und er in einzelnen oder mehreren Schuppen nicht ausgebildet. Zur Untersuchung der oberirdischen Form wurden 155 Originaltiere aus 8 verschiedenen, über den gesamten atlantischen Einzugsbereich Mexikos verteilten Lokalitäten herangezogen. Keines dieser Individuen zeigte Fragmentationen des Rumpfkanals, die denen der Höhlenform vergleichbar gewesen wären.
Der Rumpfkanal ist vor allem bei Formen des freien, bewegten Wassers gut ausgebildet. Derartige Biotopbedingungen spielen aber in den unterirdischen Lebensräumen dieses Fisches im Gegensatz zu den Verhältnissen in seinem oberirdischen Lebensraum kaum eine Rolle. Es besteht daher die Vermutung, dass die Störung in der Ausbildung des Rumpfkanals bei den kavernikolen Populationen eine Folge der Tatsache ist, dass dieser seine biologische Funktion zumindest zu einem gewissen Grade verloren hat. In diesem Falle wäre diese Erscheinung als regressiver Prozess zu betrachten[7-9].
Die Tatsache, dass der Rumpfkanal der in stagnierenden Gewässern lebenden oberirdischen Populationen nicht von vergleichbaren Phänomenen betroffen ist, könnte darauf zurückgeführt werden, dass diese Lebensräume erst in einer geologisch rezenteren Zeit als die Höhlen besiedelt wurden. Weitere Untersuchungen müssen zeigen, ob die beobachteten Fragmentationen lediglich umweltbedingt sind, oder ob sie eine genetische Basis haben.

Unusually high oxygen effect in cortisone resistant thymocytes

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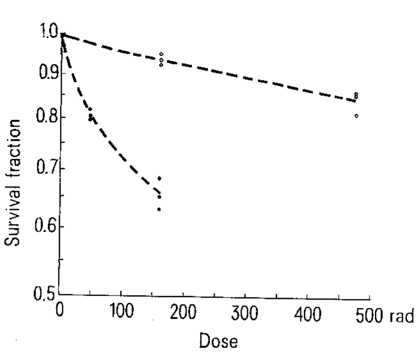
Summary. Thymic lymphocytes were assayed for their radiobiological oxygen effect. We found a large OER (12 ± 0.8) for the cortisone-resistant fraction in contrast to a normal OER (3.5 ± 0.8) for the cortisone-sensitive ones. Possible correlation of this difference with known characteristics in membrane related parameters are briefly discussed.

Radiobiological oxygen enhancement ratio (OER) with low LET radiation for the majority of cells studied is less than 3.5 and mostly between 2.5 and 3.5[2,3]. One notable exception seems to be the OER for small lymphocytes of lymphnodes which show an OER of about 12[4]. For lymphocytes involved in 'Graft versus Host' reaction, an OER of 2.7 has been described[5].
Due to the clinical and theoretical importance of this facts, we decided to study the OER in other lymphocyte populations in vitro. We selected the thymus lymphocyte population because, using cortisone, it is possible to obtain subpopulations with remarkable differences in their physiological and membrane structural properties[6]. As donors of normal thymocytes, 4–6 weeks old isogenic RK mice were used. The cortisone-resistant fractions were obtained by injecting i.p. 3 mg of hydrocortisone acetate (Nutritional Biochemical Corporation, Cleveland, Ohio, USA) per mouse 4 days before sacrifice. Lymphocytes were irradiated in vitro with X-rays (120 KV, 4 mA, total filtration 3.5 mm Al + 2 mm Pyrex Glass) at a dose rate of 79 rad/min as determined by ferrous sulfate dosimetry. Irradiations were carried out in closed Pyrex containers under continuous stirring and air or nitrogen flow. Possible contamination of nitrogen was excluded by gasing through a washing bottle containing a saturated pirogallol (Merck, Darmstadt, Federal Republic of Germany) solution alkalinized with sodium hydroxide (Merck, Darmstadt, Federal Republic of Germany). For oxygen free irradiations, the cell suspension was allowed to equilibrate with nitrogen for 15 min. The medium used throughout the experiment was Minimal Essential Medium (Eagle, Grand Island Biological Company, California, USA.) supplemented with 8% bovine serum, 0.023% Hepes buffer (SIGMA, Chemical Company, St. Louis, USA.) at pH 7.4 and antibiotics. Extraction and irradiation were carried out at room temperature. The whole procedure took 2–2.5 h from sacrifice until beginning of incubation of the lymphocytes for 6, 7, 8 and 9 h at 37 °C. At the end of the given incubation times, lymphocytes were tested for viability with the Trypan blue exclusion test. For each time and experimental condition, a non-irradiated control was included in each experiment. The given survival fraction is referred to the corresponding internal control. Non-irradiated controls showed no significant difference between N_2 and O_2 treatment. Viability in cortisone-resistant thymocytes was 10–15% lower than normal cells. Total cell counts were constant at all times and under all experimental conditions.
The figure shows the results for the cortisone-resistant fraction (about 5% of the total population) of the thymic



Survival fraction as a function of dose in cortisone resistant thymocytes under hypoxic (o) and aerobic (.) conditions. The data of 3 independent experiments with 9 mice each are shown.

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lymphocytes at 7 h p.r. These results taken together with the readings at times 6, 8 and 9 gives OER = 12.2 ± 0.8. The corresponding OER for the whole population which represents principally the cortisone sensitive fraction, is OER = 3.8 ± 0.8

These results taken together with Trowells experiments[4] give some evidence for the existence of characteristic lympnocyte subpopulations having an abnormally high OER. Since there are similarities between small lymphocytes of lymph-nodes and the cortisone-resistant fraction of thymocytes in some membrane structural and functional parameters, the high OER common for both may be related to membrane properties according to participation of membrane structures in radiobiological oxygen effect as proposed by Alper[7]. Besides the theoretical consequences, this statement may have clinical implications for the radiation therapy approach with modified oxygenation.

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Brain weight in homing and 'non-homing' pigeons

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Summary. Homing pigeons show a 5% higher brain weight than fantails and strassers. This difference is statistically significant and independent of body size. There are no allometric differences in the eye weights.

Homing ability varies among the several hundred breeds of domestic pigeons, and comparing homing pigeons with breeds that lack the homing ability should show up morphological and physiological differences which may be related to homing. We have compared the eye weight/'body size'[1] and the brain weight/'body size' relation in 2 groups of domestic pigeons using the logarithmic form of the equation of simple allometry to adjust the samples to the same body size:

$$\log y = a \log x + \log b$$

where y is organ weight, x is 'body size'[1] and a and b are calculable constants[2,3]. The first group, 'non-homing pigeons' (n = 33), consists of 2 breeds which almost lack the homing ability: fantails (n = 12) and strassers (n = 21). The second group contains only homing pigeons (n = 28) which had proved their homing ability by returning to their loft on several occasions after being released up to at least 300 miles away.

Eye weight is correlated with 'body size' in the 'non-homing' (r = 0.94) and homing (r = 0.37) pigeons (figure 1). The slope a, for the 'non-homing' breeds is 0.517 and for the homing breed 0.811. Based on a_{in}, the slope 'within' the 2 groups[3], log b is –1.269 for the 'non-homing' breeds and –1.265 for the homing breed. There is no significant difference between these values[2,3]. This suggests that a lack of homing ability in fantails and strassers is not associated with poorer vision in these breeds and supports the observation that accurate vision is not necessary for homing[4].

Brain weight and 'body size' are highly correlated in both the 'non-homing' (r = 0.92) and homing (r = 0.54) pigeons. There is no statistical difference between the slopes of the 'non-homing' (a = 0.412) and homing (a = 0.551) breeds and a_{in} = 0.418. Based on a_{in}, log b is –0.752 for the 'non-homing' pigeons and –0.730 for the homing breed; these values are statistically different ($p < 0.001$). Thus, there is an allometric difference of 5% in the brain weights between homing and 'non-homing' pigeons. Homing pigeons have relatively larger brains. If the allometric difference is calculated using body weight rather than 'body size' it is 7.5%. This higher value does not reflect the true situation since the

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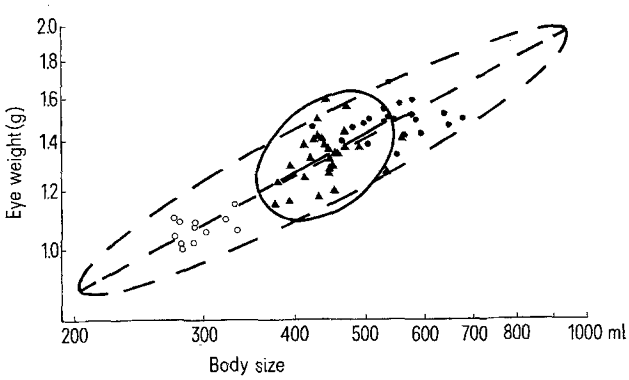

Fig. 1. Relationship between log eye weight and log 'body size' in 3 breeds of pigeons. ○, Fantails; ▲, homing pigeons; ●, strassers. The ellipse of distribution for the homing pigeons is indicated by a solide line. Since the slope of the major axis of each ellipse is not significantly different from a_{in}, a_{in} has been used for the 2 axes.

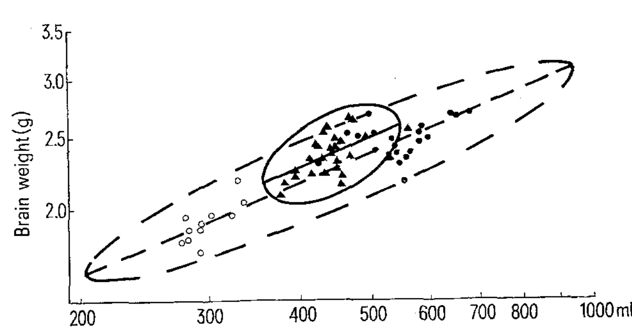

Fig. 2. Relationship between log brain weight and log 'body size' in 3 breeds of pigeons. Symbols as in figure 1. Again we have used a_{in} for the slope of the 2 axes. The axis for the homing pigeons indicates a body size independent increase in brain weight of 5% in comparison with 'non-homing' pigeons.