

Sulfathiazol is shown to be more effective than either sulfanilamide or sulfapyridine in treating the resistant strains. This agrees with the clinical reports of the efficacy of sulfathiazol.^{5, 6}

Statistical Method. Curves were plotted by accumulating negative and positive results.⁷ Curves of sulfapyridine were not included because they closely paralleled those of sulfanilamide.

Summary. Sulfanilamide-resistant and freshly isolated strains of gonococci were tested for their response to sulfanilamide, sodium sulfapyridine, and sodium sulfathiazol on the chorio-allantoic membrane of embryo chicks. The resistant strains retained their resistance *in vitro*. Sulfanilamide and sulfapyridine were about equally efficient in curing the infection. Sulfathiazol was about 3 times more effective therapeutically than sulfanilamide or sulfapyridine.

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The Number of Vitamins Required by the Rat.*

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During their studies of rat dermatitis Richardson and Hogan¹ observed that rats which receive only the recognized water-soluble vitamins are able to survive for long periods of time, and to maintain a moderate rate of growth. Four of the 8 females described in Groups III and IV, Table I. of the report cited, attained an average weight of 176 g in 20 weeks, when it became necessary to discard them. The ration was then changed in various ways in an attempt to secure a more rapid growth rate and 3 of the more important modifications are described in Table I. The response of the animals is shown in Fig. 1.

⁵ Mahoney, J. F., Wolecott, R. R., and Van Slyke, C. J., *Am. J. Syph., Gon., and Venereal Dis.*, 1940, 613.

⁶ Burkholder, T. M., and Bang, F., *J. Urol.*, 1940, 44, 541.

⁷ Reed, L. J., *Biological Effects of Radiation*, 1936, VI, 227.

* Contribution from the Department of Agricultural Chemistry, Missouri Agricultural Experiment Station, Journal Series No. 680.

¹ Richardson, L. R., and Hogan, A. G., *PROC. SOC. EXP. BIOL. AND MED.*, 1940, 44, 583.

TABLE I.
Description of Rations

Constituent	Ration		
	A	B	C
Casein	20	20	20
Sucrose	71	73	65
Lard			8
Salts	4	4	4
Cellulose	3	3	3
Cod liver oil	2	0	0
	Daily allowance per rat 10 mg		
Linoleic acid*			3 mg daily per rat
Concentrate of vitamins A and D			Mg per 100 g ration
Carotene		50	μg
Calciferol†		0.125	"
Alpha-tocopherol‡		25	" 2.5
Thiamin‡	0.2 mg§	20	" 0.8
Riboflavin‡	0.4 "	20	" 1.6
Vitamin B ₆ ‡	20 μg	20	" 1.2
Ca-pantothenate‡	70 "	100	" 1.0
Choline‡		10 mg	400

*Generously supplied by Dr. J. B. Brown of Ohio State University.

†Generously supplied by the Winthrop Chemical Co., Inc., New York.

‡Generously supplied by Merek and Co., Rahway, N. J.

§Per 100 g ration.

||Daily allowance.

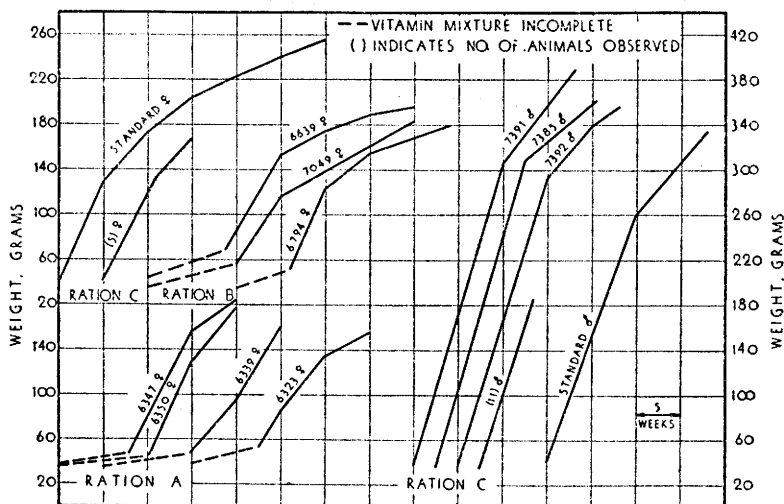


FIG. 1.

The rats which were changed to Rations A and B recovered from dermatitis,¹ and were retained to show whether recovery is permanent. The surprisingly rapid gains in weight suggested the use of Ration C, in order to improve the rate of growth. Of the older rats, Nos. 6639, 7049, 7385, 7391, 7392 are still alive and thrifty. The others were healthy when discontinued. The standard growth curves were plotted from records of the stock colony.

It will be observed that Ration B contains no added fat, but it was supplemented with 10 mg of linoleic acid daily per rat. Ration A contains no added fat except the 2% of cod liver oil. Since neither ration supplies the quantity of fatty acids that is necessary for a normal rate of growth, even if the vitamin supply is adequate, a ration was prepared which contains additional fat. Ration C contains 8% of lard, also a more generous allowance of the water-soluble vitamins. In all 14 male and 5 female rats have received this ration and up to the present their growth rate is about the same as that of rats in the stock colony. Three males, Nos. 7385, 7391, 7392, Fig. 1, attained an average weight of 368 g in 18 weeks. They are in excellent condition and heavier than stock colony males of the same age. Each of them has sired 2 normal litters. Jukes² reported that a ration which contains no water-soluble vitamins, other than those now recognized, will permit female rats to attain maturity and bear litters. However, his animals grew at a subnormal rate and reared only a small proportion of their young.

The minimum amounts that will maintain normal growth have not been determined, but it is our experience that when the water-soluble vitamins are supplied at the levels commonly employed the growth rate is suboptimal. When choline was omitted from Ration C the growth rate was severely depressed. When omitted from Ration A the growth rate was unchanged.

At present it seems that the 8 vitamins included with Ration C are all that the rat requires to attain normal weight maturity, though it is possible that the basal ration may conceal some unsuspected vitamin. However that may be, in any search for unrecognized vitamins an examination of the quantitative interrelations of the recognized vitamins is of crucial importance.

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Experiments on Stimulation of Nerves by Alternating Electrical Fields.

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It is customary to consider the nerve axon as a cylinder with a porous surface through which pass ions of positive sign. The ions

² Jukes, T. H., *PROC. SOC. EXP. BIOL. AND MED.*, 1940, **45**, 625.