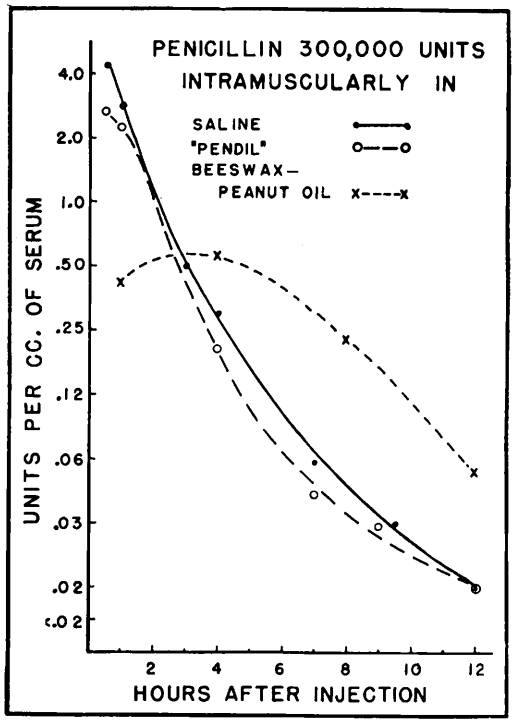

FIG. 2.
Serum penicillin concentrations after intramuscular injections of 300,000 units of penicillin in 3 vehicles.

or striking difference between the results obtained in the same subject after the same dose given in the 2 vehicles.

In Fig. 2 are shown the mean concentrations obtained over a 12-hour period after intramuscular injections of 300,000 units of penicillin given in saline, in Pendil, and in 4.8% beeswax in peanut oil (Delacillin, Squibb), the latter being contained in a volume of 1 cc. Each curve is based upon the results obtained in 6 subjects. It is seen that the maximum concentration obtained with the beeswax-peanut oil mixture was appreciably lower, but the levels were much better sustained than with the same dose in saline or in Pendil.

Conclusions. When tested in the same subject, the serum concentrations obtained after a single injection of penicillin in a water-in-oil emulsion were not superior to those obtained with the same dose given in the same volume of saline, and the levels were not better sustained. A dose of 300,000 units in 1 cc of 4.8% beeswax in peanut oil gave lower maximum concentrations, but the serum levels were better sustained over a 12-hour period.

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Suppression of Circulating Antibodies in Pyridoxin Deficiency.

HERBERT C. STOERK AND HERMAN N. EISEN.
From the Department of Pathology, College of Physicians and Surgeons, Columbia University, New York City.

There has recently accumulated evidence to indicate that there may be an important relationship between lymphocytes and antibodies.[1,2,3] Data suggesting that pyridoxin may be a factor essential for the maintenance of lymphoid tissue have been reported previously.[4,5,6] It therefore seemed of interest to study the effect of pyridoxin deficiency on circulating antibodies.

Methods. Twenty-four male albino rats of the Sherman strain, close to 4 weeks of age, were divided into 3 groups of litter mates.

The animals in the first group were weaned

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[3] Daugherty, T. F., Chase, J. H., and White, A., PROC. SOC. EXP. BIOL. AND MED., 1945, **58**, 135.

[4] Stoerk, H. C., and Zucker, T. F., PROC. SOC. EXP. BIOL. AND MED., 1944, **56**, 151.

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TABLE I.
Effect of Pyridoxin Deficiency upon Serum Antibodies.

Group	Experiment	No. of rats	Average Initial body wt, g	Average Final body wt, g	Average Thymus wt, g	Agglutinin titers Avg	Agglutinin titers Range	Hemolysin titers Avg	Hemolysin titers Range
I	Pyridoxin deficient	9	47	83	.047	1:0.4	0-1:4	1:13	0-1:80
II	Paired weighed	7	46	78	.182	1:64	1:32-1:128	1:412	1:160-1:640
III	Control	8	45	160	.395	1:36	1:10-1:80	1:68	1:20-1:160

on a diet deficient in pyridoxin but otherwise adequate.[4] Daily weights were recorded in these animals. Restricted amounts of the complete diet were fed to the second group in order to duplicate the growth retardation produced by pyridoxin deficiency (paired weighing). The third group received the complete diet *ad libitum*. During the fifth week of the dietary experiment all animals were immunized against washed sheep erythrocytes. Three intraperitoneal injections of 0.5 ml of a 5% suspension of red cells were administered on alternate days. Five days after the last injection the animals were exsanguinated under sterile precautions. Hemagglutinin and hemolysin determinations were carried out on individual sera by the usual method of serum dilution in 2-fold steps. The titer endpoints adopted were 3 plus for agglutinins and 2 plus for hemolysins.

Immediately after the bleeding the thymus and other organs were weighed and prepared for histological study.

Results. The data are summarized in Table I. It is apparent that there occurred growth retardation in Groups I and II, with very low quantities of circulating antibodies in the pyridoxin-deficient animals. Although the scatter of the antibody values is great in both control groups, the difference between these and the deficient group is most striking. Of the 9 pyridoxin-deficient animals 6 showed no measureable agglutinins or hemolysins and 3 had only very low titers. In the 2 control groups all 16 animals had measurable antibody titers, and 13 of these were comparatively high.

The extreme degree of lymphoid atrophy was apparent not only from the weight of the thymus, but also from their morphology. In the thymi and lymph nodes of the deficient animals there was observed a pronounced reduction in the number of lymphocytes.

Discussion. From the data presented it is apparent that animals fed a diet deficient in pyridoxin and then immunized exhibited little or no circulating antibodies. The immunization was begun at a time when lymphoid atrophy was advanced. From the data on hand, however, it cannot be decided that the suppression of the serum antibodies was a consequence of the lymphoid atrophy: It is possible that both alterations occur independently in pyridoxin deficiency. Further study of this point is now in progress.

Summary. Male albino rats immunized in a state of pyridoxin deficiency developed antibody levels in the serum far below those of inanition controls (paired weighed) and full controls.

We wish to express our thanks to Dr. M. Mayer for giving generously of his time and advice on the immunological procedure.