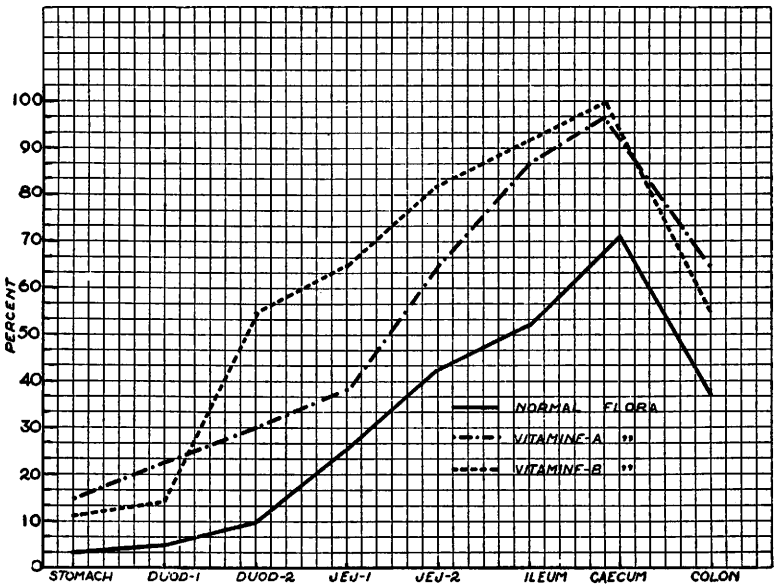

GRAPH 2.

Ordinate: % of bacterial flora, the caecal flora of the vitamin B series was the heaviest and is taken as 100.

Abscissa: segments of gastro-intestinal tract as indicated.

The lines indicating the same as in Graph I.

vitamin deficient rats had a denser bacterial population within the intestinal lumen than the normal. The H-ion concentration also shows a difference. The accompanying graphs show the results in condensed form. Each line represents the average findings of 65 rats.

5943

Absorption of Yeast from the Large Intestine.

VIRGINIA FISHER. (Introduced by Lloyd Arnold.)

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Following investigations into absorption of yeast from the small intestine,[1] a series of experiments have been conducted to demonstrate absorption of yeast through the wall of the large intestine into the splanchnic circulation.

[1] Fisher, Virginia, PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 948.

A soft rubber tube (vaselined) was inserted into the rectum of a dog so that the tip was 35 cm. from the anus. Yeast in doses varying from 8 to 31 billion cells suspended in 20 cc. of normal saline was injected by means of a syringe attached to the end of the tube. The animals were killed at 15, 30, and 60 minute intervals. Material from the various segments of the gastro-intestinal tract was obtained upon swabs and cultured on 4% maltose acid agar. One gram specimens of the liver, lymph, lung, spleen, and kidney were removed, macerated in 10 cc. of 4% maltose acid broth. One tenth cm. was cultured on maltose agar immediately; and again after 24 hours' incubation, on the same medium.

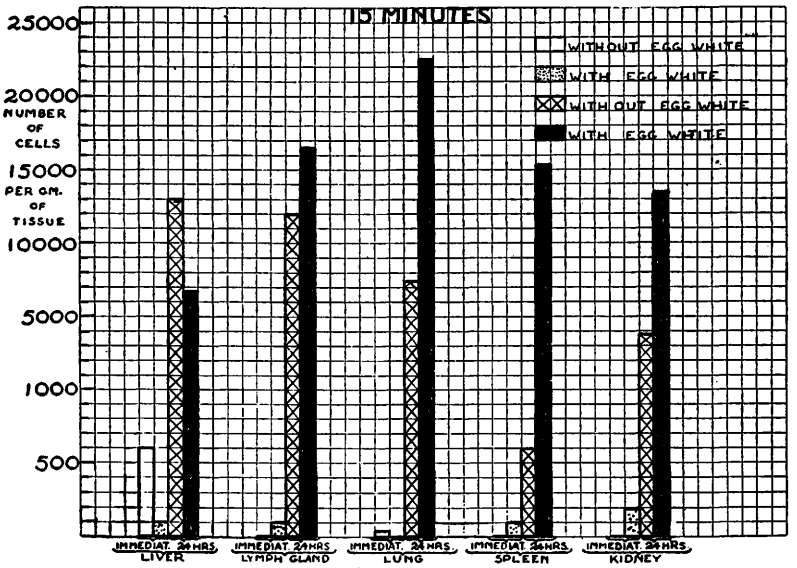
Arnold and Nedzel[2] have demonstrated experimentally that eggwhite increased absorption of bacteria into the splanchnic circulation. As yeast was not absorbed in appreciable quantities in the above experiments, a second series of 16 dogs were inoculated using eggwhite to increase, if possible, the number of yeast cells absorbed. The same technic was used except that the yeast cells were mixed with the whites of 2 eggs strained through cotton to remove the undissolved strands.

A third series of dogs were anesthetized, the abdomen opened and the gastro-intestinal tract ligated at the ileo-caecal valve. Twenty cubic cm. of eggwhite was given by mouth and 20 cc. of a yeast suspension by rectum. The procedure followed thereafter was the same as above.

TABLE I. *Typical Protocols.*

Dog No.		Cultures	Liver	Lymph	Lung	Spleen	Kidney
	15 minutes						
I	Control	Immed.	1600	—	1	—	—
		24 hr.	1500	—	9700	—	—
II	Eggwhite (rectum)	Immed.	200	—	—	—	500
		24 hr.	900	5400	2100	1400	36,300
III	Eggwhite (mouth)	Immed.	33	—	—	—	—
		24 hr.	2300	36,000	30,000	—	93,000
	30 minutes						
I	Control	Immed.	500	300	700	—	300
		24 hr.	300	—	—	—	—
II	Eggwhite (rectum)	Immed.	200	1800	800	700	300
		24 hr.	6000	12,000	27,000	2300	7200
III	Eggwhite (mouth)	Immed.	100	300	900	200	150
		24 hr.	58,100	360,000	144,000	7200	57,000
	60 minutes						
I	Control	Immed.	100	100	—	—	100
		24 hr.	—	—	100	400	—
II	Eggwhite (rectum)	Immed.	100	—	100	—	—
		24 hr.	300	200	10,000	700	1600

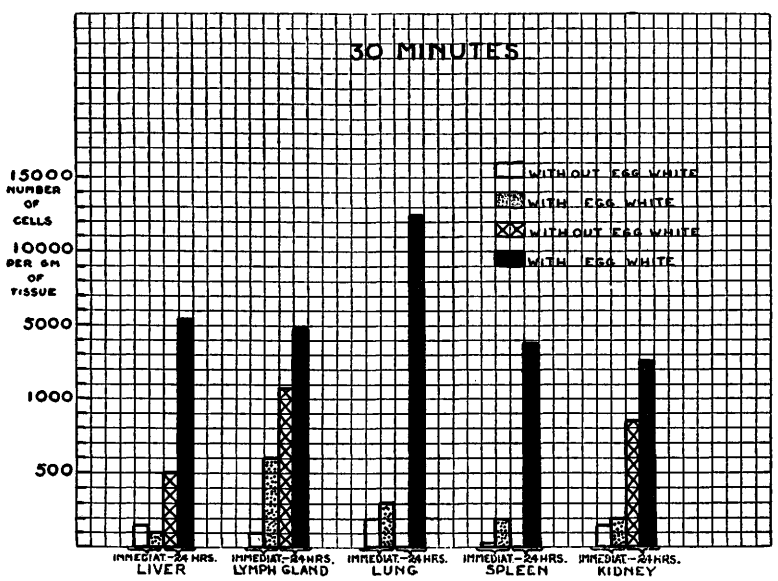
[2] Nedzel, A. J., and Arnold, L., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 358, 360, 361, 364, and 366.



GRAPH 1.

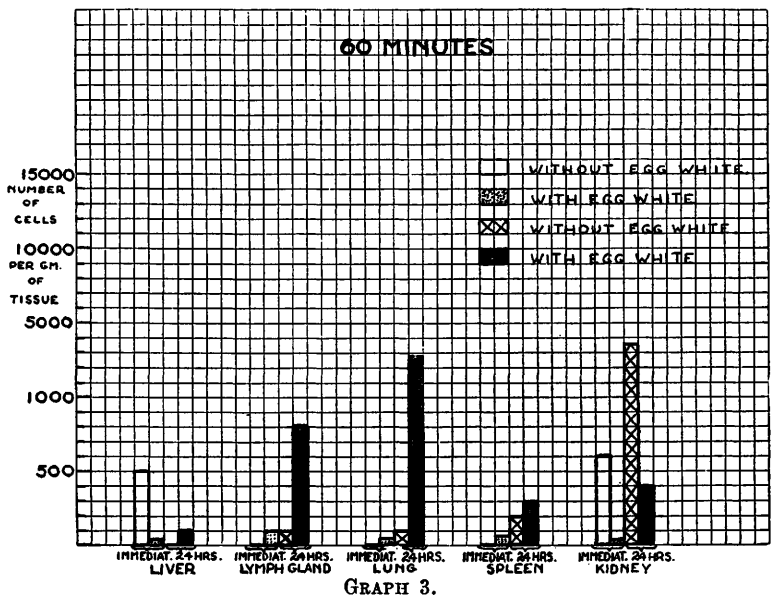
Distribution of viable yeast in organs of dogs given yeast by rectum and killed 15 minutes after injection.

Plain column represents number of yeast in immediate cultures (yeast suspended in saline). Dotted column represents number of yeast in immediate cultures (yeast suspended in eggwhite). Crossed column represents number of yeast in 24-hour cultures (yeast suspended in saline). Solid column represents number of yeast in 24-hour cultures (yeast suspended in eggwhite).



GRAPH 2.

Distribution of viable yeast in organs of dogs given yeast by rectum and killed 30 minutes after injection.



GRAPH 3.

Distribution of viable yeast in organs of dogs given yeast by rectum and killed 60 minutes after injection.

Table I gives typical protocols from each of the experiments described above. Graphs 1, 2, and 3 present results on controls and those in which eggwhite was mixed with the yeast.

In the control series, a group of animals were anesthetized, the abdomen opened, and the gastro-intestinal tract ligated at the ileocaecal valve. Increased absorption in these instances may be due to trauma.

The mechanism of the action of eggwhite is not clearly understood. Graphs 1, 2, and 3, except in 2 instances demonstrate that absorption from the large intestine is increased when the yeast is suspended in eggwhite. Since animals given yeast by rectum and eggwhite by mouth also show increased absorption over control animals, our results indicate that one of the actions of eggwhite may be due to inhibition of killing power of the body for yeast.

One incidental finding is of interest; a bitch 4 to 6 weeks pregnant in the control series, showed absorption of yeast from the rectum in numbers comparable to those animals given eggwhite.

Some of the immediate cultures show more yeast than do the 24-hour cultures. This is probably due to the toxic products within the organ which are liberated when the tissue is macerated and allowed to incubate in broth. This reaction seldom occurs when eggwhite is used.

The largest amount of absorption occurs at 15 and 30 minutes and decreases therefrom; 2 dogs killed at 2 hours after injection were negative throughout.

Conclusions. 1. Yeast is absorbed from the lumen of the colon in greatest numbers at 15 minutes, diminishing thereafter until none can be demonstrated at the 2-hour interval. 2. Eggwhite mixed with yeast increases the number of yeasts absorbed from the rectum of the dog. 3. A greater number of viable yeast cells can be demonstrated to be present in certain organs after the application of eggwhite to the duodenal mucosa and yeast introduced into the lumen of the rectum. This may not be due to increased absorption but to a decrease in the destruction of yeast in the body.

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Absorption of Bacteria from the Large Intestine.

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From the Department of Bacteriology and Preventive Medicine, University of Illinois, College of Medicine, and Research Laboratories of the Illinois Department of Public Health, Chicago.

B. prodigiosus, B. murii, and *B. welchii* have been placed in the lumen of the large intestine of dogs. The animals were killed 15, 30, 45 minutes, 1, 2, 3, 4, and 24 hours after rectal injection and the mesenteric lymph node, liver, spleen and lung specimens were removed under aseptic precautions. The tissue was cut up with sterile scissors, placed in broth cultures and further macerated with glass rods. All cultures were incubated 24 hours. Subcultures were made on plain agar for *B. prodigiosus,* Endo media for *B. murii* and *B. coli;* dextrose broth, dextrose agar shake tubes and brain media were used to subculture *B. welchii.* Ether, chloratone and nembutal anesthetics were used. No differences in bacterial permeability were noted with different anesthetics. In some animals the large intestine was washed out with saline and in the beginning of our work we exposed the large intestine by abdominal incision. Anesthetics were used throughout to make our results comparable and avoid struggling of animals during experiment. Only a part of our experiments will be reported here.

Animals killed 15 minutes after rectal injection show the highest percent of positive organ cultures. One hour after rectal injection