

Survival Time of the Mouse as Related to Ambient pO_2 Produced by Explosive Decompression. (17672)

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Gelfan, Nims and Livingston(1) have shown that altitudes above 52,500 feet (77 mm Hg do not further reduce survival time of the rat; therefore the critical pO_2 of the ambient air for the rat would be 16 mm Hg. Rats decompressed in oxygen likewise showed no further effects of altitudes above 52,000 feet. However, rats survive more than twice as long when explosively decompressed in oxygen as in air but even then the critical decompression pressure remains the same for both air and oxygen. Luft, Clamann and Adler(2) state that mice survive 25 seconds when rapidly decompressed to 43,000 feet in air or to 52,000 feet in oxygen. They also list survival of mice for 80 seconds at 32,000 feet in air. Hailman(3) using rats, and Stullken and Hiestand(4) using mice and chicks have determined the lowest oxygen pressures compatible with life. The former(3) found the critical pO_2 in rats decompressed in oxygen between 65 and 75 mm Hg, the latter(4) found the critical pO_2 in mice as 70.7 mm in baby chicks as 89.5 mm. Compared to decompression in oxygen, mice decompressed in air died at an average pressure of 218.3 mm or a pO_2 of 45.7 mm.

Method. A decompression chamber consisting of a Pyrex flask was attached to a large ballast chamber which in turn was evacuated by a vacuum pump. By opening a connection between the ballast chamber and the decompression chamber the air in the latter was reduced in a fraction of a second to any desired pressure. Survival of the animal was measured with a stopwatch to the nearest

second. Sixty-five male and 45 female adult mice were decompressed in this study and the end-point taken as the last visible respiratory movement. Since the level of the mercury in the pressure gauge was adjusted to the barometric pressure at the time of the experiment, no correction factor for standard pressure was necessary. The pO_2 was measured by multiplying the ambient pressure by 0.2096. We made no attempt to measure or estimate the alveolar pO_2 in the mice due to the fact that breathing became so rapid that an estimation would be invalid.

Results. For the sake of simplicity a table of the individual animals is omitted; instead the individual survival time in seconds is plotted against ambient oxygen pressures in Fig. 1. From the distribution of the points on the graph it can readily be seen that the critical pO_2 below which survival is unaffected occurs at approximately 21 mm Hg (equivalent to 47,000 feet altitude). At pO_2 pressures above this level survival time is longer, the curve becoming a horizontal line at about pO_2 of 48 mm. The "curve" resembles that for the rat as shown elsewhere(1). There is a species difference, however, in favor of the rat amounting to an altitude difference of about 5,500 feet, probably due to a species difference in metabolic rate. The "point of diminishing returns" is about pO_2 of 48 mm above which pressure survival is no longer related to the ambient oxygen pressure. Britton and Kline(5) using nearly 2000 rats have shown a sex difference in survival, the female surviving longer than the male. This was particularly true at low temperatures. Our findings with mice do not indicate such a difference.

Summary. One hundred and ten mice were explosively decompressed to different ambient oxygen pressures and their survival time de-

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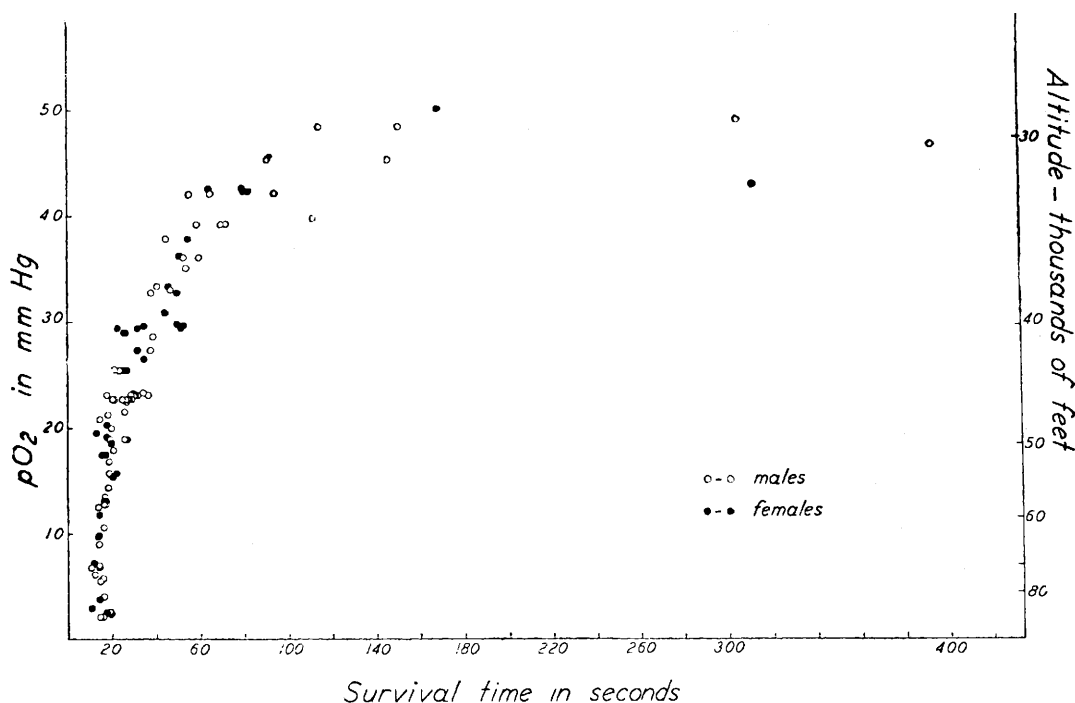


FIG. 1.

terminated. A critical barometric pressure of 100 mm Hg exists below which no further reduction in survival time occurs. The pO₂ at which survival no longer is dependent on

oxygen pressure is therefore about 21 mm Hg. No sex difference in survival of mice was found.

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Serum Lipids and Their Fractionation in Alloxan Diabetes in the Rabbit.* (17673)

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In 1945 Kendall *et al.*(1) showed that a transient hyperlipaemia and hypercholesterolaemia may or may not occur during the early stages of uncontrolled alloxan diabetes in the rabbit. Duff and Wilson(2) subsequently

confirmed these findings, making a more careful study of the serum cholesterol over a longer period of time. So far as we are aware, however, there has been no detailed study of the other serum lipids in alloxan diabetic rabbits. The lipids of the serum are characterized by two important features: in the first place the different lipid components are known to show an interrelationship which is more constantly maintained and, therefore, of more

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