The results suggest that the "growth bud" of the capillary is a multicellular formation. Lysosomes present in the young endothelial cells probably participate in the formation of the lumen of the vessel. Capillaries also form *de novo* in the zone of injury. Undifferentiated cells are evidently their source. The character of restoration of microvessels is further evidence of the simultaneous course of injury and repair processes at the tissue and cellular levels.

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FLUORESCENCE SPECTRA OF SIF CELLS IN RAT NERVE GANGLIA

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Determination of the type of mediator synthesized by the so-called small, intensively fluorescent (SIF) cells, can make a definite contribution to the elucidation of their function. To investigate this problem, besides other methods, fluorescent histochemical methods have been used and, in particular, various modifications of the method of condensation of amines with paraformaldehyde. The principal mediator for the SIF cells of several ganglia is considered to be dopamine, whereas in some SIF cells the content of noradrenalin, and also of adrenalin, has been determined [7].

Meanwhile evidence is accumulating of the existence of a subpopulation of SIF cells containing serotonin [6, 8]. Since the maximum of fluorescence of paraform-induced fluorophores (serotonin derivatives) lies in the yellow region of the spectrum, the discovery of "yellow" SIF cells is considered to be confirmation of their serotoninergic nature. Several workers have described an increase in the number of "yellow" SIF cells in animals with age and have postulated an age change in the type of mediator characteristic of some SIF cells [1]. However, it must be pointed out that the data of fluorescence analysis do not always allow different types of amines to be differentiated because of the closeness of the spectral characteristics of their paraform-induced fluorophores, and also because of the properties of visual perception, leading to the "red shift" with an increase in concentration of the fluorophore in a cell under observation [5].

The aim of this investigation was to study fluorescence spectra of SIF cells of various ganglia of old animals under the conditions of standard processing by one of the accepted "aqueous" methods of monoamine detection [4], and also to compare the curves obtained with the emission spectrum of lipofuscin granules, accumulating with age in cells of autonomic ganglia.

EXPERIMENTAL METHOD

The test objects were nerve ganglia from male rats aged 24 months. SIF cells in ganglia in the lumbar portion of the sympathetic trunk and of the great pelvic ganglion, and nerve

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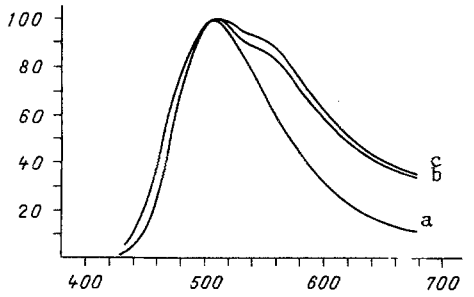

Fig. 1. Fluorescence spectra of paraform-induced fluorophores in SIF cells (a) and in "yellow" SIF cells (b) of lumbar ganglia of sympathetic trunk and great pelvic ganglion, and also fluorescence spectrum of lipofuscin in nerve cells of inferior ganglion of vagus nerve (c). Abscissa, wavelength (in nm); ordinate, intensity of fluorescence (in % of maximum).

cells of the inferior ganglion of the vagus nerve were analyzed. Under pentobarbital anesthesia (60 mg/kg) the animals were perfused with cold (4°C) fixing solution, containing 1% glutaraldehyde and 4% paraformaldehyde [4]. This method, although it possesses rather lower sensitivity, gives highly reproducible results and a stable fluorophore. The ganglia were removed and left for 24 h in fixing solution. Sections about 20 μ thick were cut in a freezing microtome and mounted in glycerin.

Sections containing SIF cells were analyzed on a inverted microspectrofluorometer [3]. The source of exciting radiation was a DRSh-250-2 mercury vapor lamp. To isolate the necessary spectral range of exciting radiation, a combination of glass filters UFS 6-3 and SZS 24-4 was used. Provision of an optical slit with variable height and width in the plane of the luminescent image of the object enabled the region of the preparation required to be investigated to be selected. The instrument was calibrated by reference to spectral lines of the mercury lamp, whenever a fluorescence spectrum was recorded. Recordings were obtained for 4-5 cells from each ganglion chosen for study in three animals. The spectral curves were plotted in percentages of the maximum.

EXPERIMENTAL RESULTS

In most SIF cells from the ganglia studied identical fluorescence spectra of paraform-induced fluorophores were recorded with a single maximum lying in the region of 500-520 nm (Fig. 1a). The "yellow" SIF cells had characteristic differences in the fluorescence spectrum, with the appearance of an additional maximum of emission in the region of 545-565 nm (fig. 1b). Analysis of the fluorescence spectrum of lipofuscin in nerve cells of the inferior ganglion of the vagus nerve under the same conditions showed (Fig. 1c) that it coincided in many details with the fluorescence spectrum of "yellow" SIF cells. The parameters determined for curve 3 coincide satisfactorily also with known data on the intrinsic luminescence of lipofuscin granules in nerve tissue [2].

Thus a certain number of small cells, intensely fluorescent in the yellow region of the spectrum, due to a shift of the fluorescence spectrum toward an increase in the wavelength by accumulation of lipofuscin granules in them, can be demonstrated in the ganglia of old animals. Meanwhile, individual lipofuscin granules in nerve cells can be clearly identified, but in small cells they evidently cannot be visualized because of the high density of their distribution.

Without rejecting the hypothesis that serotonin-containing SIF cells exist, the results of the present investigation indicate a limitation of fluorescence methods of determining the nature of their mediator, because some of the small (perhaps not SIF) cells of autonomic ganglia in old animals can probably accumulate lipofuscin.

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SENSORY CONTROL OF TONGUE MOVEMENTS IN INFANTS DURING PHONATION

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Changes in the shape and position of the tongue relative to the hard and soft palate and the front teeth determine the formation of the sounds of human speech. The appearance of resonance cavities and noise sources is connected with the participation of the tongue [1]. The formation of different sounds is determined by the degree of elevation of the tongue: The tongue assumes its highest position during pronunciation of the vowels *i* and *u* (closed), and its lowest position during pronunciation of the vowel *a* (open). The tongue plays an even greater part in the formation of consonants. The articulation-acoustic characteristics of different sounds allow the degree of participation of different parts of the tongue (tip, body, root) in their formation to be differentiated. From the point of view of pronunciation of voiced consonants, we can distinguish between posterior lingual (k,k^1, g,g^1, kh,kh^1), middle lingual (the constant j), and anterior lingual consonants (t,t^1, d,d^1, n,n^1, s,s^1, z,z^1, zh,zh^1, l,l^1, ts^1, shch).

Sensory control of tongue movements during phonation is connected with the tactile receptor apparatus. The role of the sensory periphery in the control of speech formation was first noted in a model of speech as a servo system [3]. It was shown that tactile and proprioceptive channels provide information for the mechanics of speech. Accordingly attempts have been made to determine the role of oral sensation in the control of speech formation [3-5].

Meanwhile, the tactile papillae of the tongue undergo marked changes in postnatal development [2]. This has been shown by psychophysical investigations conducted on people of different ages, which have demonstrated a decrease in the tactile sensitivity of the tongue with age. However, the study of age differences in the oral tactile sensory periphery has been inadequately carried out, especially in connection with phonation.

The formation and participation of the sensory apparatus of the tongue in the control of production of the various sounds of speech have so far received little study, especially in infants during the first 6 months after birth. Meanwhile phonation is under oral sensory control.

Normally developing infants begin to babble at the age of 3-5 months. Linguists are well aware that an infant's babbling in the first year of life may contain the most widely different sounds from all existing human languages. It is considered that the "infant language" of infants of all nationalities is the same. Meanwhile, during the first 6 months of life the process of "vocalization" is not yet controlled by hearing, as may be shown by observation on deaf children: Children deaf from birth babble in just the same way as those with hearing.

The aim of the present investigation was to study and compare the characteristics of structural formation of the tactile apparatus of the tongue with the appearance of different sounds in infants during the first year of life.

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