

in support of the view that the RFCs appearing at the peak of the immune response and, as was established previously, belonging to the class of B lymphocytes [1], have adsorbed antigen-antibody complexes as their antigen-binding receptors.

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CYTOTOXIC AND COMPLEMENT-FIXING ACTIVITY OF RABBIT ANTISERA AGAINST RAT AND HUMAN BRAIN CORTEX AND WHITE MATTER

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UDC 615.365.82+612.82.017.1

The cytotoxic and complement-fixing activity of antisera against the cortex and white matter of the rat and human brain was investigated on thymus and bone marrow cells of mice and rats. The cytotoxicity test proved to be more sensitive and accurate and showed that cytotoxins against rodent thymocytes were present only in antisera against the cortex of the human brain but they were present in antisera against both the cortex and the white matter of the rat brain, although in significantly larger amounts in the former. Sera against rat cerebral cortex, when exhausted by the homonymous antigen, lost their cytotoxicity but they retained it after exhaustion with white matter.

KEY WORDS: cross-reacting antigens; thymus; brain.

The existence of cross-reacting antigens has not been clearly demonstrated in the brain and thymus of many species of animals [3, 4]. However, there have been few attempts to study with which components of the brain, i.e., with the gray or white matter, these antigens are mainly associated [3, 5].

The investigation described below was carried out to study this problem.

EXPERIMENTAL METHOD

Antisera against homogenates of the cortex and white matter of the rat or human brain were obtained from rabbits by the method described previously [2]. The resulting sera were heated to 56°C for 30 min and absorbed with homogenates of rat or human liver and erythrocytes at room temperature, twice for 1 h each time, in the ratio of 1 ml antiserum to 0.1 ml solid

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cell residue. To estimate the specificity of action of the antisera, they were exhausted in a similar manner for 1 h with homogenates of cortex or white matter of homologous brain.

The heated and appropriately absorbed antisera were tested in the complement-dependent cytotoxic test against mouse and rat thymus and bone marrow cells by the method of Niederhuber and Möller [6]. Parallel tests of the sera were carried out in the complement fixation test (CFT) in the cold [1] with the above-mentioned cells, used as antigens in a dose of $15 \cdot 10^6$ – $20 \cdot 10^6$ /ml.

EXPERIMENTAL RESULTS

The cytotoxic activity of antisera against homogenates of human cerebral cortex on mouse and rat thymocytes was measured as a dilution of 1:10 (indices of cytotoxicity 93 ± 1.9 and 91 ± 2.0 , respectively). It was virtually absent when the sera were diluted 1:100. Sera against human white matter, however, were weakly active even in a dilution of 1:10: Their indices of cytotoxicity were 17 ± 1.8 and 7 ± 1.8 , respectively. Correspondingly, they did not react at all with thymus cells in the CFT.

Antisera against the cortex and white matter of the rat brain possessed equal cytotoxic activity against mouse and rat thymocytes in a dilution of 1:10, but in dilutions of 1:10–1:200, some differentiation of their cytotoxic action on the cells was observed: whereas antisera against white matter had very low cytotoxic action (indices of cytotoxicity 19 ± 3.9 and 25 ± 4.2 , respectively), sera against cortical antigens led to death of 78–84% of thymus cells. Sera against the cortex and white matter of the rat brain reacted in the CFT with both mouse and rat thymocytes equally.

None of the antisera against brain tissue reacted in the cytotoxic test with mouse bone marrow cells and they had only a very weak action on the homonymous rat cells (indices of cytotoxicity from 4 ± 1.3 to 17 ± 3.7).

To establish the precise relationship between cytotoxic antibodies and antigens of the cerebral cortex or white matter, experiments were carried out with exhaustion of the brain antisera by the corresponding substrates. Antisera against rat cerebral cortex, after exhaustion with the homonymous antigens, completely lost their cytotoxicity against thymus cells, but they preserved it if they were exhausted with white matter. Antisera against white matter lost their comparatively low toxicity in both cases.

Cross-reacting antigens common with those of the thymus cells are thus unquestionably present in the cerebral cortex. For a final solution to the question of whether or not they are present in the white matter also, as some workers suppose [3, 5], further investigations are necessary, for it is difficult to obtain white matter free from elements of gray matter by simple mechanical separation of the brain.

Of the tests used in these experiments the cytotoxicity test is more sensitive and accurate.

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