large vacuoles corresponding to coarse lipid inclusions which, at least in this species – in *Agama agama* it seems to be different[7] –, are always more frequent in the central cells.

These findings make it possible to outline an interpretation on the whole, regarding the functional signification of the peripheral layer of interrenal cells in reptiles, as well as to understand the apparently contradictory data existing in the literature. Indeed, these cells are small and show histological signs of hypoactivity in control adults and prepuberal males, which coincides with that observed in normal specimens of other species[4–7]; but they react more rapidly and with a greater intensity than the central cells to the hypophyseal corticotrophic stimulus, quickly surpassing them in size and histological signs of hyperactivity. This is observed as well by effect of exogenous corticotrophin, as by the endogenous corticotrophin which is released consequently to metopirone administration[9], or which must be produced by the hypertrophic corticotrophs of sexually maturing animals[10]. Very probably, the springtime hypertrophy of the peripheral cells observed in some snakes[8,13] is, in a like manner, a response to a corticotrophic stimulus. On the other hand, these cells suffer the atrophy by lack of stimulus also in a more rapid and intense manner, as has been seen in hypophysectomized specimens of *Agama agama*[7]. It is evident that this layer reacts to the corticotrophin or to its absence with the same tendency as the remainder of the gland, but that it has a much greater sensitivity or responsiveness; for this reason it seems suitable to term it the reactive zone.

At present there is no evidence that the reactive and central zones of the reptile interrenal accomplish diverse functions with reference to the synthesis of hormones, as is generally acknowledged for the different zones of the mammalian adrenal cortex. In spite of its external situation and often smaller cells arranged in rounded formations, the reactive zone could be related, owing to its behaviour before similar stimuli, rather to the mammalian fasciculata than to the glomerulosa[2,14,15].

By its great sensitivity, the reactive zone of the interrenal gland of reptiles is evidently a useful index, which should be taken into account in the histophysiological studies concerning this organ.

Resumen. El estudio histofisiológico de la glándula interrenal de un lagarto teído (*Cnemidophorus l. lemniscatus*) permitió poner de manifiesto la que se denominó zona reactiva de la glándula. Por su situación es periférica, y está constituida por células dispuestas en formaciones redondeadas. Estas células, que tienen normalmente aspecto de menor actividad, responden más rápida e intensamente que las centrales a la acción de la corticotrofina, exógena o endógena, y aparecen entonces más activas que las últimas.

E. Del Conte

Facultad de Medicina, Universidad del Zulia,
Apartado 10.065, Maracaibo (Venezuela), 19 July 1971.

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Intramitochondrial Complexes of Atypical Structures in Hepatocytes of *Triturus alpestris* (Laurenti)

Mitochondria showing atypical internal structure or the presence of various inclusions, both in physiological and pathological conditions, have been the subject of numerous publications[1–12]. During present studies on the fine structure of *Triturus alpestris* hepatocytes, complexes of atypical structures were observed inside some mitochondria.

Three adult males of *Triturus alpestris* reared in tap water were used in this study. Small pieces of the liver were excised and fixed for 1.5 h in 2% OsO_4 in phosphate buffer containing 2.5% sucrose. After dehydration the tissue was embedded in Epon 812[13]. Ultrathin sections were stained with Karnovsky's lead stain A[14] and examined in a Tesla BS 613 electron microscope.

Atypical structures in mitochondria were visible in sections in the form of complexes consisting of a few to a dozen or so elongated bodies localized non-specifically inside the mitochondrial matrix (Figures 1 and 2). Three types of organization of these complexes were ascertained. Complexes of the first type (Figures 2 and 4) contain the bodies of approximately 220 Å thick, arranged parallel, with distances of about 100 Å between them. The ends of these bodies form characteristic club-shaped dilatations. Each body has electron-opaque walls and a brighter core with centrally placed dense structure, approximately 38 Å wide. In the second type of complexes (Figure 3), the bodies show also characteristic dilatations at the ends, but they are devoid of the electron-opaque element and their walls show in sections a sinuous line. Their thickness, as well as the width of space between them, is similar to the previous case. The bodies of the third type (Figures 1 and 5) have, apart from electron-transparent club-shaped dilatations, certain features of crystalline structures. Some of their fragments show hexagonal organization under large magnification.

The electron micrographs obtained suggest that complexes of these atypical intramitochondrial structures represent, in respect to spatial configuration, systems of biconcave and closely assembled lamellae. This is supported by the fact that no sections through these bodies, under the form of circular profiles, corresponding to a tubular structure, were ever observed. Lamellar features of the complexes described suggest that most probably they re-

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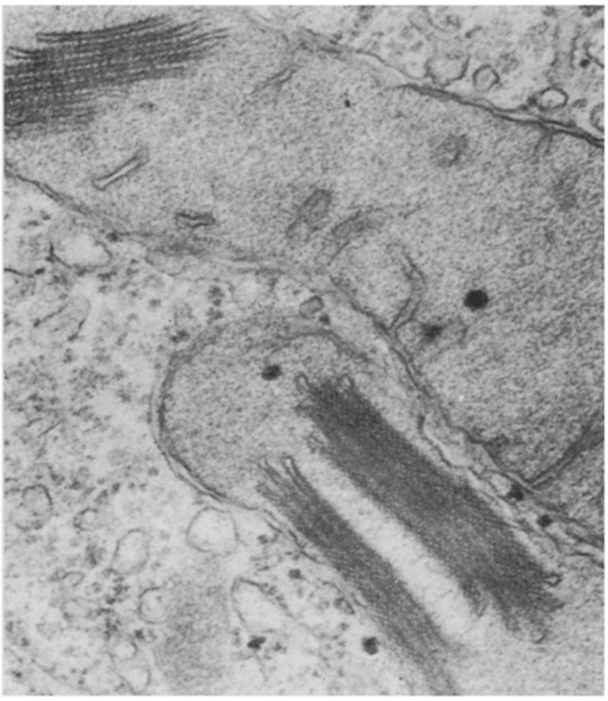

Fig. 1. Mitochondria from the hepatocyte of *Triturus alpestris* with lamellar bodies of type II (lower) and III (upper). ×57,500.

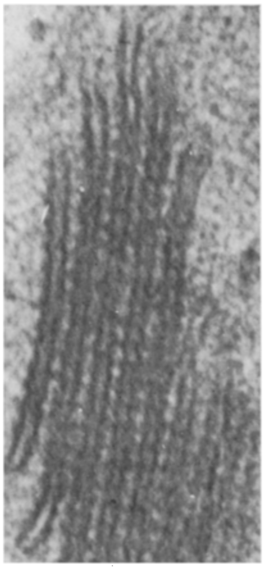

Fig. 3. Higher magnification of the lamellar complex shown in the bottom of Figure 1. ×125,000.

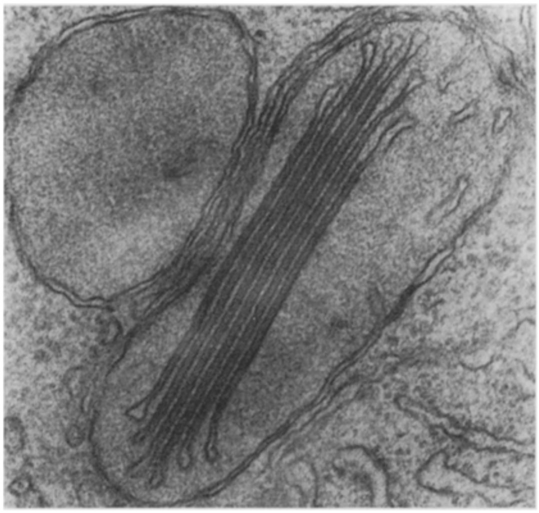

Fig. 2. Mitochondrion showing type I complex of lamellae. ×47,655.

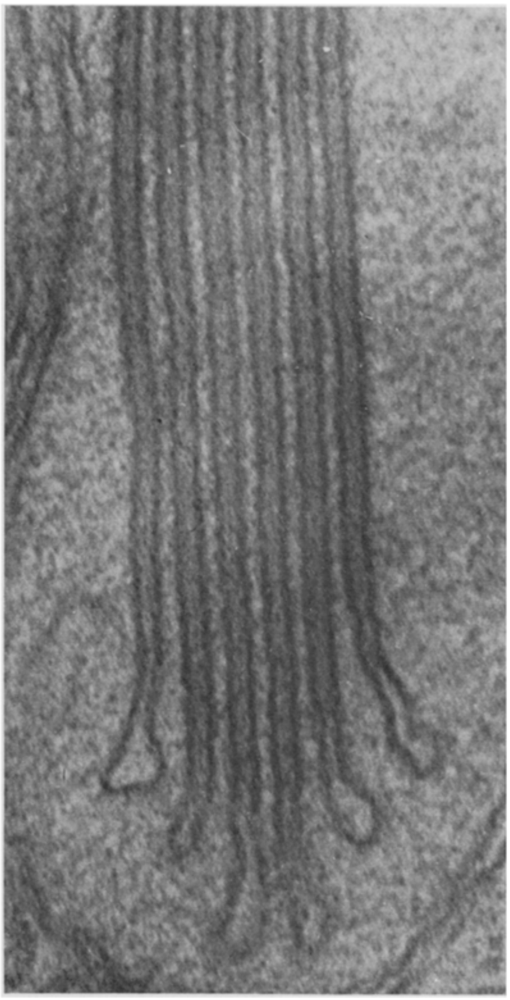

Fig. 4. Higher magnification of the lamellar complex shown in Figure 2. Note electron-opaque lines approximately 38 Å thick running inside the core. ×158,850.

present altered cristae mitochondriales, although no junctions with the internal mitochondrial membrane were encountered. The cristae might be transformed into the bodies described by some pathological factors (progressive degeneration?), or even by some metabolic processes occurring in mitochondria within physiology limits. Recently SANDBANK, ISHAY and GITTER[15] observed, in mitochondria of the guinea-pig muscle exposed to the toxin of *Vespa orientalis*, the accumulation of cristae under

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[15] U. SANDBANK, J. ISHAY and S. GITTER, Experientia *27*, 303 (1971).

the form of characteristic clumps resembling in the arrangement the complexes described here. It is possible that alterations in the fine structure of the *Triturus alpestris* liver mitochondria are caused by laboratory conditions (particularly pollution of water, especially since the liver of one individual was markedly enlarged. Recently, HALL and CRANE[16] reported the occurrence of electron-opaque rod-shaped structures inside the cristae of heavy mitochondria isolated from beef heart. These structures on sections running parallel to their length and perpendicular to the cristae, appeared as dense continous lines 45–60 Å thick and resembled electron-opaque elements in bodies classified here as type I complexes. The ascertainment whether the latter also form rods described by HALL and CRANE, or whether they have different properties, requires further studies, which are now in progress. The investigations are aimed at establishing the accurate structure of intramitochondrial complexes in hepatocytes of *Triturus alpestris*, as well as their function. Particularly interesting will be to find out whether the differences described in the organization of lamellar bodies concern the same structure in different stages of degeneration, or various stages of physiological adaptation to laboratory conditions; whether they represent sections of the same structure at different planes, or constitute three independent and morphologically distinct complexes.

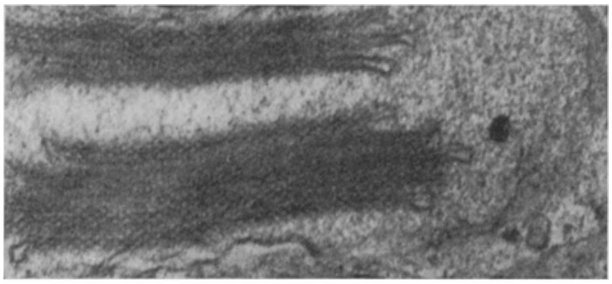

Fig. 5. Fragment of the mitochondrion with crystalline-like lamellar complex. ×138,750.

Résumé. Des structures lamellaires sont décrites dans la matrice mitochondriale du foie de triton (*Triturus alpestris*).

J. GODULA

Department of Systematic Zoology and Zoogeography,
Institute of Zoology, Jagiellonian University,
Krupnicza 50, Krakow (Poland), 19 July 1971.

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Mechanical Recovery Properties of Human Tendons

The collagen fibers are an essential part of tendons, ligaments, bones, capsules of joints, vessels, skin and capsules of organs. They possess several typical mechanical properties. Among these the most important are tensile strength, elasticity, viscosity, relaxation and retardation.

The mechanical recovery function is also an essential physical property of tendons. It plays an important part for all anatomical structures which contain collagen fibers. We are especially engaged with this recovery function of tendons.

Material and methods. We have extirpated the tendon of the M. extensor hallucis longus from corpses, which were preserved in cold-storage-chambers, 36 h after death. Using a technical tensile-testing-machine (type 1381, manufactured by Zwick & Co., Einsingen bei Ulm, Western Germany) we have tested the tendons at a temperature of about 22 °C. To fasten the tendon we used the grips type 8132, also produced by Zwick & Co., Einsingen. In order to prevent the tendon from gliding out of the grips, we put screen linen, produced by Black & Decker, Type 1235–88, between the jaws of the grips and the tendon. We chose a length between the grips of 50 mm. First we expanded the tendon with a strain rate of 2 mm/min to a preload of 8 kg in the 1st experiment (diagram Figure 1), to a preload of 32 kg in the 2nd (diagram Figure 2a) and in the 3rd experiment (diagram Figure 2b). As we wanted to compensate the relaxation we expanded the tendon several times up to this load. This is why a saw-tooth-curve is written. After about 3 min we took the preload away from the tendon with a rate of 2 mm/min in the first and second experiment (diagram Figure 1 and Figure 2a) and with a rate of 8 mm/min in the 3rd one (diagram Figure 2b), until we reached 25% of the starting-point load. Now we can observe an increase of tension in the tendon.

Results. A tendon, which has been extended and from which this load is partly taken away, shows an increase of its own tension when it is held at a constant length. This means: tendons have the property of mechanical recovery when the load is partly reduced. It is remarkable

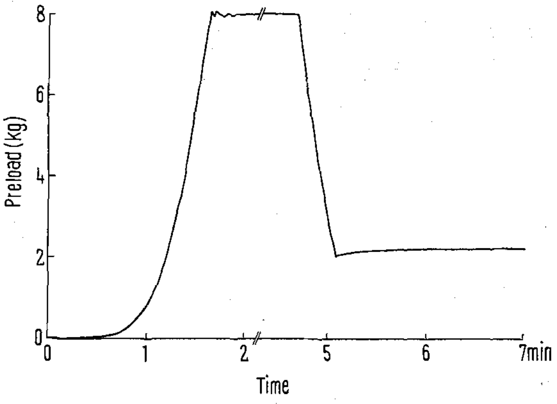

Fig. 1 (time recording). The tendon was expanded with a strain rate of 2 mm/min to a preload of 8 kg. To compensate the relaxation, it was then expanded several times up to this load. After about 3 min we took the tension away with a rate of 2 mm/min, until we reached 25% of the preload. Now the length was held constant and the increase of load was registered.