The free ribosomes, arranged in rosettes, are still present in great numbers. With progressive maturation of neurons, more profiles appear in the cytoplasm, and an accumulation of ribosome granules can be observed as if queuing up to pass through the nuclear pores. In the final stage of neuronal development, there appears to be a steady state between free and membrane-bound ribosomes. Concerning mitochondria, the great number of mitochondria in embryonic nerve cells must be emphasized. The mitochondria can reach considerable size and their structure is of the crista type. Similar large mitochondria have been reported by TENNYSON[12] for the cord of rabbit embryos.

Discussion. The marked basophilia of neurons seen in light microscopy and referred to as Nissl substance has in electron microscopy its counterpart in an accumulation of profiles densely sown with ribosomes[13–17]. Apart from these membrane-bound ribosomes, the cytoplasm of neurons shows a fair number of ribosomes not attached to membranes which may be called free ribosomes, often arranged in rosettes. It seems reasonable to suggest from our embryo studies reported in this paper that the function of these free ribosomes is the protein synthesis necessary for cell development and maintenance, and that this synthesis is carried out provided messenger RNS is organized to form a rosette of ribosomes[18]. Taking this view into account, it is probable that free ribosomes have the task of synthesizing proteins necessary for the build-up of the neuron which, due to its axonic and dendritic expansion, reaches considerable size in comparison with other body cells. It is not surprising, therefore, to find a continuous expulsion of ribosomes from the nucleus into the cytoplasm taking place while simultaneously mediating the genetic coding necessary for the future structural or functional organization of a particular neuron. The problem, therefore, arises as to what is the functional significance of the progressive increase of membrane-bound ribosomes in the final development stages of neurons. Some neurons show a preponderance of membrane-bound ribosomes (Nissl bodies) in a distinct way. This stage is reached when functional connections of motoneurons have been established with skeletal muscles on the one hand and with receptors on the other.

We would like to suggest as a possible task for these membrane-bound ribosomes the morphological coding of information resulting from the functional interconnection of receptor activity and motor discharge muscular contraction. We tend, therefore, to postulate the preservation of a functional pattern in or around the membrane-bound ribosomal organization capable of preserving a functional pattern of afferent discharges and enabling the cell to discharge in a particular sequence. For this morphological type of coding the same material is being used, namely membrane-bound ribosomes in contrast to free ribosomes carrying out 'genetic orders' and establishing neuronal connections. This speculative view finds some support when we relate our morphological findings to the observations of KUO[19], who finds a rhythmic discharge of chicken neurons after 96 h incubation. In this stage of development a motoneuron has only efferent connections, while afferent stimuli reach the neuron only after 126 h. Examination of cords stained for fibre connections seem to confirm these functional observations, namely that afferent connections follow efferent ones. With progressive establishment of afferent connections, synchronized discharges become more frequent. It is in these stages that the previously discussed appearance of membrane-bound ribosomes becomes more marked[20].

Zusammenfassung. Die Histogenese sowie die Anordnung und Verteilung der Nissl-Substanz wurde an ausreifenden Neuronen des Hühnchenrückenmarks licht- und elektronenmikroskopisch untersucht. In den ersten Phasen der Neurogenese wurden nur freie Ribosome im Cytoplasma aufgefunden. Mit fortschreitender Reifung bilden sich erste Profile des endoplasmatischen Retikulums aus, die spärlich mit Ribosomen besetzt sind. Diese Befunde werden funktionell ausgedeutet.

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[21] All illustrations are derived from chick material of 7 days incubation. The two diagrams are based on original electron microscopical photographs.

Experiments on the Formation of Combs in the Ctenophores

According to FISCHEL[1], each blastomere of the Ctenophore egg at the 8-cell stage has the potential of forming one row of combs in the larva.

The results obtained by YATSU[2] confirm this statement. SPEK[3] maintains that in *Beroë ovata* this potential is connected with a peculiar green luminescent plasma; this plasma, according to REVERBERI[4], would consist mainly of mitochondria. At the 16-cell stage the green plasma is segregated into the 8 micromeres; these are thought to give rise to the 8 rows of combs: each micromere giving rise to one row.

YATSU[5], who described the cell-lineage in *Beroë ovata*, *Beroë forskalij* and *Callianira bialata*, found differences in the segmentative behaviour of the first 8 cells; the end-cells (E) would behave in a different way to the middle-cells (M).

YATSU did not thoroughly analyse the meaning of these differences, but the results he obtained from development

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of isolated E- and M-cells ought to have been considered more carefully by him.

A new investigation of some of these problems seemed necessary: a particular object of the research consisted in determining whether the E- and M-cells behave in the same way with regard to the origin of the comb-rows.

Eggs of *Beroë forskalij*, *Bolina hydatina* and *Eucharis multicornis* were used.

The eggs were freed from their jelly, and at the 8-cells stage the blastomeres were isolated and allowed to develop until the larval stage.

Results. The results obtained were as follows: (1) *Development of one E.* Every E-cell isolated (19 cases) always gives rise to a larva with combs. The combs are arranged in 2 short rows of 6–7 plates each. (2) *Development of one M.* Every isolated M-cell (16 cases) develops into a round, disorganized cellular group, lacking plates. (3) *Development of two E.* Two E-cells (8 cases) give rise to a round larva, smaller than the control, with 4 rows of combs. (4) *Development of two M.* From two M-cells (5 cases) one obtains only a round mass of rather big cells, not organized and always lacking plates. (5) *Development of one E, from which its micromere e_1 was removed.* The resulting larva (9 cases) is very rudimentary, round and completely lacks plates.

From these results one can conclude that only the E-cells of the 8-cell stage have the potentiality for the formation of the combs. This potentiality becomes restricted to the 4 micromeres e_1 deriving from them, at the 16-cell stage.

The 4 micromeres m_1 have nothing to do with the plates. The green plasma which is present in all the 8 micromeres at the 16-cell stage is not responsible for the formation of the swimming plates.

Riassunto. È stato studiato il comportamento dei diversi blastomeri dell'uovo di Ctenofori nei riguardi della formazione delle 8 costole di palette.

Allo stadio 8, la capacità a dare origine alle palette non è ripartita in modo uguale negli 8 blastomeri. I 4 blastomeri E danno origine ciascuno a 2 costole di palette; i 4 M non sono invece responsabili in alcun modo della loro formazione.

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Suppression of the Immunological Reaction by Methylhydrazines, a New Class of Antitumour Agents

In a recent paper we have described the tumour-inhibiting properties of methylhydrazine derivatives[1]. The growth-inhibiting effect is not restricted to tumours; other rapidly proliferating tissues are affected as well. In their haematological and histological investigations, SCHÄRER and THEISS[2] found a lymphopenia and an involution of the germinal centres of the spleen in rats treated with methylhydrazine compounds. It is generally assumed that the reticulo-endothelial and lympho-plasmocytic elements are in some way involved in the formation of antibodies. A series of alkylating agents and antimetabolites, having a pronounced effect on the growth of these tissues, are able to suppress immunological reactions (see review article[3]).

The present experiments were intended to provide information on the effect of the methylhydrazines, a new class of cytotoxic agents, on immunological reactions.

As a test model we chose the immune response against tumour heterografts. Without conditioning the host, an implant of the mouse Crocker sarcoma 180 in young rats grows to a minimal size only and is already necrotized after 6 to 10 days. By conditioning the rats with whole body irradiation or with cortisone treatment, this heterograft rejection is retarded[4]. The tumours grow to a large size and start to regress only after 2 to 3 weeks. The same phenomenon can be brought about by pretreating the rats with a methylhydrazine derivative.

Methods. Young albino rats weighing 40–50 g at the time of tumour implantation were used. The mouse Crocker sarcoma 180 was transplanted subcutaneously as small tumour fragments of 3–5 mm^3 size into these rats. Two similar experiments were carried out. In each case 30 animals, being implanted with fragments of the same tumour, were divided into groups of ten rats. One group of rats was not treated and served as control. Ten rats received 8 daily intraperitoneal injections of the methylhydrazine derivative 1-methyl-2-*p*-(isopropylcarbamoyl)-benzyl-hydrazine hydrochloride (I)[5], within the 10 days *prior* to the heterologous tumour transplantation. Daily doses of 50 mg/kg I dissolved in 0.1 ml distilled water were given. Ten rats were injected with the same daily doses of 50 mg/kg, medication starting only *on* the day of implantation. 8 injections within the first 10 days after implantation were administered to the rats of this group. The volume of the well palpable tumours was determined daily; it was calculated with the formula $4/3\ ab^2\pi$ (rotational ellipsoid), a and b being a half of the 2 diameters measured with calipers. Mean tumour volumes are indicated in the Table.

Heterologous transplantation of *mouse* sarcoma 180 in *rats*

Days after implantation	Mean tumour volume in mm^3 (each value being an average of 20 tumours)		
	Controls	Treatment with I *before* implantation	Treatment with I *after* implantation
7	1166	2300	825
8	804	3325	416
9	310	4801	0
10	0	7330	0
13	0	7919	0
14	0	9913	0
15	0	10049	0
16	0	10722	0

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