EFFECT OF IMPLANTATION OF XENOGENEIC LYMPHOID TISSUE ON THE IMMUNOLOGIC REACTIVITY OF NEONATALLY THYMECTOMIZED MICE

A. E. Vershigora, É. V. Lukach,
Yu. A. Grinevich, and V. N. Medvedev

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Investigations on BALB/c mice showed that intraperitoneal implantation of xenogeneic lymphoid tissue of the tonsil and spleen, taken from newborn rabbits and dogs and from an infant dying in childbirth, abolishes the wasting syndrome in neonatally thymectomized mice. The normal count of small lymphocytes in the blood and the reactivity of the lymphoid tissue were restored.

The object of this investigation was to study the action of transplanted xenogeneic lymphoid tissue on the immunologic reactivity of neonatally thymectomized mice.

EXPERIMENTAL METHOD

BALB/c mice were used. The thymus was removed from the mice between 18 and 24 h after birth by Zinzar's method [1]. Immediately after or the next day, lymphoid tissue from the palatal tonsil or spleen or liver tissue from newborn rabbits, puppies, or an infant dying in childbirth was implanted under sterile conditions in the peritoneal cavity of thymectomized mice (TEM).

Each mouse of the experimental group was grafted with a mean dose of 10-14 mg tissue kept for not more than 20 min at 4°C after extirpation. The mortality among the mice from the operation was about 40%. Mice with residual thymus tissue were excluded from the experiment. This left 14 experimental and seven control TEM for observation: seven without transplantation of lymphoid tissue, six with transplantation of the tonsil, four of the spleen, and four of liver tissue. Normal mice (five intact, six unimmunized) also served as the control. The young mice after thymectomy and tissue transplantation were kept with their mothers in individual cages for up to four weeks.

The control experimental mice on reaching the age of six weeks were immunized by intraperitoneal injection of a 50% suspension of sheep's red cells (4.5×10^8 cells per mouse) and killed on the seventh day. The number of plaque-forming [4] and rosette-forming [2] cells were determined in the spleen. The titers of hemolysins and hemagglutinins in the blood serum were investigated. The possibility of migration of the xenogeneic lymphoid tissue cells into the recipient's spleen and of their saturation in the blood was investigated by the direct immunofluorescence method.

EXPERIMENTAL RESULTS

After implantation of xenogeneic tissue from the lymphoid organs into the TEM, an increase (up to the normal level) in the absolute number of small lymphocytes was observed in the animals' blood. The number of small lymphocytes in the TEM with transplanted liver tissue did not reach the normal level.

All the TEM serving as the control developed a wasting syndrome. The TEM with grafted xenogeneic lymphoid tissue from the tonsil and spleen or liver tissue did not develop the wasting syndrome.

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The titers of hemolysins and hemagglutinins in the blood serum of the TEM immunized with sheep's red cells were considerably lower than in the normal immunized mice. In all three groups of experimental TEM the antibody titers in the blood serum were about equal. They were higher than the titers of the normal unimmunized mice and rather lower than those found in normal immunized mice.

The number of plaques formed by spleen cells (per 10^5 living mononuclear cells) of the TEM was six times smaller than in normal animals. The same number of plaque-forming cells as in normal immunized mice was found in the spleens of TEM with grafted lymphoid tissue from the tonsil and also with grafted liver tissue. After implantation of lymphoid tissue from the spleen, plaque formation was increased by three times compared with the normal immunized mice.

Spleen cells of TEM with grafted xenogeneic tonsillar lymphoid tissue and of normal mice became capable of forming about equal numbers of rosettes (2350 and 2740 per 10^5 cells) after their immunization with sheep's red cells. After implantation of splenic lymphoid tissue the number of rosette-forming cells was twice as large, but after implantation of liver tissue it was only half as large. The mean number of rosette-forming cells in the control TEM was 900 per 10^5 spleen cells.

Solitary cells containing donor's globulins were found in the blood of TEM aged 5-7 weeks with implanted xenogeneic tonsillar lymphoid tissue. Single cells and groups of cells containing donor's globulins were found in sections of the spleen.

Intraperitoneal implatation of xenogeneic tonsillar and splenic lymphoid tissue taken within a few hours after birth of rabbits, dogs, and man thus prevents the wasting syndrome in neonatally thymectomized mice, restores the normal small lymphocyte count in the peripheral blood, restores the immunologic reactivity of the animal, and creates cellular chimerism.

Harrison [3] observed restoration of the structure of thymus-dependent zones in the spleen of neonatally thymectomized mice after transplantation of lymphoid tissue of the palatal tonsils of newborn rabbits into these animals. He concludes that the function of the palatal tonsils is analogous to that of the thymus. The results of the present experiments showed that besides tonsillar tissue, xenogeneic tissues of other lymphoid organs can stimulate the immunologic reactivity of neonatally thymectomized mice.

LITERATURE CITED

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