Le cellule neurosecretrici di *Mesostoma* sono localizzate alla periferia del ganglio cerebroide, sono distinte nettamente dalle normali cellule nervose sia per caratteri morfologici che per le affinità tintoriali; inoltre l'orientamento dei poli neuritici in un unico senso è simile alle figure notate da SCHARRER nei Nemertei.

Si può concludere per ciò che nelle zone periferiche latero-dorsali del ganglio cerebroide di *Mesostoma* esistono elementi con caratteri abbastanza tipici di cellule neurosecretrici che rappresentano per ciò il tipo filogeneticamente più primitivo di un sistema neurosecretore.

Summary. This investigation is concerned with the neurosecretory activity in the cerebral ganglion of a rhabdocoel turbellarian: *Mesostoma lingua* (Abildg.).

It was observed that the neurosecretory activity is primarily localized in the pear-shaped cells, situated near to the region where the external anterior cords arise from the dorsolateral tract of the cerebral ganglion.

The neurosecretory material appears to be transported – via the ventral cords – to the transverse cord behind the pharynx, where it is stored. Then, probably, it flows down into the parenchyma.

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Depression of the Isolated Guinea-Pig Uterus by Reserpine

WITHRINGTON and ZAIMIS[1] found that cats treated with reserpine (1 mg/kg) developed acute heart failure which could be partly counteracted by ouabain, and NAYLER[2] showed that on the isolated, electrically stimulated toad heart reserpine had a direct depressant action in concentrations up to 5 μg/ml which could be partly reversed by caffeine, ouabain and an increase of extracellular calcium. Ouabain has been found to stimulate the guinea-pig uterus[3], and it seemed of interest to see whether reserpine directly depressed the isolated uterus, and if so whether this could be reversed by ouabain and other drugs.

Virgin guinea-pigs of 500–700 g were used during natural oestrus, and were given oestradiol monobenzoate 25 μg subcutaneously 24 or 48 h before experiments, in order to ensure standard hormonal conditions. The apparatus used has been described in detail previously[3,4]. Briefly, one horn of an uterus was set up in oxygenated, modified Krebs solution containing $CaCl_2$ 0.46 m*M*, at 30°C. It was stimulated at 50 *c/s* sinusoidal a.c., and it was found that 15 V for 5 sec at intervals of 1 min produced a maximal response. Isometric contractions were recorded with a differential capacitance transducer, the output voltage from which was coupled to a servo recorder from which a kymograph tracing was obtained, and to an integrator motor with which uterine activity was measured as integrated tension in *g* sec over periods of 5 min. Reserpine was used in the form of Serpasil (Ciba Laboratories Ltd.), and was added to the Krebs solution perfusing the organ bath (Krebs-reserpine solution). For control experiments, the solvent used in this preparation of Serpasil was added to the perfusing Krebs solution in the same concentration (control solution). This solution had no pharmacological action on the uterus in any concentration used in these experiments.

Two groups of experiments were undertaken. In one group the animals were pre-treated with reserpine (2 mg/kg subcutaneously) 24 and 16 h before death in order to release endogenous adrenaline and noradrenaline, which stimulate the oestrogen dominated guinea-pig uterus to contract[5]. This was done because NAYLER[2] found that low concentrations of reserpine had a positive inotropic effect, due to release of endogenous catecholamines, in isolated hearts from toads which had not been pre-treated with reserpine; this effect was abolished by reserpine pre-treatment. In the other group of experiments, control animals were pre-treated with the same volume of normal saline.

In both these groups, reserpine in concentrations of 1–5 μg/ml depressed or abolished the response of the isolated uterus to electrical stimulation. No positive inotropic effect was observed on uterine horns from saline pre-treated animals. The rate and degree of depression were related to the concentration of reserpine. In the experiments described below, a concentration of 2 μg/ml was used, which caused a maximum depression or complete abolition of the response to electrical stimulation in about 20 min (see Table I), whether the animals were pre-treated with reserpine or saline. In the results shown in Table I, the response of the uterus to electrical stimulation during perfusion with the control solution was greater when animals were pre-treated with reserpine than with saline. But this was not a general phenomenon, since wide converse variations were also recorded. On changing back from perfusion with Krebs-reserpine to perfusion with the control solution, only slow, partial recovery of the uterine response to electrical stimulation occurred, and the longer

Table I. Response of the uterus to electrical stimulation on changing from perfusion with control solution to perfusion with Krebs-reserpine solution. Guinea-pigs were pre-treated with (a) reserpine or (b) saline. Integrated tension is given in *g* sec ± S.E for successive periods of 5 min. Each result is the mean of 3 experiments

Perfusing solution	Time (min)	(a) Reserpine pre-treatment	(b) Saline pre-treatment
Control	0– 5	1332 ± 11	985 ± 44
Krebs-reserpine	5–10	973 ± 126	730 ± 121
Krebs-reserpine	10–15	603 ± 133	423 ± 173
Krebs-reserpine	15–20	82 ± 67	115 ± 48

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the Krebs-reserpine perfusion had lasted, the less complete was the recovery from depression.

Uterine stimulants were added to the organ bath in a random order and left for 5 min while the integrated tension was measured. They were then washed out for 5 or 10 min until uterine tone relaxed to the baseline. In each experiment, one dose was added during perfusion with the control solution and then repeated during Krebs-reserpine perfusion. Submaximal concentrations were used which, allowing for variations in sensitivity, caused comparable degrees of integrated tension when added during the control perfusion. In Table II the increase in the activity of the electrically stimulated uterus in response to these drugs is shown. The mean results obtained using uterine horns from guinea-pigs pre-treated with reserpine and saline are compared, and as will be seen, they followed a similar pattern in both groups of experiments. Depression during perfusion with Krebs-reserpine solution was only partly reversed by the drugs, the responses to the drugs being significantly less than those obtained during control perfusion. Proportionately, the uterine responses to procainamide, ouabain and calcium chloride were inhibited by reserpine-induced depression much more than those to oxytocin and acetylcholine.

Table II. Increase in the activity of the electrically stimulated uterus in response to drugs added to the organ bath during perfusion with control and Krebs-reserpine solutions. Guinea-pigs were pre-treated with (a) reserpine or (b) saline. Integrated tension is given in g sec ± S.E. Each result is the mean of 7 experiments. [a] = $p<0.02$, [b] = $p<0.01$, [c] = $p<0.001$

Drug concentrations	(a) Reserpine pre-treatment		(b) Saline pre-treatment	
	Control solution	Krebs-reserpine solution	Control solution	Krebs-reserpine solution
Acetylcholine 100 ng/ml	6645 ± 875	2396 ± 415[c]	7493 ± 896	2216 ± 322[c]
Oxytocin 25 ng/ml	4825 ± 555	1431 ± 255[c]	6171 ± 580	2361 ± 262[c]
Procainamide 200 µg/ml	4271 ± 939	644 ± 212[b]	4151 ± 483	209 ± 91[c]
Calcium chlor. 100 µg/ml	4459 ± 975	519 ± 175[b]	5241 ± 657	654 ± 246[c]
Ouabain 0.5 µg/ml	3359 ± 1117	304 ± 178[a]	3747 ± 270	364 ± 124[c]

The depressant effect of reserpine observed in these experiments was complementary to the finding of GUPTA and KAHALI[6] that crude rauwolfia depressed the guinea-pig uterus *in vivo* and *in vitro*, and to the observation that reserpine antagonized the action of 5-hydroxytryptamine on the isolated rat uterus[7].

NAYLER[2] found that reserpine caused an efflux of calcium from the electrically stimulated toad heart, and suggested that the reversal of reserpine-induced depression might be due to an effect on membrane calcium. Since calcium is essential for smooth muscle contraction[8], this might also be true of the uterus. But if so, the results of these experiments indicate that acetylcholine and oxytocin have a much greater effect on membrane calcium than procainamide, ouabain or an increase in extracellular calcium[9].

Zusammenfassung. Reserpin verhindert sofort die elektrische Reizbarkeit des isolierten Meerschweinchenuterus. Eine Depression wurde von einigen Substanzen nur partiell bewirkt, wobei sich auffallende Wirkungsunterschiede zeigten.

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Elicitation of Strikes of Predatory Insects by Projected Images and Light Spots

Praying mantids [*Hierodula* (*Rhombodera*) *crassa*] catch their prey with a very quick movement of their forelegs (extension in 48–75 msec[1]). Dragonfly larvae (*Aeschna cyanea*) strike at their underwater prey with a somewhat slower movement of their extensible labium. The characteristics of the prey which release both the mantis and the dragonfly larva strikes and the feeding behavior of these insects have been previously studied[2–7].

In an effort to develop a method for studying the effective strike releasing parameters more quantitatively we have investigated the reactions of these insects to projected two-dimensional images. The animal is placed in a cage or aquarium, one wall of which is made of a translucent diffusing screen (milk glass or tracing paper), and the images under study are projected through a lens onto this wall. The projection of the image of a live insect allows one to quantitatively vary its size and sharpness, while at the same time retaining the normal movements of the prey. Mantids will readily strike at the projected two-dimensional image of a live moving fly several times enlarged, or even at a severely defocused image of a live fly.

A further simplification of the stimulus is to project only a moving spot. An oscilloscope trace provides an ideal image for such experiments as it may be moved in an

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