Urethan ebenso wie die Arousal-Reaktion nach sensorischer oder direkter reticulärer Reizung beeinflusst[4-6]. Barbiturate verursachen an den Motoneuronen des Rückenmarks der Katze einen präsynaptischen Effekt, der die Ausschüttung des Überträgerstoffes verringert[7]. Es ist daher unter der Voraussetzung, dass in der Formatio reticularis ein ähnlicher Wirkungsmechanismus vorliegt, verständlich, dass es unter Pentobarbital zu keiner hypoxiebedingten Arousal mehr kommt. Das Urethan verursacht in der verwendeten Dosis einen schlafähnlichen Zustand des intakten Tieres, der unter anderem durch Deltawellen im EEG gekennzeichnet ist. Mittelhirndurchtrennung vor der Urethanapplikation verhindert das Auftreten dieses EEG-Bildes[8]. Obgleich somit eine Hirnstammwirkung dieses Präparates wahrscheinlich ist, lässt es die Hypoxie-Arousal, wie auch die Arousalreaktion nach reticulärer und sensorischer Reizung[9] unbeeinflusst. Die beschriebene Latenzzeitverlängerung unter Urethan bis zur Arousalreaktion könnte in dem stoffwechseldepressiven Effekt dieser Substanz begründet sein.

Summary. The influence of pentobarbital and urethan on the hypoxia induced EEG arousal was studied in adult rats and rabbits. A depression of this EEG reaction by pentobarbital was found, while the arousal was unchanged by urethan. A possible mechanism for these findings is discussed.

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Regeneration of the Testes in the Clawed Toad (*Discoglossus pictus* Otth.) After Complete Surgical Removal[1]

The point of origin of these experiments was an investigation on the relationships between seminal vesicles and gonads. As is known, the seminal vesicles of *Discoglossus pictus* are very large during the reproductive season[2]; in order to investigate whether they regress in the absence of the testes these were surgically removed[3]. The results demonstrated that there is no regression, and that the development of the seminal vesicles is independent of the testicles.

During the course of this investigation it was noted with considerable interest that in some of the experimental animals there was evidence of testicular regeneration. This observation suggested the necessity of a systematic research, the results of which are reported here.

The surgical removal of the testes in *Discoglossus* is a relatively simple operation as the testes are clearly defined; there is no doubt that the whole testes is removed during the operation.

Bilateral removal was undertaken on relatively young but sexually mature males. A longitudinal incision was made in the abdominal region; the testes were withdrawn

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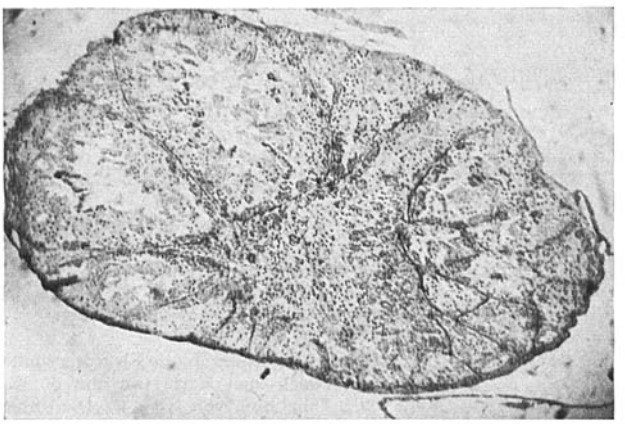

Fig. 1. Transverse section of regenerated testes.

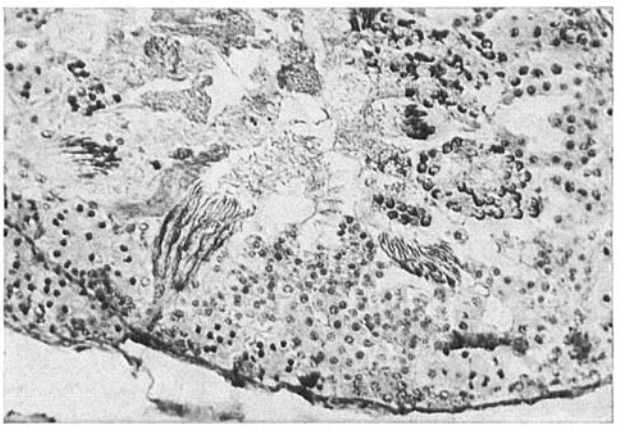

Fig. 2. Tufts of sperm present in regenerated testes.

and cut at the point of origin of the spermatic duct. In some cases the removal of the testes was done in 2 stages.

The experimental animals were examined after 2, 3 or more months, and showed regeneration of the testes in about 50% of the cases. Bilateral regeneration was almost always observed, and often one of the testes was much smaller than the other. In many cases there was regeneration 2 months after the operation. Histological sections showed the typical structure of the testes, with spermatocytes in all stages of development (Figure 1) and even tufts of sperm (Figure 2) in some cases. The great development of the fat bodies in the animals with regenerated testes should be noted. In all cases the fat bodies were in direct communication with the regenerated testes.

The origin of the regenerated testes is not known as yet. The most obvious hypothesis is that they are derived from somatic cells of the sperm duct which have dedifferentiated and then redifferentiated. They are clearly not derived from fragments of testes accidentally left after the operations. A more extensive paper is in preparation.

Riassunto. Dopo ablazione totale dei testicoli in *Discoglossus pictus* si ha rigenerazione. Nei testicoli rigenerati si riscontrano spermatociti in tutti gli stadi di sviluppo e talvolta anche spermi. È avanzata l'ipotesi che la rigenerazione avvenga a partire da cellule somatiche degli spermidutti.

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The Distribution of Glucose and Methyl-Glucose Between the Liver and Plasma in Normal and Insulin Injected Rats

It appears to be a well established fact that in vivo glucose enters the liver cells rapidly and is contained therein at a concentration slightly higher than in the blood plasma[1,2]. This calculation involves the assumption that glucose in the liver is distributed uniformly in the total volume of tissue water. However, if some part of the cell water is not accessible to glucose its actual concentration in other parts of the cell water has to be higher than estimated. Insulin was shown to increase the apparent glucose space of the liver, i.e. the ratio of the concentrations of glucose in liver tissue and plasma[2]. The validity of this finding was challenged[3] by pointing out that the determination of the glucose space of the liver in the absence of a dynamic steady state of plasma glucose may lead to a biased estimate[4].

The aims of the present study are: (1) to establish the distribution space of an unmetabolizable glucose analogue, 3-methyl-glucose (MEG) in liver water; (2) to calculate the average glucose concentration in the 'available' water of the liver, assuming that MEG and glucose enter the same volume of liver water; and (3) to establish whether insulin has any effect on the distribution space of MEG and/or the apparent distribution space of glucose in the liver of animals which are in or close to a dynamic steady state with respect to their glucose and MEG levels in the plasma.

Methods. Experiments were carried out on fasted male rats under Nembutal anaesthesia. A priming dose of 0.25 μC (18 μg) of ^{14}C-labelled MEG injected into the jugular vein was followed by a 0.004 μC/min (0.012 μg/min) infusion of MEG to keep the concentration of MEG constant in the plasma. After 60 or 120 min, 0.4 ml blood was taken from the aorta and a quick-frozen[5] sample of liver was removed. Another liver sample was weighed and then dried at 110 °C for 24 h. One gastrocnemius was analysed for ^{14}C activity and the other dried as above. 5 rats received i.p. injections of crystalline insulin (Toronto): 1 U at the beginning and 1 U at the mid point of the 60 min infusion of MEG.

Glucose and MEG were extracted from liver and muscle as described by MORGAN[6]. Glucose was determined enzymatically[7] and MEG as the radioactivity present in the extracts. Total tissue water (ml/g) was calculated as the difference between the wet and dry weight of the sample, plasma was assumed to contain 0.94 ml H_2O/g, the ratio of the concentrations in total tissue water and plasma water will be referred to as the calculated distribution space of MEG and/or glucose. Since MEG is not metabolized, the distribution space of MEG was taken as an estimate of the actual volume of water in which MEG and presumably glucose are distributed.

Results and discussion. The results are summarized in the Table. It appears that MEG equilibrates with only about 85% of total tissue water in the liver. This calculated distribution volume was not increased significantly by prolonging the infusion of MEG from 1–2 h, the equilibrium was 'complete' after 1 h. As insulin did not cause an increase in the distribution volume of MEG, it appeared that no part of liver water inaccessible to MEG had been made accessible to it by insulin. Our results are in essential agreement with those of BERTHET et al.[8], who found that ^{14}C-glucose equilibrates with about 72% of the total water of incubated liver slices, and this % is not altered by a concentration of insulin active in other respects. CSAKY and GLENN[9] found that after a single injection, unlabelled MEG was dissolved in 100% of total liver water in nephrectomized rats. The slight discrepancy

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