AMD-treated tadpoles. From the close agreement of the values obtained, the inhibitory effect of AMD on the accumulation of cathepsins in the tails of prometamorphic tadpoles appears to be highly reproducible.

On the basis of this evidence it is concluded that cathepsins are, indeed, functionally related to histolysis and that the accumulation of these enzymes in the regressing tail must be due to neosynthesis. Further work on the mechanism of action of AMD, particularly in relation to macrophages, is now in progress[13,14].

Table II. Effect of Actinomycin D on catheptic activity in tail tissue

Experiment		Days after AMD injection	AMD µg/animal	Specific activity µg casein/h/µg TN	Ratio C/T	Total activity µg casein/h/tail	Ratio C/T
1	C	5	–	30.77	13.6	2981.6	3.82
	T	5	0.2	2.26		781.1	
2	C	7	–	45.38	12.5	2913.8	3.82
	T	7	0.1	3.63		763.4	
3	C	7	–	32.88	13.5	3224.2	3.48
	T	7	0.1	2.44		924.4	
			Mean ratio C/T		13.2		3.71

C = Controls, undergoing normal metamorphosis. T = AMD-treated tadpoles.

Zusammenfassung. *Xenopus*larven, denen zu Beginn der «Metamorphoseklimax» 0,1 γ Actinomycin D intraperitoneal injiziert wurden, zeigten eine erhebliche Verzögerung der Metamorphose. Biochemisch ist die Hemmung der Schwanzresorption bei behandelten Larven durch die geringe Aktivität der Gewebekathepsine gekennzeichnet.

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[14] Note added in proof: Further experiments have shown that the inhibitory effect of AMD is not abolished by the exposure of the injected tadpoles to L-thyroxine (1:50 million). This indicates that AMD exerts its action by suppressing the responding capacity of the larval tissues.

On the Hepato-Protective Effect of Selenium in Carbon Tetrachloride Poisoning in Albino Rats

A group of researches (SCHWARTZ et al.[1,2]) established that in the liver of rats submitted to a diet containing sufficient amounts of proteins, vitamins, salts and calories, necrotic lesions appear in cases where the protein is given in the form of certain species of brewer's yeast.

According to the findings of SCHWARTZ, in certain yeasts this hepato-protective factor is present, while in others it is lacking. In the yeast extracts showing a hepato-protective effect, it was possible to demonstrate the presence of a selenium compound.

The lack of selenium causes various morphological modifications, varying from one species of animal to another. In rats the effect assumes the form of hepatic necroses. The hepato-cellular modifications show a great variety, from hydropic aspects or those of fatty degeneration up to symptoms suggesting the presence of hepato-cellular necroses. Several authors[3–9] have studied the effect produced by the lack of selenium. The object of this paper is to investigate the effect produced by the administration of small doses of selenium upon the course of acute carbon tetrachloride poisoning.

Our experiments were made on albino rats of both sexes, weighing between 120–150 g. The animals were divided into 4 groups, each consisting of 30 rats. The animals were kept on a semi-synthetic diet, poor in selenium, while the controls were given the customary non-treated diet. The selenium was given per os in the form of sodium selenite dissolved in distilled water.

Group I. During the first 10 days of our experiments, each animal was given intraperitoneally 0.1 ml of a mixture of carbon tetrachloride and sunflower oil in the proportion of 1:1. Following the carbon tetrachloride poisoning, the rats received per os a daily dose of 1 γ selenium/100 g body weight, in the form of sodium selenite, for 21 days.

Group II. The animals were submitted to intoxication during 10 days with a method similar to that used in the case of group I with carbon tetrachloride, but simultaneously we also initiated the administration of a daily dose of 1 γ selenium/100 g body weight. The administration of selenium lasted 31 days, i.e. another 21 days following carbon tetrachloride poisoning.

Group III. During the first 21 days, the animals received a daily dose of 1 γ selenium/100 g body weight. Then, starting with the 21st day, in addition to selenium, the animals were also given carbon tetrachloride, using the same method as the one applied in group I.

Group IV. The animals received the customary diet to serve as controls. After completion of the experiments, the animals were sacrificed.

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Fragments of the liver were fixed in isotonic formalin, neutralized with a buffer solution: then included in paraffin and stained with hematoxyline-eosine. Certain series were stained with Sudan III.

The most severe histological modifications were found in the liver of those animals which were first given carbon tetrachloride and only thereafter selenium (group I). The toxic modifications of the hepatic tissue consisted of the hydropic and lipid degeneration of the parenchymatous cells. The cells showing the most severe modifications were found in the peripheral areas of the lobules, the lipid substance appearing in the form of small fatty droplets. The confluence of these droplets gave rise to a large fatty drop, the cell becoming similar to an adipose cell. In the periportal spaces, and even in the interior of the lobules, we noted lymphocytic and plasmocytic infiltrations. Only a limited number of hepatic cells suffered necroses. In the animals of group II and III, the tissular picture of the liver was identical.

The lipid loading of hepatic cells proved to be slighter, manifesting itself only in the appearance of small droplets of fatty substance in the cytoplasm of a limited number of hepatic cells. It should be noted that the increase of binucleated cells amounted to 8–10%. Only small lymphocytic infiltrations were noted, particularly in the periportal spaces. The lesions were significantly slighter in the liver of animals having received selenium, either simultaneously with carbon tetrachloride (group II), or prior to its administration (group III). This fact allows us to conclude that selenium possesses a protective action towards the toxic effects exercised on the liver by carbon tetrachloride.

When, however, selenium is given later, it fails to stimulate in the same measure the degenerative processes of hepatic cells.

By observing the histopathological picture of the rat's liver, it appears that selenium administered prior to the initiation of intoxication accumulates in the organism and continues to exercise its protective effect also in the subsequent phases of carbon tetrachloride poisoning.

Résumé. Les auteurs ont étudié l'effet hépatoprotecteur du sélénite de sodium administré en doses de 1 γ/100 g du poids corporel, avant, pendant et après l'intoxication de rats avec du tétrachloride de carbone. Ils en ont conclu que, suivant un critère anatomo-pathologique, l'effet antitoxique du sélénite de sodium est de protéger le parenchime hépatique contre l'action du tétrachloride de carbone.

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Vestibular Influences on Vegetative Functions During the Rapid Eye Movement Periods of Desynchronized Sleep[1]

Transient vegetative changes parallel the appearance of the bursts of rapid eye movements (REM) during the desynchronized phase of sleep. At the time of the REM, phasic pupillary dilations appear[2,3] and two kinds of events affect the cardiovascular system: (i) a slight increase in heart rate and blood pressure, followed by (ii) a prominent slowing of the heart rate and fall in blood pressure[4]. These phasic vegetative changes seem to be an integral part of the constellation of events triggered by the mechanism which is also responsible for the episodes of REM. Previous experiments have shown that the medial and descending vestibular nuclei are responsible for the appearance of the REM[5]. The aim of the present investigation was to establish whether the vegetative changes characteristic of the desynchronized phase of sleep also depend upon the vestibular nuclei.

Methods. The experiments were performed on 10 unrestrained, unanaesthetized cats. The electroencephalogram, the electromyogram of the posterior cervical muscles, and the ocular movements were recorded through chronically implanted electrodes. The pupillary changes occurring during desynchronized sleep were observed in complete darkness with the aid of a sniperscope provided with an infrared source[2]. In order to prevent closure of the eyelids during sleep an apparatus made of plexiglass was applied to the cat before the experiment took place. The electrocardiogram was recorded by means of two electrodes placed subcutaneously on the limbs.

Results. The changes in pupillary diameter and heart rate that occur during desynchronized sleep, particularly those synchronous with the bursts of REM, were documented in 7 intact, unrestrained animals (Figure A, B).

Following a bilateral lesion of the vestibular nuclei in 3 cats, the bursts of REM characteristic of desynchronized sleep were abolished; only slow ocular movements and occasional isolated jerks of the eyes were noted. As in intact animals, the pupils constricted tonically in the periods of transition from wakefulness to drowsiness. The myosis gradually increased as synchronized sleep progressed. The pupils became fissurated when the cat reached the stage of desynchronized sleep. The most striking effect of this lesion was the abolition of the short-lasting and pronounced pupillary dilations which in the intact animal appeared in conjunction with the REM. During the episodes of desynchronized sleep, one only observed very slight variations in the tonus of the sphincter of the iris. At these times the transverse diameter of the pupil would vary from a width of 1 mm to complete fissuration. Even the phasic changes in heart rate, which occur simultaneously with the appearance of the outbursts of REM in the normal cat, were absent (Figure C, D).

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