Effect of Antibacterial Agents on Growth of Baby Pigs Fed a "Synthetic" Diet. (18314)

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The effect of antibiotics in promoting the growth of pigs was first reported by Stokstad and Jukes(1), and by Johnson(2). The growth-promoting effect of aureomycin when added to the diet of weanling pigs has been reported by Jukes *et al.*(3). Carpenter(4) has reported less scouring and also some growth stimulation when feeding aureomycin to growing pigs.

The present study was conducted to determine the growth-stimulating effect of aureomycin, penicillin and sulfathalidine on the baby pig receiving a "synthetic milk" diet supplemented with all known factors.

Experimental procedure. Thirteen 2-day-old Berkshire pigs were allotted into 5 groups and individually fed *ad libitum*. The alpha-protein "synthetic milk" ration fed was essentially the same as reported by Neumann *et al.* (5). In addition 0.8 μg of vitamin B_{12} per kilo of body weight per day was injected intramuscularly. The feeding and care of the animals was similar to that reported previously by Johnson *et al.*(6). The levels of antibiotics and sulfathalidine fed are given in Table I. At periodic intervals fecal samples were collected from one pig in each of groups 1, 2, 4, and 5. Coliform, lactobacilli and yeast cell counts were determined on these samples by dilution methods employing EC medium (Difco) for the *E. coli* counts, Lactalysate broth (BBL) for the lactic counts and Winblad's acetic acid medium(7) for the yeast counts. Weighed samples of 0.1 g were diluted to 100 cc to give a concentration of 10^{-3}. Dilutions were then made from this concentration. The results are given in Table II.

Results and Discussion. A summary of the total performance of each of the 5 groups of pigs is given in Table I. The growth curves of each group are plotted in Fig. 1. Because of the small number of pigs in each group, Groups 1 and 2 receiving no aureomycin were combined for statistical treatment and compared with the combination of Groups 3 and 4 which received aureomycin. The average daily gain of the latter combination was significantly more rapid than the average daily gain of the former ($P = 0.03$). The 6 pigs receiving aureomycin had an average daily gain of over 1 lb/day for the 8-week experimental period. This is remarkable growth for pigs of this age.

The addition of 2% sulfathalidine or 100 mg of penicillin per kilo of dry matter of the diet did not increase 8-week gains significantly.

The bacteriological counts showed a decrease in the number of *E. coli* in the feces of the pigs receiving sulfathalidine, as has been previously observed for other species(8-10). Lactobacilli and yeast cell counts were high and apparently not affected by any treatment.

Summary. Aureomycin stimulated the growth of baby pigs on an alpha protein "synthetic milk" diet. It did not reduce the coliform, lactobacilli or yeast cells present in the feces. Sulfathalidine reduced the num-

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TABLE I. Response of Baby Pigs to Antibiotics and Sulfathalidine.

	Group 1 Basal	Group 2 Basal + 2% sulfathalidine	Group 3 Basal + 2% sulfathalidine + 100 mg aureomycin/kg dry matter consumed	Group 4 Basal + 100 mg aureomycin/kg dry matter consumed	Group 5 Basal + 100 mg penicillin/kg dry matter consumed
No. of pigs	2	2	3	3	3
Avg initial wt, kg	1.83	1.81	1.78	1.76	1.74
Avg final wt, kg	20.57	20.40	28.86	26.40	21.51
Avg daily gain, lb.	0.74	0.73	1.06	0.97	0.78
Dry matter consumed (kg/kg gain)	1.30	1.34	1.29	1.32	1.28

TABLE II. Bacteria and Yeast Cell Dilution Counts Giving Greatest Dilution at Which Growth Occurred.

Days on test	Group 1 Basal			Group 2 Basal + 2% sulfathalidine			Group 4 Basal + 100 mg aureomycin/kg dry matter consumed			Group 5 Basal + 100 mg penicillin/kg dry matter consumed		
	E. coli	Yeast	Lactic	*E. coli*	Yeast	Lactic	*E. coli*	Yeast	Lactic	*E. coli*	Yeast	Lactic
1	10^{-8}	10^{-6}		10^{-6}	10^{-6}		10^{-6}	10^{-6}		10^{-6}	10^{-4}	
3	10^{-11}	10^{-8}		10^{-8}	10^{-10}		10^{-11}	10^{-6}		10^{-11}	10^{-6}	
5	10^{-11}	10^{-11}		10^{-9}	10^{-10}		10^{-11}	10^{-10}		10^{-10}	10^{-8}	
8	10^{-9}	10^{-8}		10^{-6}	10^{-10}		10^{-10}	10^{-10}		10^{-11}	10^{-6}	
12	10^{-11}		10^{-10}	10^{-6}		10^{-11}	10^{-11}		10^{-11}	10^{-11}		10^{-11+}
19	10^{-11}		10^{-11}	10^{-6}		10^{-10}	10^{-10}		10^{-11}	10^{-11+}		10^{-11+}
26	10^{-11}	10^{-8}	10^{-10}	10^{-6}	10^{-6}*	10^{-9}	10^{-10}	10^{-8}	10^{-10}	10^{-12}	10^{-8}*	10^{-11}

* Microscopic examination showed a few lactobacilli but yeasts were predominant.

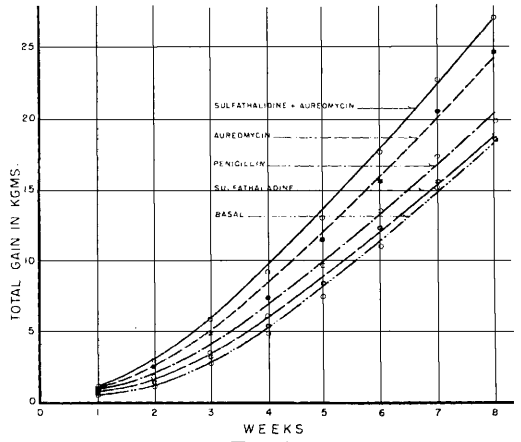

FIG. 1.

Graph showing the average growth responses of the various groups.

ber of coliform bacteria present in the feces. There was no statistically significant beneficial growth-promoting effect from adding penicillin or sulfathalidine to the diet.

We are indebted to Merck and Company, Inc., Rahway, New Jersey for crystalline vitamins, and penicillin; to the Lederle Laboratories Division, American Cyanamid Company, Pearl River, New York, for folic acid and aureomycin HCl; and to Sharp and Dohme, Inc., Glenolden, Pennsylvania, for sulfathalidine.

We are also indebted to Eva M. Cohn for carrying out the bacterial counts.

Received October 30, 1950. P.S.E.B.M., 1950, v75.