vascular system to the increase in the volume velocity of the blood flow in it and to the change in the character of the pulse wave in the main coronary arteries and the aorta (the appearance of an additional peak of pressure in diastole due to the injection of blood from the pump). Whether these factors have a positive or negative influence on the myocardium and on the organism as a whole is something that only future research will decide.

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IDENTIFICATION OF SMOOTH MUSCLE MYOSIN IN MYOID CELLS OF THE TESTES

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Smooth muscle myosin was found by the Coons' immunomorphological test in the outer wall of the seminiferous tubules of man, rats, and mice. The results of the investigation confirm the smooth-muscle nature of the myoid cells.

KEY WORDS: testis; myoid cells; smooth-muscle myosin.

The so-called myoid cells (myofibroblasts, contractile fibroblasts) which, together with fibrous structures, form the outer wall of the seminiferous tubules, have many common features with smooth muscles. The cytoplasm of these cells is rich in actinlike microfibrils 50-70 Å thick, which by themselves and with the plasmalemma form dense bodies. To correspond to the pinocytotic vesicles, on the outer surface of the cell membrane there are craterlike depressions. At the site of contact of the cells with each other desmosome-like formations and nexuses have been identified [3, 10]. Contraction of myoid cells in isolated seminiferous tubules [8] and in tissue culture [5] has also been observed.

This morphological and functional similarity between the myoid and smooth-muscle cells suggested that the composition of their contractile proteins would be identical.

In this investigation an attempt was made to identify smooth-muscle myosin in the myoid cells.

EXPERIMENTAL METHOD

Myosin was identified by the indirect Coons' method using pure donkey antibodies against rabbit immunoglobulin G, labeled with fluorescein isothiocyanate. Antiserum against human uterine myosin was obtained in rabbits in several stages by the method described previously [2]. Sections through the testes, and

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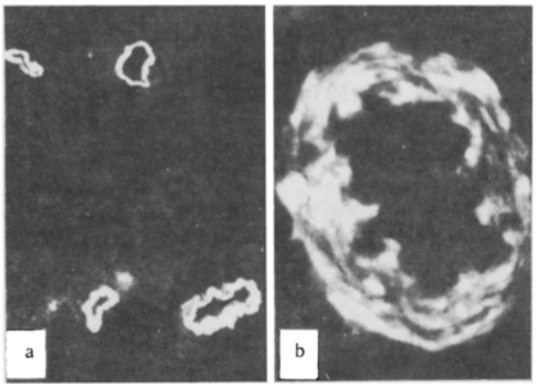

Fig. 1

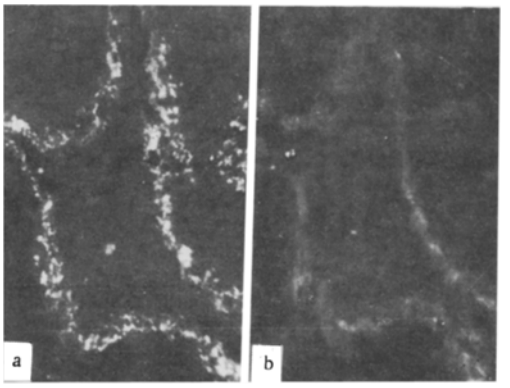

Fig. 2

Fig. 1. Fluorescence of muscular coat of vessels: a) myocardium of mouse (60×); b) human liver (200×). Sections treated with antiserum against human smooth muscle myosin by indirect Coons' method.

Fig. 2. Fluorescence of smooth-muscle myosin in myoid cells from wall of human seminiferous tubules (lamina propria): a) section treated as in Fig. 1; b) control, serial section. Weak background fluorescence of collagen fibers. Section treated with nonimmune serum.

also the heart, kidneys, liver, and esophagus of man, mice, and rats, 5 μ in thickness, were cut on a freezing microtome and fixed for 10 min in 96% ethanol at room temperature. The sections were incubated successively with antiserum against myosin and with labeled antibodies for 30 min, with intermediate and final rinsing for 10 min in each case in buffered physiological saline, pH 7.2. As a control of the specificity of the reaction serial sections were treated with antiserum previously absorbed with myosin, with antiserum against different antigens, and with immune serum.

EXPERIMENTAL RESULTS

Preliminary immunomorphological investigations showed that antiserum against human uterine myosin detected human and animal smooth muscle from any source equally clearly and specifically (Fig. 1). Fluorescent cells in human testes were arranged in several rows around the tubules (Fig. 2a). They consisted of elongated or round cells. In longitudinal sections through the cells under high power it could be seen that the fluorescence was restricted to the cytoplasm only. The specific fluorescence of the myoid cells did not differ in intensity from the fluorescence of the smooth muscles. In control serial sections only weak background fluorescence of collagen fibers was observed around the tubules (Fig. 2b). A similar picture was observed when the testes of animals were studied, the only difference being that the peritubular myoid cells of rats and mice lay in a single layer.

Smooth muscle myosin was thus identified by means of a sufficiently sensitive and reliable immunomorphological method in the myoid cells of the testes. This observation is evidence that myoid cells have a developed contractile apparatus. Periodic contractions of the myoid cells evidently facilitate the passage of spermatozoa along the seminiferous tubules. Considering that myosin of striated and smooth muscles [1] and the myosinlike proteins of various cells [7], unlike actin [6], possess individual antigenic specificity, the results must be interpreted as direct proof of the smooth-muscle nature of the myoid cells. By their ultrastructural characteristics the myoid cells occupy an intermediate position between the typical smooth-muscle cells and typical fibroblasts, resembling the myofibroblasts of granulation tissue and of atherosclerotic plaques [10]. Existing views of myofibroblasts as intermediate forms in the transformation of the smooth-muscle cell into a fibroblast or vice versa must be seriously challenged [9]. At least under tissue culture conditions the conversion of fibroblasts into cell forms synthesizing myosin has not been observed [4].

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IMMUNOHISTOCHEMICAL INVESTIGATION OF PROTEIN S-100 IN NEURONS AND GLIA OF *Helix pomatia*

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The location of brain-specific protein S-100 was investigated by the indirect Coons' method in neurons and glia of Helix pomatia. This protein was found in the cytoplasm of neurons and glial cells, and in the nucleus and outer member of neurons.

KEY WORDS: brain-specific antigen; neurons of mollusks.

The investigation of the physiological role of brain-specific proteins is a problem of the utmost importance at the present time. These proteins are considered to participate in the regulation of the permeability of neuronal membranes and so to be concerned in the mechanism of electrogenesis. An important place in research in this field is occupied by the identification of nerve-specific proteins and the investigation of their localization in structures of the nervous system.

The study of the properties of protein S-100 is particularly interesting in connection with the known participation of this antigen in the neuronal mechanisms of memory and learning [6]. Data on its distribution in cells of the vertebrate nervous system are contradictory: Some investigations [1, 4-6] have shown that S-100 is localized in the cytoplasm and nuclei of neurons, in tumors of glial nature, and in cell clones from human glia. The results of other investigations have shown that this protein is present in the cytoplasm, nucleus, and axoplasm of neurons [4, 8, 10, 11].

Protein S-100 is known to be species nonspecific. The results of a study of its localization in invertebrate neurons have not been reported in the literature.

The object of this investigation was to study the distribution of protein S-100 in nerve and glial cells of the cerebral structures of Helix pomatia, using the indirect Coons' method.

EXPERIMENTAL METHOD

The visceral ganglion was isolated from the subesophageal complex of Helix pomatia at 4°C and immersed in liquid nitrogen. Sections 5 μ thick were cut through the brain on a freezing microtome at −15°C, their quality was verified under the microscope, and they were dried under a fan and fixed with 96% ethanol for 10 min. Various fixatives (absolute acetone, absolute and 96% ethanol) and different exposures (5, 10, 15, 25, and 30 min) were tested as a preliminary measure. The most distinct morphological picture was obtained by the use of cold 96% ethanol for 10 min. The sections were rinsed with 0.14 M NaCl and then treated with monospecific antiserum (anti-S-100)* for 30 min, followed by labeled serum in the usual way. Labeled eluate of antibodies against rabbit IgG used in the experiments was generously provided by the staff of the Laboratory

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