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.

results of animal experiments,[2] one is led to wonder if wheat germ oil is effective as an antisterility agent because of the presence of a specific vitamin, or because of its retarding influence on the oxidation of Vitamin A, a certain minimum of which is necessary for reproduction.

It seemed possible that this might be determined by comparing the growth and reproductive behavior of animals receiving fat free rations, with animals receiving similar rations to which were added small amounts of wheat germ oil. We therefore have fed 3 groups of rats purified rations in which the Vitamins A and D were supplied by a cod liver oil concentrate (Oscodol*). Vitamin B was furnished by starch free yeast.[3] In one group the ration was supplemented with 3% of wheat oil[4]; in another 12 gm. of lard was substituted for 27 gm. of cornstarch. All rations were made into a paste with distilled water, fresh mixtures being prepared approximately twice a week. Two oscodol tablets, the equivalent of about 5% of the ration in cod liver oil, were added to every 488 calories of food. This, we have reason to believe, furnished a plethora of Vitamin A.[5] Each experimental group, consisting of 2 males and 4 females, was placed on the ration when the animals were about 4 weeks of age.

The growth curves of all the animals were comparable, and were somewhat better than the Donaldson curves for normal rats. There were no symptoms of Xerophthalmia or upper respiratory infection. The data pertaining to the composition of the ration, and the results of the feeding tests are given in the following table.

Only one female in the group receiving the ration containing no fat (Group A) reproduced. This animal which weighed 60 gm. at the beginning of the experiment was about 6 days older than the others. The physiological changes resulting from deprivation of Vitamin E had not occurred at this time. There was no second gestation. In contrast to Group A is Group B, which received a similar ration, but with added wheat germ oil. The reproductive performance of these rats is fairly comparable to that of our stock animals. Within 7 months each female produced 2 litters; one pro-

[2] Nelson, V. E., Jones, R. L., Heller, V. G., Parks, T. B., and Fulmer, E. I., *Am. J. Physiol.*, 1926, lxxvi, 325. Nelson, V. E., Heller, V. G., and Fulmer, E. I., *J. Biol. Chem.*, 1923, lvii, 415. Anderegg, L. T., and Nelson, V. E., *J. Indust. and Engin. Chem.*, 1925, xvii, 451.

* Supplied through the courtesy of H. A. Metz Laboratories.

[3] Furnished by Fleishman Yeast Company.

[4] An extract of wheat germ furnished by Squibb and Company.

[5] Steenbock, H., Jones, J. H., and Hart, E. B., *J. Biol. Chem.*, 1923, lviii, 383. Dubin, H. E., and Funk, C., *J. Metab. Res.*, 1923, iv, 467.

TABLE I. *Influence of Wheat Germ Oil on Fertility.*

Group	Ration	No. of females	Initial wt. av. gm.	Av. No. of pregnancies to 7 mos.	Av. age at birth of young mother	Av. No. of young per female	Viable young %	Remarks
A	Fat free*	4	47.7	0.25	4	1.7	86	Rat which reproduced weighed 60 gm. at beginning of experiment.
B	Fat free + 3% wheat germ oil	4	41.	2.25	3	15.	78	One mother died; cause unknown.
C	Fat free + lard†	4	45.5	1.	3	3.5	7.1‡	Two litters died at birth; another within 24 hours; one mother died.

*The ration consisted of 22 gm. of casein, 100 gm. of cornstarch, 7 gm. of yeast, 8.5 gm. of a salt mixture, 1.5 gm. or iron citrate, and 0.5 cc. of a 2% potassium iodide solution. 2 oscodol tablets were crushed, mixed with water, and added to the mixture.

†12 gm. of lard were substituted for 27 gm. of cornstarch.

‡When 3 weeks old this animal developed convulsions. It was given wheat germ oil by mouth several times a day for a period of one week.

duced 3. The average number of young per litter was 6.4. With the lard and oscodol (Group C) the results were slightly better than with the fat free ration, but in no way comparable to those receiving the wheat germ oil. Each female reproduced once. Two litters

died at birth or were born dead. These were not seen. A third litter died within 24 hours after birth. Reproduction in these would seem to be an example of delayed sterility, for which we have no explanation. Evans and Burr[6] cite similar cases. In this group also there were no second gestations.

The results of the investigation quite definitely indicate that the effectiveness of wheat germ oil as an anti-sterility agent is due to the presence of some substance (Vitamin E) contained therein, and not to any retarding action which this may have on the oxidation of Vitamin A.

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Effect of Changes in Ion Concentration of Blood upon Reflex Time.

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Previous studies[1, 2] on the effect of changes in acid-base equilibrium on the physiological action of strychnine and curare indicated that an increase in hydrogen or hydroxyl ions might affect neural or neuro-muscular factors and thus alter the rate of conduction of the nerve impulse.

Dogs were used as experimental animals. The patellar tendon reflex time of normal unanesthetized dogs varied from .00775 to .0094 seconds with an average of .0082 seconds. The pH of the blood of the normal dogs at the time the records were obtained was about 7.36 and the CO_2 capacity 45 volumes %. With a drop in pH and CO_2 capacity the reflex time was decreased to about .0043 seconds. An increase in pH and CO_2 capacity also brought about a decrease in reflex time. The average reflex time following alkali administration was .0057 seconds. One dog included here showed an insignificant increase of .0006 seconds in reflex conduction rate at pH 7.53 and CO_2 capacity 72.97 volumes %.

The records obtained show clearly that the reflex time of dogs is markedly reduced, following acid, and to a less degree, following alkali administration.

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[6] Evans, H. M., and Burr, G. O., loc. cit.

[1] Wenner, W. F., and Blanchard, E. W., PROC. SOC. EXP. BIOL. AND MED., 1928, XXV, 726.

[2] Wenner, W. F., and Blanchard, E. W., *Ibid.*, 1928, xxvi, (preceding abstract).