The Elasticity of the Collagen Triple Helix

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The stress-strain diagram of native wet collagen fibers shows two linear parts which are separated by a sharp kink [1]. With the help of x-ray diffraction (Fig 1) and the use of a synchrotron x-ray source [2] we were able to demontrate the following:

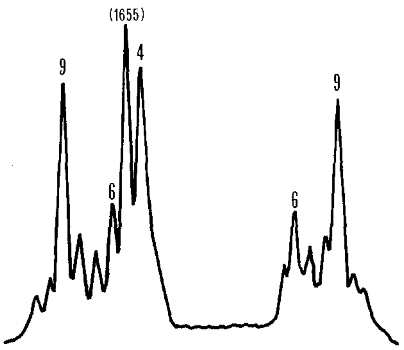

Fig. 1. Meridional x-ray reflections from a 22-month-old RTT fiber (∅ 0.09 mm^2; strain 7%). The spectrum was recorded by a position-sensitive detector with a xenon-methane mixture as chamber gas. Time of exposition 100 s; max. peak height 1655 pulses. In order to exclude disturbing scattering a large zone around the primary beam was masked. The distance of the peaks of the 9th order comes to 395 channels. This being so, the resolution is approximately the width of one channel, and one can minimally detect a change of 0.25%. The low-angle spacing amounts to 685 ±1 Å. After discharge it was reduced again to the starting value of 670 Å

1. The 670-Å low-angle spacing is due to secondary units which will not be influenced in the lower part (strain <3%), because,
2. the intermolecular cross-links out of peptide chains will be elongated in such a way that the secondary units can slip reversibly [3].
3. In the upper linear part (strain >3%) the force is applied to the secondary units and now the triple helix itself becomes elongated elastically, so that the low-angle spacing increases reversibly by 2–3%.

A detailed communication will be published elsewhere.

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Giant Fibres in the Ventral Nerve Cord of *Peripatoides leuckarti* (Onychophora)

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The Onychophora are of interest because they occupy a unique phyletic position between the annelids and arthropods. There are some older descriptions of the anatomy of the nervous system (for review see [1]) but information on its fine structure and function is lacking. This study describes a polysegmental giant-fibre system in the ventral nerve cord of the Australian Onychophoran *Peripatoides leuckarti*.

Morphology. A pair of large fibres (15–20 μm in diameter in animals more than 2 cm long) is found in the dorsal part of each nerve cord and can be traced along the segments up to the connectives of the brain in serial sections. One of these giant fibres lies adjacent to the medial pericaryal layer; the other is situated more laterally (Fig. 1a). Cell bodies of the giant fibres are still undetected and it is therefore unclear whether the giant fibres represent single axons or belong to a train of nerve cells. Electron microscopy reveals a tiny glial sheath with extracellular collagenous material around the giant fibres which is often interrupted by small naked fibres or by the protrusions of the giant fibres making synaptic contacts.

Electrophysiology. The conduction of impulses along the ventral nerve cord was investigated by recording extracellular electrical responses after electrical or mechanical stimulation. A single electric shock applied to the nerve cord evokes multiphasic compound action potentials which are conducted in both directions along the cord. A short-latency large-amplitude component, which can appear as a simple triphasic or as a smaller multiphasic potential, is a characteristic feature of the response. These responses do not occur

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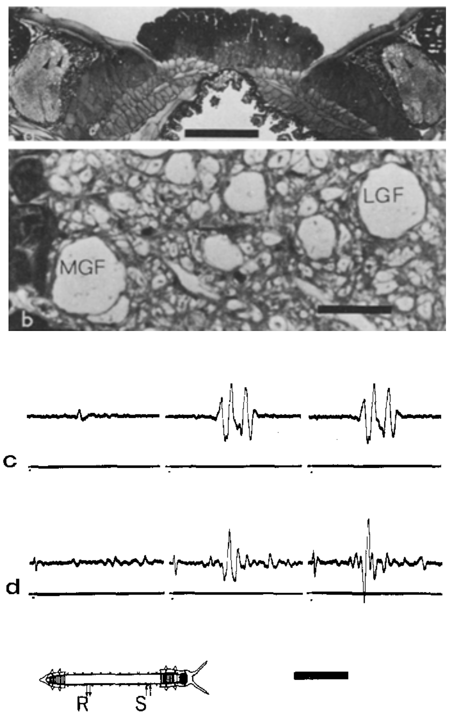

Fig. 1. Transverse section through ventral nerve cords and muscles of *Peripatoides leuckarti.* (a) Position of the giant fibres in widely separated nerve cords is marked by arrows. Scale 200 μm. (b) Medial (MGF) and lateral giant fibre (LGF). Scale 20 μm. (c, d) Recordings from ventral nerve cord after single electric shock. (c) Large compound potential remains unchanged when the stimulus intensity is increased. Asynchronous arrival of action potentials of two axons at recording site. (d) One axon activated initially (*middle*); large potential caused by simultaneous arrival from spikes of two axons (*right*) when stimulus intensity increased. Drawing shows nervous system, recording site (*R*) and stimulus point (*S*); time scale 20 ms

spontaneously and are produced in all-or-nothing fashion with carefully controlled stimulus intensities (Fig. 1c). Small changes in suprathreshold intensities can be accompanied by abrupt changes in the shape of the short-latency potential (Fig. 1d). They are understood as combined action potentials of two large axons. Separation between the spikes of two large axons was found in some preparations where stimulus and recording site were far apart from each other indicating slightly different conduction velocities of the fibres (Fig. 1c). These short-latency spikes are the largest electrical events recorded after electrical stimulation ipsi- or contralateral to the recording site. Spikes run equally well in both directions along the cord as expected for a through-running axon system. It is reasonable to attribute the described action potentials to the two giant fibres shown by morphology. The conduction velocity of the giant fibres was determined as 1.14 m/s ($n=19$) and fell in the range of 0.7–1.7 m/s.

Giant-fibre responses can be produced by mechanical stimulation of the antennae, the dorsal parts of the head, the tail, the feet and dorsolateral body walls. The strongest phasic discharges of the giant fibres were obtained from touching the head or tail. The response shows rapid habituation. Contralateral response is prevented by cutting the commissures of the ladder-like-type nerve cord near the stimulus site.

The animal displays different fast reactions when touched or pinched. One of them is a quick shortening of the body including several segments when the head or tail is stimulated. The contraction shortens the soft-body animal up to 65% of its former length in 200–500 ms. It is assumed that the activity of the giant fibres is associated with rapid overall body movements.

The acquisition of a fast-conducting through-running giant-fibre system is a typical feature of many polysegmental invertebrates. The giant fibre system of *Peripatoides* shows considerable similarities to those of annelids with respect to morphology and function in relation to behavior (for comparison see [2]).

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Erhöhung der Beutefang-Effektivität durch Librium

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Librium® (Chlordiazepoxid-hydrochlorid), ein Psychopharmakon vom Typ der Tranquilizer, wird beim Menschen allgemein zum Lösen von Angst-, Spannungs- und Aufregungszuständen eingesetzt. Von Tierversuchen, z.B. an Affen und Ratten, sind „Zähmungseffekte" bei zuvor wilden Tieren und Abnahme der Aggression beschrieben worden [1, 3].

Das Beutefangverhalten des Frettchens (*Putorius furo* L.), eines primitiven Vertreters der Überfamilie Canoidea, besteht zu großen Teilen aus Instinkthandlungen, die durch äußere Reize ausgelöst werden und relativ starr ablaufen [2]. Librium-Konzentrationen von 1 mg/kg Körpergewicht verändern dieses Beutefangverhalten charakteristisch. Frettchen benötigen zum Suchen und Fangen von Ratten (200 – 300 g, Stamm Wistar) bis zu 60% weniger Zeit als üblich ($p<0{,}05$, Mann-Whitney-U-Test) und wirken konzentrierter als im Normalverhalten. Die Anzahl der Bisse zum Töten der Beute verringert sich um 30% ($p<0{,}05$); die Gesamtdauer des Beutefangverhaltens sinkt um 25% ($p<0{,}05$).

Librium hat damit eine größere Effektivität des Beutefangverhaltens zur Folge, was nicht zu den bekannten Befunden mit dieser Droge paßt.

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Disparlure: Differences in Pheromone Perception between Gypsy Moth and Nun Moth

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Under field conditions, males of the nun moth, *Porthetria monacha*, and males of the gypsy moth, *P. dispar*, respond to synthetic (7R, 8S)-(+)-disparlure. However, the addition of (7S, 8R)-(−)-disparlure in racemic proportion significantly suppresses response by *P. dispar* [1] while the racemate does not have such effects on the response by *P. monacha*.

In the absence of chemical messengers unique to the species, differences in pheromonal communication systems among sympatric insect species have been related to pheromone-pheromone combinations [2] or pheromone-kairomone systems [3]: related species share identical compounds but react to varied combinations. We present evidence that species-specificity in chemical communication might be achieved, in part, through the chiral quality of one pheromonal messenger.

Sticky traps baited with (+)-disparlure,

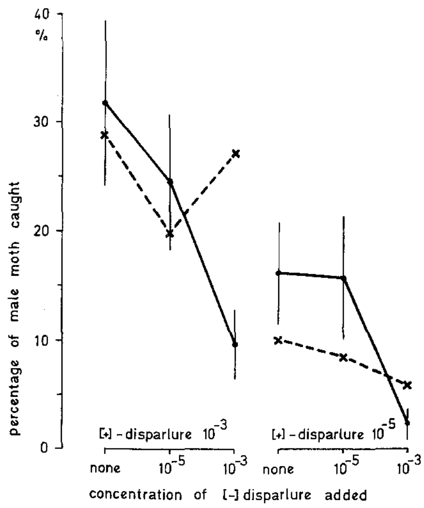

Fig. 1. Response of *P. monacha* (broken lines) and *P. dispar* (solid lines) to (+) and racemic concentrations of disparlure in pentane (data for *P. dispar* from [1]; vertical lines give 95%-confidence limits)

