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Phoebe R. Hall
Iowa State College

Elery R. Becker
Iowa State College

THE SIZE OF THE OÖCYST IN A SELECTED STRAIN OF COCCIDIA

PHOEBE R. HALL AND ELERY R. BECKER

The writers noticed while studying *Eimeria miyairii* Ohira infections in the white rat that there was a rather wide variation in the size of the oöcysts when a highly heterozygous strain of the parasite was used for infective purposes. In order to determine whether or not selecting and inbreeding would have any effect on the range of the size of the oöcyst, a single oöcyst was isolated from a mixed culture, and placed on the back of the tongue of a previously uninfected rat by means of a micropipette. This procedure of isolation and infection was repeated for three succeeding generations of the parasite. A large number of oocysts from the yield of the fourth generation of inbreeding was then fed to a rat and a total of five hundred oöcysts was in turn measured from its yield. These measurements were then compared with a series of previously made measurements of fifteen hundred oöcysts from the original random strain.

All of the measurements were made by means of a microscope which was equipped with a 20X ocular and a 44X high dry lens combination, and a camera lucida, giving a magnification of about 1560. The specimens measured were floated in a concentrated sugar solution, transferred to a glass slide by means of a flat-headed solid glass rod, covered by a number one cover slip, and measured in the order in which they were encountered. Many oöcysts had a tendency to stand either partially or entirely on end and consequently appeared at first glance to be either spherical or subspherical. Because of this tendency, the cover slip was lightly tapped before measuring each oöcyst to avoid any erroneous interpretations as to size or shape.

In order to make the two series of measurements more comparable, the frequencies obtained in the inbred strain were multiplied by three, thus making the number of each strain totaling fifteen hundred. From this study, it was observed that the oöcysts of the random strain ranged in length from 17 to 27 microns and in breadth from 13 to 23 microns, while the range in the inbred strain was in length from 20 to 27 microns, and in breadth from

15 to 21 microns. Although the range of both length and width was approximately 50 per cent greater in the mixed strain, the means of the two measurements were within .2 micron of those of the inbred strain. The means for the mixed strain were 22.57 microns for length and 17.83 microns for width, while in the inbred strain, the means were 22.75 and 17.86 microns respectively. The mean shape index for the random strain was .7934 and for the selected strain .7326. In the mixed strain the standard deviation for length was ± 1.54 and for width ± .96; in the inbred strain for length ± 1.58 and for width ± .33.

In testing these measurements statistically to determine whether or not this difference was one of significance, it was found that the ratio of the difference of the mean widths of the two strains to its probable error was 1.698, which indicates that the slight increase in mean width of the inbred strain is not significant. In order for this difference to be of significance, the ratio must be 3.0 or above. The mean lengths were tested by the same method, and were found to have a significant ratio of 4.63.

In addition to this slight significant morphological difference between the two strains of the parasite, the writers have observed also a physiological difference. It was found that rats which had been immunized to infection by the inbred strain could be infected by the highly heterozygous strain, but that those animals immunized by the mixed strain by feeding the same size dose could not be infected by the inbred strain.

Department of Zoology,
Iowa State College,
Ames, Iowa.

BLOOD VOLUME IN SINGLE AND PARABIOTIC RATS [1]

Robert T. Hill
(Introduced by E. Witschi)

The method described in this paper for the measurement of blood volume in rats is very similar to that used by H. P. Smith ('30) in his blood volume determinations on dogs.

Eight mg. per kg. body weight of Brilliant Vital Red (Evans) in 1 per cent solution was injected in the tail vein. After a lapse of 4 minutes blood samples were taken from the heart (usually 1 cc.), mixed with oxalate solution and centrifuged in a calibrated tube.

[1] Presented at the meeting of Iowa Academy of Science, April, 1932, Cedar Falls, Ia.