medium contains Merck's asparagine the differences in the amount of yeast present at the end of the second growth cycle are for 0.1 mg./cc. 135%, and for 0.5 mg. 115%. These figures come from series 86 and are in addition to the data given above for series 91. The inosite added was obtained from the Eastman Kodak Co., who list it as ash-free. This increase in yield seems to be the result of a stimulant rather than the addition of an essential substance because the rate of growth is greater and the retarding influences appear earlier when this material is present. These differences depend on the kind of asparagine in the medium and indicate that the different brands of asparagine contain a substance which has a much greater effect on the growth of this yeast than does inosite. The isolation and identification of this substance will be published elsewhere.[8]

The recent studies of Williams[9] and his co-workers suggest again the conclusions of Henneberg[10] and Tanner[11] that different yeasts have different nutritional requirements and material serving as a "Bios" for one yeast need not do so for another. These authors indicate that they know of the existence of some 7 *"nutrilites"* (including inosite) as they choose to call these substances[12] which stimulate the growth of yeast. The rapidly increasing list of these yeast foods indicate that such a *special name* for them is unnecessary.

6008

Studies on Transmissible Lymphadenosis of Mice.*

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A new transmissible strain of malignant lymphadenosis isolated at the Henry Phipps Institute has been observed to possess the following properties.

[8] In mms. to be published.

[9] Williams, R. J., and Truesdale, J. H., *J. Am. Chem. Soc.*, 1931, **53**, 4171.

[10] Stated by Tanner, F. W., *Chem. Rev.*, 1925, **1**, 397.

[11] Tanner, F. W., Devereux, F. W., and Higgins, E. D., *J. Bact.*, 1926, **11**, 45.

[12] Williams, R. J., *Science*, 1928, **67**, 607.

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It can be passed to mice of the stock in which it originated but not to other stocks. About 12% of mice of the same stock, and about half of the closely inbred relatives of the mouse from which this strain was derived were susceptible on intravenous inoculation, but the disease could not be transmitted to 2 unrelated stocks of mice.

The disease caused by intravenous inoculations of emulsions of lymph nodes and spleen resembles the spontaneous disease very closely. Both are characterized by a systemic enlargement of the lymph nodes and splenomegaly, associated with massive lymphoid infiltrations in organs such as bone marrow, liver, kidney, and ovary, assuming in the latter 2 organs tumor-like proportions. In spite of the intravenous route of injection and the massive infiltrations, the number of lymphocytes in the circulating blood was within normal limits or was only slightly increased. The percentage of lymphocytes was likewise within normal limits. Many cells seen in smears, however, were an unmistakable evidence of the disease process. These were medium or large lymphocytes with scant but intensely basophilic cytoplasm and hyperchromatic nuclei. A few cells contained, instead of nuclei, globular or angular material staining red with Romanowsky dyes, this being presumably the disintegrating nucleus. There were also, apparently intermediate between these and immature lymphocytes, lymphocytes with atypical chromatin structure.

Thus the new strain differs from the strains of transmissible lymphoid leucemia of mice previously described[1] in the morphological character of the lymphocytes involved. It differs also in the biological behavior of the immature lymphocytes, in that they invade the organs more extensively, do not invade the blood stream in considerable numbers, and do not affect unrelated mice.

When non-susceptible mice are exposed to X-rays before inoculation, a majority of them will develop lymphadenosis. This observation fully confirms that of Krebs and his associates.[2]

Quantities of radiating energy much below the lethal dose are sufficient to bring about this change. The dose of X-rays fatal to mice within about 15 days was approximately 600r to 700r; quantities as small as 200r were sufficient to make them susceptible to the strain of transmissible lymphadenosis investigated. The increased susceptibility lasted for at least 42 days; that is, mice could be successfully inoculated from 1 to 42 days after irradiation.

[1] Furth, J., and Strumia, M., *J. Exp. Med.*, 1931, **53**, 715.

[2] Krebs, C., Rask-Nielsen, H. C., and Wagner, A., *Acta Radiologica*, 1930, Suppl. to Vol. 10.

After 4 successive passages in irradiated mice the disease still failed to effect non-irradiated mice of the same insusceptible stock, but could still be transmitted to non-irradiated members of the susceptible stock.

On subcutaneous inoculation of irradiated mice there was tumor formation at the site of inoculation (lymphosarcoma). This was not accompanied by systemic enlargement of the lymph nodes nor by an involvement of the blood.

These observations together with those reported by Richter and McDowell[3] and by Furth and Strumia[1] show that: (a) Lymphadenosis, aleucemic as well as leucemic, resembling closely the spontaneous disease, is best reproduced by intravenous inoculation. (b) Tumor formation (lymphosarcoma) may be produced by the material that causes systemic lymphadenosis when introduced by routes other than the intravenous. (c) Various strains of transmissible lymphadenosis differ from each other in the type of involvement observed (leucemic or aleucemic, intensity of infiltration, etc.). They differ also in their genetical behavior inasmuch as some strains may be transmitted to any stock of mice (Furth and Strumia), and some only to related mice (McDowell and Richter and the transmissible strain described here). The strain of Krebs and his associates can be transmitted only to mice whose resistance is lowered by irradiation. (d) These differences are dependent mainly on the character of the malignant lymphocytes, which retain their original properties after numerous passages.

6009

Specific and Non-Specific Cell Polysaccharides of the Human Type of Tubercle Bacillus, H_{37}.*

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Six hundred gram portions of ground, defatted human type (H_{37}) tubercle bacilli† were percolated with dilute acetic acid containing

[3] Richter, M. N., and MacDowell, E. C., *J. Exp. Med.*, 1930, **52**, 283.

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