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THE ROLE OF MATERNAL IMMUNITY IN THE ACTIVE IMMUNIZATION AGAINST MYXOMATOSIS

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Rabbit myxomatosis caused severe losses during the last decades all over the world. After many unsuccessful trials, vaccines for prophylactic use could be manufactured only using a tissue culture adapted virus strain /5, 6/. On the basis of the long experimental work of Áldásy, P. and Máté, Zs., a vaccine produced of tissue culture adapted virus was registered under the name Myxovac by the firm Phylaxia Veterinary Biologicals in Hungary in 1977. The control tests of the vaccine were carried out by the Hungarian State Institute for the Control of Veterinary Biologicals.

During field experiments preceding the registration, 10 out of 4223 rabbits vaccinated and individually observed showed severe reaction following vaccination. The virus propagates in the organism and this fact manifests in pin-headed nodules observed on the predilection sites in 5.8 percent of the cases. The vaccination provokes satisfactory immunity. After challenge with 1000 ID on the 14th postvaccination day, reactions are sometimes observed on the site of challenge, but no generalization occurs /1, 2, 4, 8/.

Various methods were applied by different authors for the serological detection of antibodies, complement fixation /3, 7/, geldiffusion /9 /, pock-reduction /3/ and immunofluorescence tests /10/.

In this work, we would have liked to get an answer for the following questions:

a/ Are maternal antibodies detectable in the offsprings of vaccinated rabbits?

b/ Is there any inoculation reaction following vaccination of 2-week-old kittens?

c/ Can suckling rabbits be successfully immunized against myxomatosis?

Experiments

Vaccine

Throughout the whole experiment Myxovac, a vaccine registered and produced in Hungary, containing 500 idp. ID/0.5 ml was used. The offsprings were vaccinated with 0,1 ml idp. or 0,5 ml i/m, on two sites.

Experimental animals

Susceptible young rabbits and nursing does together with their kittens were bought from a small farm in an area free from the disease. Immune does together with their kittens were bought from a large cooperative farm.

Challenge virus

Virus strain designated Miskolc was kindly supplied by Áldásy,P. /Animal Health Institute, Miskolc/. The rabbits involved into the experiment were infected with 1000 ID/0,1 ml idp.

Observation period

Rabbits were individually and carefully observed twice a week from the 3-4th up to the 21-28th postvaccination or post-infection day.

Vaccination of breeding rabbits

Thirty rabbits selected for breeding were inoculated on the day of mating and 14 days later with 0.5 ml of the vaccine i/m,

in the cooperative farm. The purpose of revaccination was to provoke increased antibody production. No reaction following vaccination was observed on the rabbits, the usual percentage of conception was achieved and abortion did not occur.

Determination of the infectivity of challenge virus in rabbits of susceptible and immune does

Offsprings of immune does devided into 3 groups were infected idp with 10^{-1}–10^{-7} dilutions of the virulent virus on the 14th, 34th and 105th postparturition day. At the same time titration of the virus was carried out in susceptible rabbits of the same age as well. The results of the tests are shown in Table 1. When evaluating the results according to Reed-Muench, the virulent virus contained $10^{6.83}$ ID_{50}/0,1 ml and $10^{7.25}$ ID_{50}/0.1 ml when titrated on the offsprings of immune and susceptible does, respectively.

Table 1. Titration of the virulent virus on susceptible and immunized rabbits

Dilution of the infective virus	Rabbit populations				
	Immunized			Susceptible	
	Age of rabbits /day/				
	14	34	105	14	75–90
10^{-1}	1/1	-	-	-	-
-2	1/1	-	-	-	2/2
-3	1/1	-	-	-	2/2
-4	1/1	2/2	2/2	2/2	2/2
-5	1/1	2/2	2/2	2/2	4/4
-6	0/1	1/2	1/2	1/2	3/4
-7	0/1	0/2	0/2	0/2	0/4

Remark: In the numerator the diseased, in the denominator the vaccinated rabbits are represented.

Significant differences in the clinical symptoms were not observed. In both groups, the first symptoms were observed at the site of infection on the palpebra on the 3-5th day depending upon the dilution of the virus. Generalization was observed after an other 4-7 days. Deaths occured from the 16th day onwards but with great fluctuation.

Intradermopalpebral immunization of the offsprings

Fourteen-day-old offsprings of 2 previously vaccinated and 3 susceptible does were inoculated idp with various dilutions of the vaccine and challenged on the 21st postvaccination day idp as well.

All rabbits of immune does, inoculated with 10 or 100 ID showed reaction on the site of inoculation, however only some of those from the group immunized with 1 ID. Two of the symptom--free rabbits became ill and died following the idp challenge.

All susceptible suckling rabbits immunized with 1 ID resisted the challenge. 10-100 ID was suffecient for the development of massive immunity in suckling rabbits with maternal immunity. The results are summerized in Table 2.

Table 2. Intradermopalpebral immunization of the offsprings

Immunizing dose, idp. ID	Offsprings of			
	vaccinated		susceptible	
	does			
	Reaction on the inoculation site following vaccination	Generalization after challenge	Reaction on the inoculation site following vaccination	Generalization after infection
100	4/4	0/4	4/4	0/4
10	6/6	0/6	4/4	0/3*
1	2/5	2/5	4/4	0/4

Remark: In the numerator the number of reacting rabbits, in the denominator the total of rabbits are represented.

*: One of the rabbits died of intercurrent disease before infection.

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Intramuscular immunization of the offsprings

Suckling rabbits of immune does were inoculated on the 14th day after birth with 500, 50 and 5 idp ID/0.5 ml virus dose i/m. The rabbits were observed up to the 21st day after inoculation, pin-headed, rapidly healing nodules were observed on 3 of them.

Eleven and 10 out of the vaccineted control rabbits were infected idp with 1000 ID/0.1 ml virus on the 21st and 105th day respectively. The results are shown in Table 3.

Table 3. Intramuscular immunization of the offsprings of immune does

Immunizing dose	Day of challenge after vaccination			
	21st		105th	
	Reaction on the infected eye	Generalization	Reaction on the infected eye	Generalization
500	0/3	0/3	4/4	0/4
50	0/4	0/4	3/3	0/3
5	1/4	0/4	3/3	1/3

It can be concluded from the table that there are differences in the durability of immunity, depending on the infective dose when administering the vaccine intramuscularly. One of the rabbits immunized with 5 ID got ill following the challenge 3 1/2 months after vaccination. It is obvious from the table as well, that 50 and 500 ID provokes satisfactory immunity even in suckling rabbits still possess passive immunity. At the challenge 3.5 month after vaccination one of the rabbits immunized with the lowest dose /5 ID/ diseased in the generalized form of myxomatosis, that refers to the decrease of immunity. The experiments support that the prescribed potency of the vaccine /500 ID/ is satisfactory to provoke adequate immunity even in the offsprings of vaccinated does.

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The role of maternal immunity in the active immunization against myxomatosis

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Summary

The authors have investigated the maternal immunity in the offsprings of does vaccinated with Myxovac /Phylaxia, Hungary/. They have concluded that low level maternal immunity is detectable in suckling kittens but this doesn't interfere with the immunization efficiency of Myxovac.

Le rôle de l'immunité maternelle au cas de l'immunisation active contre la myxomatose

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Résumé

Les auteurs ont examiné l'immunité maternelle des descendants des lapines, vaccinés avec "Myxovac" /Phylaxia, Hongrie/. Ils ont enregistré chez les lapereaux une protection maternelle légère, mais cela n'interferait pas l'efficacité immunogène du vaccin Myxovac.