulative. It is very weak during the early stages of gill atrophy, but increases proportionately with increasing atrophy and reaches a maximum just prior to the release of the fore-limbs. Following the release of the fore-limbs the histolytic influence of the gills still persists, but gradually subsides as the gills undergo their final stages of atrophy.

During metamorphosis the fore-limbs differentiate very rapidly and occupy a large part of the opercular cavity. They were in contact with the atrophying gills which appear, however, to be ineffective in producing histolysis of the fore-limb integument. Operations were designed to throw light on this apparent resistance of fore-limb integument to histolysis.

In determining the possible specificity of fore-limb integument in this respect, autoplasmic fore-limb integument transplantations were made to regions of the back. Homoplastic gill transplants, in the stage of greatest histolytic influence were then placed beneath the skin grafts. In this manner atrophying gill tissue was brought in contact with the *inner surface* of the fore-limb integument, a condition never attained during the normal development of fore-limb integument in the opercular cavity.

Perforations appeared in the skin grafts in all cases, being preceded by a definite process of thinning corresponding closely to the macroscopic thinning of normal opercular integument. The thinning was first noticeable in the integument directly over the slight

bulge caused by the gill transplantation, and resulted in a loss of coloration, the area assuming a grayish and opalescent shade typical of histolysis. Histological sections later showed that the perforations were the result of a definite and typical cellular histolysis.

Homoplastic gill transplants in stages of greatest histolytic activity were next placed on the epidermal surface of fore-limb integument grafts, which had been previously transplanted to the back. Normal back skin was then grafted over both the gill and fore-limb integument grafts. After a typical perforation had appeared in the back skin graft, the 2 skin grafts were removed and sectioned. It was at once evident that the fore-limb integument showed only slight sign of histolysis as compared with the total disintegration of the back skin where the perforation had formed.

The above results indicate strongly that the failure of the integument of the fore-limbs to histolyze during metamorphosis when in contact with the atrophying gills, is due to the fact that the gills are in contact with the *epidermal surface* of the skin only. It must also be borne in mind that the integument of the fore-limb is undergoing rapid growth and development during metamorphosis and that the heightened metabolism of this tissue would also probably tend to counteract the histolyzing influence of the atrophying gills.

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Influence of Wheat Germ Oil on Fertility of Rats Fed Fat Free Rations.

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In animal studies pertaining to Vitamin E, varying amounts of fat have been used as essential constituents of the ration. Certain of these are known to have a specific influence on the rate of the oxidative changes in fats carrying the vitamins A and E. For example, wheat germ oil, a substance seemingly rich in Vitamin E, has been found to retard the oxidation of cod liver oil, as well as the destruction of Vitamins A and E; whereas lard hastens the destruction of these vitamins.¹ Correlating these findings with the

¹ Mattill, H. A., *J. Am. Med. Assn.*, 1927, lxxxix, 1505. Evans, H. M., and Burr, G. O., *J. Am. Med. Assn.*, 1927, lxxxviii, 1462. Fredreica, L. S., *J. Biol. Chem.*, 1924, lxii, 471.