What is the possible mechanism of this hormonal effect on mating behavior in an insect? As ROTH and WILLIS[8] have shown, the female of some cockroach species, including *Leucophaea*, takes an active part in courtship. An odorous substance excreted by the male causes the female to feed on his tergal gland, and by so doing she stimulates the male to copulate. Unless the female responds in this particular way to the courting male, no mating occurs. To test whether the antennae serve as the organs of smell in this female behavior, the antennae were removed from 16 females shortly after emergence. None accepted a male in an observation period of 26 days. Perhaps, then, the failure of allatectomized females to mate depends on some alteration of their ability to perceive the male odor. Whether the corpus allatum hormone acts on the olfactory center in the brain or directly on the sensory receptors on the antennae, or whether it conditions the female in an entirely different way cannot be determined at the present time.

It will be of interest to learn whether in other insect species the corpora allata likewise influence the mating behavior of the females. Experiments in this direction are under way. It might be worth mentioning that in *Diploptera* allatectomized females are courted and mate as readily as normal animals. The female of *Diploptera*, however, differs from *Leucophaea* in that she plays a rather passive role during courtship[5]. The female of the *Cecropia* moth is also more or less inactive during courtship; even the isolated abdomen of the female is properly mated by the male[9]. Perhaps the corpus allatum hormone conditions the females only in those species where the female actively takes part in courtship, i. e., in species where the proper sequence of courting events consists in mutual interaction between the sexes.

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Zusammenfassung

Von normalen *Leucophaea*-Weibchen werden etwa 90% nach der Adulthäutung innerhalb von 4 Wochen begattet, von allatektomierten Weibchen unter gleichen Zuchtbedingungen nur etwa 30%. Wurden allatektomierten Weibchen 26 Tage post operationem aktive Corpora allata reimplantiert, so kopulierten 82% innerhalb von 12 Tagen. Kastrierte Weibchen zeigten Normalverhalten.

Die Wirkung der Allatektomie auf die Kopulationsbereitschaft wird diskutiert.

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The Intercalated Disc of the Goldfish Heart[1]

Previous electron microscopic investigations have revealed the presence and the fine structure of the intercalated disc in the cardiac muscle of a variety of vertebrates, e.g., mammal[2–6], chick[7], turtle[8], and the toad[9]. The intercalated disc is one of the first structures to arise in the embryonic cardiac tissue[7,10–12]. Its origin and micromorphology are intimately related to those of intercellular bars[8,9,11,12], and its structure is also quite similar to that of the Z-line of cardiac and striated muscle[9,10]. The intercalated disc, in fact, appears to be a specialized type of the ubiquitous intercellular bar, modified in certain contractile tissues such that it interrupts, in simple or complex pattern, the longitudinal myofibrillar pattern, whether found in simple forms as hydroids[13] or in complex forms as in the insectan dorsal vessel[11], and as in the higher vertebrate cardiac muscle, and conducting system[12,14]. It, therefore, would be extremely surprising, and significant, for cellular theories and for phylogenetic concepts, were the intercalated disc to be lacking in the fish as previously reported[15,16].

Electron microscopic preparations were made of the various regions of the heart of the common goldfish (*Carassius auratus*). The methods were the standard ones of fixation in 2% buffered osmium tetroxide, dehydration in graded ethanols, infiltration with a 9:1 mixture of butyl- and methyl-methacrylates, and final embedding in the mixture of methacrylates, initiated with 2% Lucidol, and polymerized at 47°C. Thin sections were cut with a Porter-Blum microtome, using a diamond knife, and the sections examined in a Siemens' Elmiskop I.

Results. – As in mammals, the heart muscle is cellular. The fibers themselves are narrow, one to three fibrils wide in the plane of sectioning (Fig. 1). The cytoplasm appears granular, and contains a large number of mitochondria, which are often long or irregular in shape (Fig. 1). Pinocytotic vesicles are frequently observed, and the endoplasmic reticulum is abundant and highly organized. The Golgi complex is often large, contains the several vesicular and dictyosomal components, is usually located in the residual cytoplasmic area, and often has multivesicular bodies[17] associated with it. The fibrils show all the cross striations including a well-developed N-line (Fig. 7). The Z-band is relatively less dense and less wide than in the mammalian cardiac fiber but shows the vesicular nature (Fig. 2, 4, 7) and has the relations to the endoplasmic reticulum that are common to the mammalian fiber.

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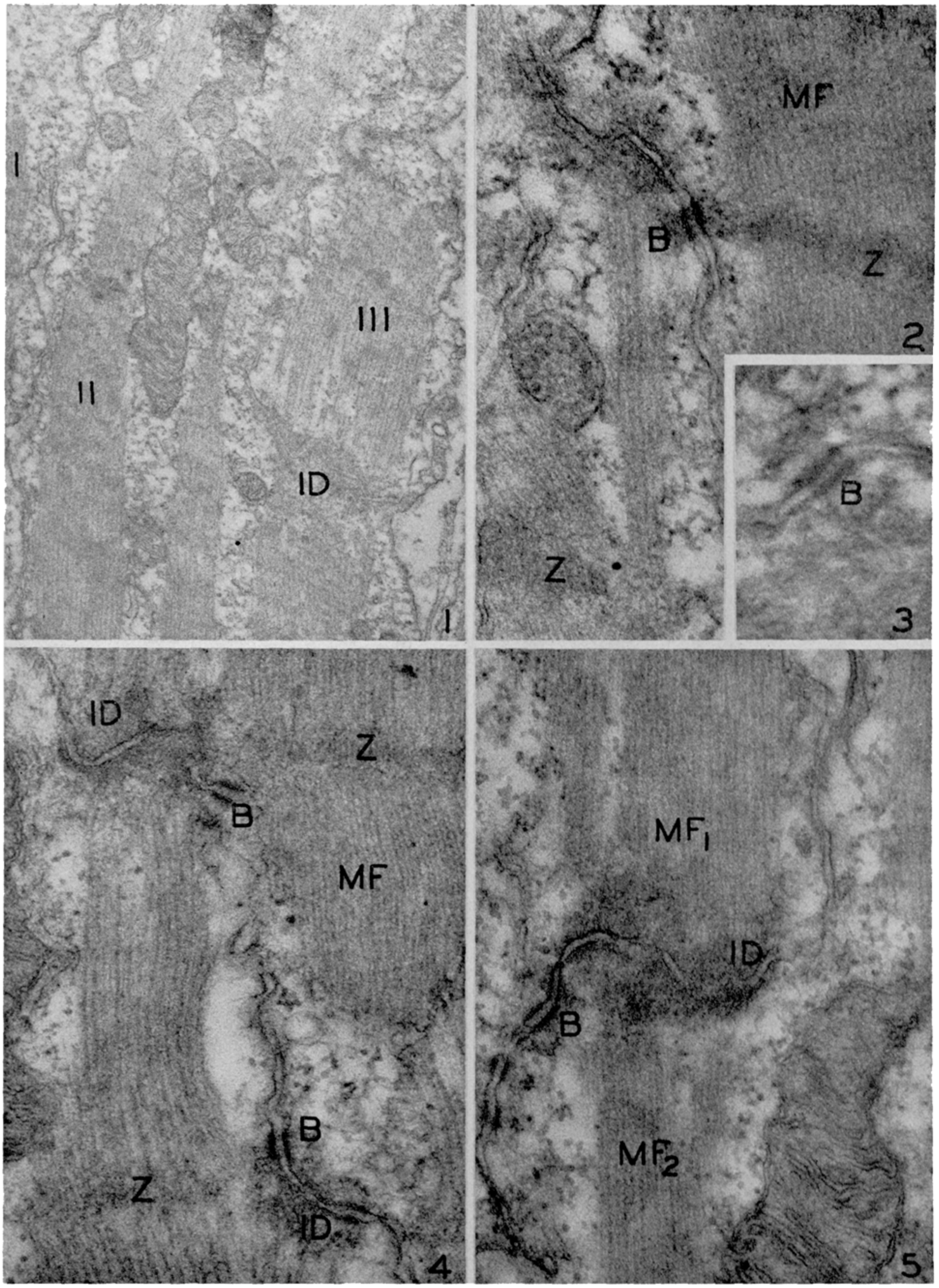


Fig. 1. – Three fibers of the goldfish ventricle. Two of the cells are interrupted by intercalated discs (ID), cells I and II being separated by unmodified plasma membranes and some basement membrane material. The fibers are usually 1–3 myofibrils wide. × 30000

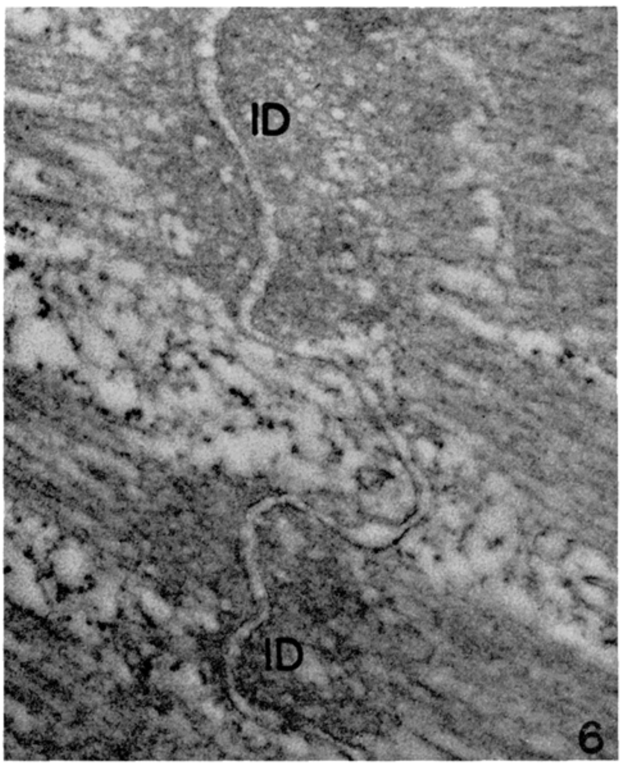
Fig. 2. – Two fibers showing an intercellular bar (B) at the level of the *Z* band of the myofibril (MF) at the right. A specialization of the abutting plasma membranes in the form of a doubling of membranes occurs at the level where the myofilaments terminate just above the bar. × 80000

Fig. 3. – Detail of an intercellular bar, showing the oriented intercellular substance between the modified plasma membranes. × 100000

Fig. 4. – Two abutting cells in which the longitudinal myofibril pattern is interrupted by step-wise simple intercalated discs (ID). The cell borders in the interfibrillar regions are specialized as intercellular bars. Both disc and bar substances are continuous with the *Z* substance of the peripheral myofibril. × 70000

Fig. 5. – Simple intercalated disc (ID) interrupting myofibrils (MF1 and MF2) in two abutting ventricular cells. To the left of the disc is an intercellular bar in the non-fibrillar portions of the cell borders. × 70000

Intercellular abutments are of three types, all of which have been observed in higher vertebrate forms. The most common is the simple intercalated disc, interrupting the longitudinal patterns of single myofibrils (Fig. 1, 4, 5). These often occur in stepwise fashion, the steps being one sarcomere long (Fig. 4). Complex discs, interrupting the pattern of more than one fibril (Fig. 6) also occur, although less commonly. These discs are convoluted but not to the same degree as those of the mammalian cardiac muscle. Either type of intercalated disc may at times be continuous with Z band substance (Fig. 4) and indeed the Z band and disc substances appear to be similar. The similarity is not as striking in the fish as in the mammal, however, in that the Z bands are generally of little density, whereas the discs may be of considerable density and indeed of total width up to 1/3 μ. The disc itself comprises modified plasma membranes, vesicles, filaments, a disc substance, and an intercellular cement of medium density. Structures quite similar in their detail, but shorter, not normal to the long axis of the cells, and not always related to contractile filaments, have been observed associated with, but at times distant from, the intercalated discs. These are termed intercellular bars (Fig. 2–5). They seem to be always associated, at least in one of the abutting cells, with the Z band of a fibril. These intercellular bars correspond to, and include, structures previously referred to as mirror plaques[9], desmosomes[8], and specialized regions of the disc[6].



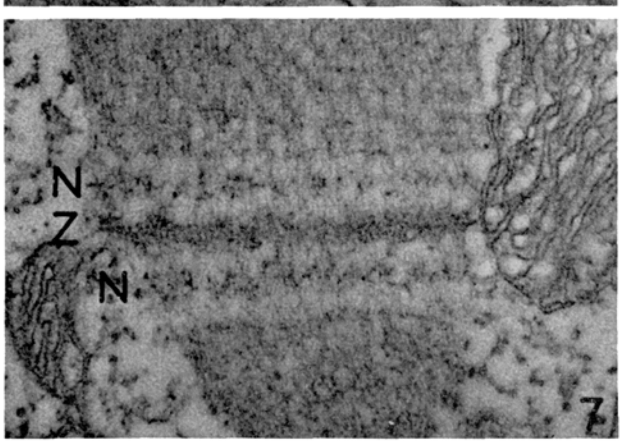


Fig. 6. — Complex intercalated disc (ID) in fish heart, interrupting the longitudinal pattern of several myofibrils. The complex disc of the fish is less convoluted than that of the mammal. × 60000

Fig. 7. — Detail of I region of a myofibril of the ventricular muscle fiber, showing *N* lines on either side of the fairly light *Z* band. × 60000

The results of the present study show that an intercalated disc, closely resembling that in mammalian cardiac muscle, exists in the heart of the fish. In addition, more examples of intercellular bars have been found, in close association with the intercalated disc[8], and the Z band, affording further evidence that these three structures are related to one another.

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Résumé

L'examen au microscope électronique de coupes minces du cœur de cyprin doré révèle la présence de disques intercalaires de forme soit simple, soit complexe, semblables aux disques des vertébrés supérieurs. De plus, les barres intercellulaires sont présentes. La structure et les rapports des disques et des barres avec la bande Z de la myofibrille suggèrent leur proche similarité.

The Importance of Autoplastically Transplanted Pituitaries for Survival and for Regeneration of Adult *Triturus*

The essential role of the pituitary for the initiation of regenerative processes having been discovered in 1926[1] and definitively established in a series of other researches[2–4], it became imperious to investigate firstly, whether heterotopically transplanted pituitaries were able to support the vital functions indispensable for survival, and secondly, whether grafted pituitaries away from their normal nervous connections, were still capable of providing the required stimuli for regeneration. Autoplastic transpantations were performed on 163 adult *Triturus viridescens* (kept at 20° ± 1° C) into the anterior *eye-chamber*, the *manus* or the *tarsus*. Direct observation under the binocular permitted to establish vascular connections between the eye and the pituitary within 5 to 10 days; for the manus and the tarsus it was established by histological examinations that vascularization occurred somewhat later in most, but not in all the cases.

I. *Survival patterns after autoplastic pituitary transplantations.* Hypophyseoprivic controls begin to die fifteen days after the operation and only 11% live as long as fifty

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