

MORPHOLOGICAL AND HISTOCHEMICAL CHANGES IN POSTVACCINAL IMMUNOGENESIS

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During the formation of immunity morphological and biochemical changes take place in several organs and systems [1-3]. An active part in these processes is played by nucleic acids [2, 3]. In the present investigation an attempt was made to determine the degree of these changes during postvaccinal immunogenesis against a virus disease and to study and compare the histochemical and histological changes in this process.

EXPERIMENTAL METHOD

Experiments were carried out with filter-passing hog cholera virus. Material for the investigation was obtained for 15 young pigs of which 12 were vaccinated and 3 acted as controls.

Vaccination was carried out with a commercial glycerinated crystal-violet vaccine in two doses of 5 ml each at an interval of 10 days. The vaccine was injected subcutaneously into the lower third of the medial surface of the thigh. The pigs were sacrificed on the 3rd, 10th, and 20th days after vaccination, 3 animals being taken from each group. Twenty days after the 2nd vaccination, 3 pigs were infected with hog cholera virus and sacrificed on the 7th day after infection.

The histochemical reaction for determination of RNA and DNA was carried out by Brachet's method (methyl green — pyronine) and by Feulgen's method. A general survey of the organs was made from sections stained with the ordinary hematoxylin eosin.

EXPERIMENTAL RESULTS

A picture of acute catarrhal lymphadenitis, and in some glands one of hemorrhagic lymphadenitis, was observed in the lymph glands 3 days after the 2nd vaccination. The changes were more marked in the lymph glands of the "vaccinated limb" than on the opposite side.

The RNA content in the plasmablasts and lymphoblasts was higher than normal. The DNA content in the lymphoid cells (especially the small lymphocytes) also was slightly increased.

On the 10th day after vaccination the intensity of the immunomorphological processes was increased, as also was the content of nucleic acids. The number of plasma cells, reticular cells, and lymphocytes was increased (Fig. 1).

On the 20th day, the hyperplasia in the lymph glands was much less marked than on the 10th day after vaccination. The RNA reproduction was also much weaker.

In the animals infected with hog cholera virus after immunization a catarrhal lymphadenitis again developed, corresponding in its intensity to that observed on the 10th day after vaccination. The reproduction of RNA also was increased (Fig. 2).

In the spleen, as in the lymph glands, hyperplasia was observed. It took the form of multiplication of the reticular and endothelial cells filling the pulp and sinuses, and also of activation of the lymphoid and reticular cells of the follicles. Clusters of plasma cells were seen in the sinuses of the spleen. Immunomorphological changes of this type were observed as soon as on the 3rd day after vaccination, and they reached a maximum on the 10th day; later they gradually subsided. When the vaccinated animals were

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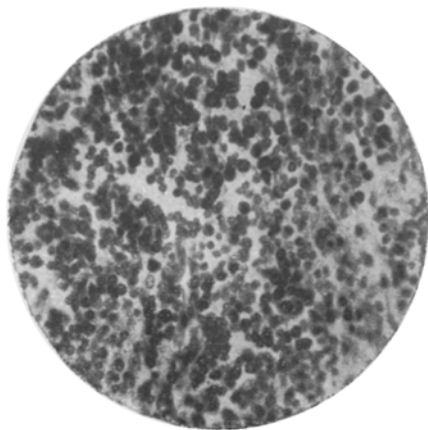


Fig. 1

Fig. 1. Clusters of cells in sinuses of lymph glands. The cytoplasm of most cells is rich in RNA. Brachet's method. Objective 40, ocular 20.

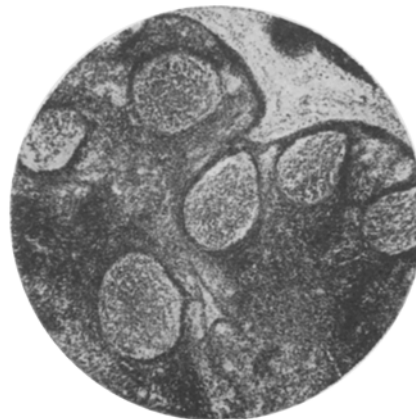


Fig. 2

Fig. 2. Accumulation of RNA in the cytoplasm of the cells of the sinuses and hyperplastic follicles of a lymph gland. Brachet's method. Objective 40, ocular 7.

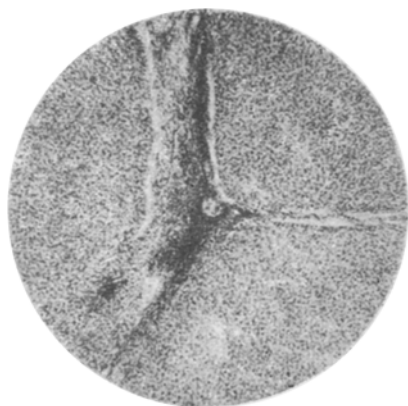


Fig. 3. Increase in the DNA content in cells infiltrating the interlobular connective tissues of the liver, especially around the triad. Feulgen's method. Objective 8, ocular 20.

infected with hog cholera virus, the intensity of the hyperplasia again increased, and reached a maximum on the 7th day after infection, when the picture resembled that observed on the 10th day after immunization.

In the course of vaccination against hog cholera, definite changes thus take place in the lymph glands and spleen, and especially in the regional lymph glands for the site of injection of the antigen. Hyperplasia of the cells of the germ centers of the lymph gland follicles develops, with proliferation of the reticular and lymphoid cells and accumulation of plasma cells.

An increase in the accumulation of RNA is observed, starting on the 3rd day after injection of the vaccine, reaching its maximum on the 10th day, and then declining. By the 20th day after vaccination the RNA content in the cells is close to its initial level.

The accumulation of nucleic acids and the proliferation of the lymphoid tissue correspond to the dynamics of the plasma-cell reaction.

If pigs vaccinated with hog cholera virus are infected (20 days after vaccination), a further increase in the content of nucleic acids, especially RNA, is observed, to the level found on the 10th day after vaccination.

LITERATURE CITED

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