Although stable, the R colonies differ in morphology when grown on solid media containing different sugars.

The R strain which has been converted to an S strain by growth on solid glucose media gives an unusually large colony and is subsequently stable and characteristically an S culture when carried on media containing or lacking glucose. The R to S transformation is effected in the presence of 0.3 to 20.0% glucose; but the colony is smaller in the presence of the highest concentrations of sugar. The effectiveness of the glucose is apparently not dependent upon impurities, as evidenced by experiments upon 5 commercial brands of the sugar of varying degrees of purity.

The R strains which have been converted to S by growth on glucose (dextrose)-containing medium, called the RD strains, show virulence, agglutination and electrical characteristics more like the typical S than the typical R strains. Tables I and II illustrate some experiments.

In agglutination tests with homologous and heterologous sera, results like those in Table II are obtained.

The electrophoretic charges or potential differences for 10 strains of each R, R D and S cultures are illustrated in Table III.

TABLE III.
Electrophoretic Potentials in μ/sec./volt/cm.[2]
(Migrations to the anode.)

Strain	
R	2.66
R D	4.04
S	4.21

In one experiment, S and R D cultures were found to be virulent for mice and the R cultures were not virulent. But it has been difficult to duplicate this experiment. Hence its significance is still uncertain.

4267

Experimental "Food-Poisoning" in Monkeys with Living Paratyphoid Bacilli.

G. M. DACK, E. O. JORDAN AND W. L. WOOD.

From the Department of Hygiene and Bacteriology, University of Chicago.

Previous experiments in this laboratory have shown: (1) that the symptoms of food-poisoning were not reproduced when enormous

[2] Using the "slide cell" method of Falk, I. S., Jensen, L. B., and Mills, J. H., *J. Bact.*, 1928, xv, 421.

numbers of heat-killed paratyphoid bacilli were fed to monkeys and other animals;[1] (2) that similarly, no symptoms were produced when large amounts of heat-killed paratyphoid cultures were swallowed by human volunteers.[2] These results indicated that the thermostabile substance (or substances) long known to be toxic to animals on intraperitoneal inoculation, is not the substance (or substances) responsible for the gastro-intestinal outbreaks with which paratyphoid bacilli are commonly associated.

Experiments have accordingly been undertaken using massive doses of living paratyphoid bacilli taken from agar cultures grown in Kolle flasks. These have been carried out with rhesus monkeys, and have yielded positive results. Monkeys of about 3½ to 4½ kilos, fed with from 95 to 816 billions of viable organisms, have shown symptoms of illness, such as sluggishness, loss of appetite and marked watery diarrhea. There was in all instances some loss of weight, but as a rule this was quickly regained. The diarrhea usually lasts 1 or 2 days, but in one instance persisted over 4 days. In no case did death occur, and the organisms fed were in no instance isolated from the blood, although daily attempts at blood cultures were made. One strain used (411) was of the Aertrycke type and was isolated in 1923 in a food-poisoning outbreak in New York City.[3] Large doses of heat-killed cultures of this organism had been given in previous experiments without causing any symptoms in man, monkeys or other animals.[1, 2] In the present series a saline suspension of organisms was prepared from several Kolle flasks, and was divided into 2 equal portions, one portion consisting of living organisms, the other portion being boiled for 20 minutes before being fed. Symptoms of "food-poisoning" appeared in animals fed with living cells, not in the others. Similar positive results were obtained with an Enteritidis strain, but monkeys fed with a living Proteus strain and with living *B. coli* strains showed no signs of illness. In 2 instances monkeys in which "food-poisoning" had been produced were fed again with the same strains 3 weeks later, and for the second time developed the typical symptoms.

---

[1] Dack, Harmon and Jarra, *J. Prev. Med.*, 1928, ii, 461.

[2] Dack, Cary and Harmon, *J. Prev. Med.*, 1928, ii, 479.

[3] *Cf.* Salthe and Krumwiede, *Am. J. Hyg.*, 1924, iv, 23.