

TABLE I.
Table Summarizing Data on Induced and Spontaneous Mammary Cancer and Induced Leukemia
in Strain DbA Animals of These Experiments.

Group	No. of mice	No. with mam- mary cancer	Induction time of mam- mary cancer, days	No. with leukemia	Induction time of leukemia, days
I. Breeding ♀	27	27	105	7	106
II. Virgin ♀	31	4	191	20	113
III. Untreated breeding ♀	26	23	Mammary cancer ap- peared spontaneously at an average age of 370 days	0	
IV. ♂	48	0		31	122

appeared. Of the 11 virgins which did not develop leukemia, however, only 4 developed mammary cancer, the induction period of these being longer than in any one of the 27 cases of mammary cancer in treated breeders. It is interesting to note that the incidence of induced leukemia appears to have been reduced in the Group I female breeders, suggesting that either the development of mammary cancer, breeding, or both, might inhibit the induction of leukemia in the same animal. These data are summarized in Table I.

Mammary cancer appeared invariably as multiple growths in the breeding carcinogen-treated animals of Group I. Each of the mammary glands was studded with macroscopic cancerous and precancerous nodules. Only one to 3 mammary cancers appeared in

each of the untreated breeding females which developed the disease spontaneously. Macroscopic nodulation did not appear in the non-cancerous glands of these mice.

Further experiments are being conducted on the relationship of the estrogenic, genetic, and milk influences to the induction of mammary cancer by chemical carcinogens in various sub-lines of the DbA strain. The nature of the nodulation in all mammary glands of breeding carcinogen-treated females is also being investigated.

Summary. Mammary cancer appeared precociously in strain DbA female mice subjected to percutaneous applications of methylcholanthrene. The latent period was markedly shorter and the total incidence higher in breeding than in virgin animals.

14493

L Type of Growth in Cultures of a Hemolytic Parainfluenza Bacillus.*†

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Colonies similar to the pleuropneumonia group of organisms were isolated and maintained in pure cultures from 2 bacterial spe-

cies, the *Streptobacillus moniliformis* and *Bacteroides funduliformis*.¹ The colonies consist of small granules which invade the agar and which swell up on the surface of the colonies to large bodies of 10 micra or more. These large bodies by disintegration again reproduce the small granules. According to the observations of the author, this L type of

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¹ Dienes, L., *J. Bact.*, 1942, **44**, 37.

growth originates in both species from the bacteria. Under appropriate conditions the bacteria swell up into large round bodies and germination of granules from these produces the L type of colonies. A similar transformation process of the bacteria was observed in more or less complete form in other species also. The swelling of bacteria into large bodies, the germination of these and the production of tiny colonies consisting of small granules was observed in *B. coli* and *H. influenzae*. In a flavobacterium and gonococcus the large bacterial forms and the tiny colonies of granules were observed; the latter in the flavobacterium could be grown in 3 successive generations. These processes are so characteristic in appearance and, so far as they can be observed, so similar in different species that they evidently represent a similar transformation of the bacteria with the difference that in most cases we are not able to provide the conditions necessary for the continuous growth of the granular form.

Large swollen forms are often present, in addition to the species already mentioned, in cultures belonging to various species cultivated directly from the human body. Meningococci isolated from spinal fluid often swell up to such forms and they are not rare in streptococcus cultures. The development of L type of colonies was not observed in these species. From the common saprophytic organisms of the human body parainfluenza bacilli produce large bodies most often and recently the development of L type of growth from these large bodies was observed.

The strains belonging to the parainfluenza bacilli are very variable. The colonies consist sometimes of regular-shaped individual bacilli, sometimes of long segmented filaments which may be regular or may develop into large fusiform or round bodies. The pleomorphic colonies of this bacillus can be seen in the majority of throat cultures if they are appropriately examined, and a colony transformed entirely into large round bodies was illustrated in a former paper.² The pleomorphism usually disappears after a few transplants.

During the last 5 years many pleomorphic colonies were transplanted to horse blood and ascitic agar plates, but the large bodies always disappeared without further development. Since last August the author carried in his throat a very pleomorphic hemolytic parainfluenza strain. The large bodies of this strain as in other strains did not show any development on horse blood and ascitic agar plates. In December, experimenting with new media, the pleomorphic colonies were transplanted to a medium consisting of sedimented boiled blood agar, horse blood, and fresh egg yolk. On this medium after 4-8 hours' incubation many of the transplanted large bodies considerably increased in size and they were deeply stained in agar preparations with methylene blue and azur. From many of these large bodies small light blue staining granules grew into the media. These germinating large bodies were similar in every respect to the corresponding structures formerly described in *Streptobacillus moniliformis* and *B. coli* cultures. The largest size to which the L type of growth developed corresponds about to Fig. 8, Plate I of the aforementioned paper.¹ After 6-8 hours the growth did not develop and the granules started to lose their staining and disappeared. After 24 hours' incubation the plates were usually overgrown by bacterial colonies.

The difference between the plates on which the L type of growth did or did not develop was marked. When L growth did not develop the large bodies remained stationary; after 6 hours most of them were vacuolized and they were stained only at the periphery or not at all. On the plates on which L type of growth developed the deeply and uniformly stained large bodies were conspicuous. The medium on which the development of L was observed, although better than those tried before, is insufficient for the continuous growth of the L. A similar germination of the large bodies with consecutive disappearance of the tiny colonies was observed in cultures of *Streptobacillus moniliformis* on certain media not appropriate for the growth of L₁.

Several circumstances under which this observation has been made are of interest. L type of growth appeared on a new medium

² Dienes, L., *J. Inf. Diseases*, 1939, **69**, 24.

after many trials during a period of five years had been unsuccessful. The development of large forms under normal conditions of growth probably indicates always the tendency for the transformation into L type, but in many cases our culture methods are inappropriate to induce germination of the large bodies as well as to allow continuous growth of the L forms. All strains in which L type of growth was formerly observed were cultivated from pathological processes. The case described in this note is the first in which this growth developed in a culture obtained from a normal human throat. Influenza bacilli cultivated from the throat have never shown L type of growth. The parainfluenza strains are similar in many respects to the *Streptobacillus moniliformis* which is also a normal inhabitant of the rat's throat.

The L type of colonies developing in the culture of parainfluenza, influenza bacillus, and of gonococcus are inconspicuous and

transitory. However, their development indicates that those processes, the full development of which was observed in *Streptobacillus moniliformis* and in *Bacteroides funduliformis*, are present also in these species. The significance of these processes in the life of the bacteria and in their pathological effects are not known, but such deep-going transformation of the bacteria cannot be without significance.

Summary. In a hemolytic parainfluenza strain a transformation process of the bacteria similar to that occurring in *Streptobacillus moniliformis* and *Bacteroides* were observed. The bacteria swelled up into large round bodies and these, transferred to appropriate media, germinated and produced a tiny colony consisting of granules which invaded the agar. The tiny colonies of granules were transitory and after 8 hours' incubation ceased to grow and disappeared.

14494

A Method of Obtaining Blood Samples Directly from the Hepatic Vein in Man.

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Studies regarding the function of the liver in man have been hampered by the inability to obtain blood either immediately before or after its passage through the liver. In the course of observations on the circulation during which blood samples were being obtained from the right side of the heart through a catheter in the venous system, we have observed that the tip of the catheter can often be manipulated into one of the hepatic veins, enabling us to withdraw blood from these vessels. The purpose of this note is to call attention to this as a means of obtaining blood directly from the hepatic vein in man.

The liver receives blood from the portal vein and the hepatic artery. The blood from both of these vessels drains into the hepatic

sinusoids, which in turn unite to form the central veins. These come together to make up the hepatic veins, usually 2 or 3 in number, which pass upward to enter the inferior vena cava only a short distance below its entrance into the heart. On rare occasions the hepatic veins may empty directly into the right auricle. No other major veins occupy a position in this locality. Roentgenologists¹ have noted that the hepatic veins may at times be seen crossing the angle formed by the right border of the heart and the diaphragm.

The passage of a catheter through the

¹ Roesler, Hugo, *Clinical Roentgenology of the Cardiovascular System*, C. C. Thomas Co., Baltimore, Md., 1937.