PERSISTENCE OF CIRCULATING ANTIBODIES IN SWINE REVACCINATED WITH OIL-ADJUVANTED FOOT-AND-MOUTH DISEASE VACCINE

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SHORT COMMUNICATION

The behavior of foot-and-mouth disease (FMD) in swine and the types of swine production systems presently employed do not justify including swine vaccination in official FMD control programs. This does not, however, exclude the possibility that official strategies may establish swine vaccination in high-risk areas or under special circumstances (*1*). It is thus important to add to available information on double oil emulsion FMD vaccines in swine when applied intraperitoneally (*3, 4*) with further results concerning the persistence of circulating antibodies after revaccination.

At the conclusion of an experiment (*6*) on the immune response at challenge with "O" virus, 24 swine were kept in strict isolation to study the persistence of circulating antibodies against A Bage and C Indaial virus.

Swine Nos. 1-12 (*Table 1*) had been vaccinated previously with emulsified "minisonic"[2] vaccine in the following dilutions: swine Nos. 1-4, 1:1 vaccine; swine Nos. 5-8, 1:3 vaccine; and swine 9-12, 1:9. Swine Nos. 13-24 received "Silverson"[3] emulsified vaccine with the following dilutions: swine Nos. 13-16, 1:27; swine Nos. 17-19, with 1:9 and swine 20-24 with 1:1 (*6*).

Six months after the first vaccination, all swine were revaccinated with double emulsion (Silverson) vaccine, 3 ml intramuscularly (*3*). Blood samples were taken before revaccination and at 30, 180, 270 and 360 days post-revaccination (DPR).

Table 1 shows the antibody levels detected by the mouse protection test (*5*). As can be seen, at 6 months after the first vaccination, levels were low except for swine Nos. 20 and 24 for A Bage virus and for Nos. 9 and 24 for C Indaial virus. The anamnestic response observed at 30 DPR was significant; antibody levels remained at high levels for at least 360 DPR, when the experiment was concluded.

Results indicate that, as with cattle (*2*), revaccination in swine induces high levels of long-lasting antibodies regardless of the type and dilution of oil vaccine used at the first vaccination.

We may thus consider a revision of the generally accepted idea that, among species naturally susceptible to FMD, swine show the least response to inactivated FMD vaccine.

If we consider that vaccination of recently weaned piglets provides coverage throughout the useful life of the animal (*1*), results of this experiment suggest that for breeding stock revaccination at 3-4 months of age followed by annual revaccination would be sufficient to protect the herd from FMD.

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[2]Minisonic, Ultrasonic Ltd. Otley Road Shipley, West Yorkshire, England.

[3]Silverson Machine (Sales) Ltd., London.

TABLE 1. *Circulating antibody levels detected by the mouse protection test in swine revaccinated with oil-adjuvanted vaccine*

No. Swine	Days post-revaccination					Days post-revaccination				
	0[a]	30	180	270	360	0[a]	30	180	270	360
	A Bage					C Indaial				
1	1.50	>5.15	>4.75	5.00	>4.87	1.00	3.88	>4.70	>4.50	3.51
2	≤0.25	>5.15	>4.75	4.30	>4.87	0.35	>4.75	4.20	4.25	4.75
3	1.50	>5.15	4.50	–	–	1.10	3.75	1.30	–	–
4	1.35	3.66	>4.75	5.00	>4.87	0.85	2.50	1.20	2.00	3.00
5	1.00	>5.15	>4.75	4.65	>4.87	0.85	3.39	>3.70	>4.50	2.75
6	0.75	>5.15	>4.75	>5.00	>4.87	0.35	2.15	1.96	>3.50	4.25
7	0.35	>5.15	>4.75	–	–	0.00	4.35	4.70	–	–
8	1.00	>5.15	4.75	>5.00	>4.87	0.10	3.15	3.45	>4.50	>5.00
9	1.25	>5.15	>4.75	>5.00	>4.87	2.60	3.88	>3.70	>4.50	3.00
10	0.35	>5.15	>4.75	>5.00	>4.87	0.35	5.15	2.70	2.82	2.00
11	1.00	>5.15	–	–	–	0.85	2.75	–	–	–
12	0.35	>5.15	>4.75	–	–	0.00	3.44	1.70	–	–
13	0.75	>4.70	>4.60	5.00	4.00	0.40	4.22	4.75	4.50	5.00
14	0.10	4.70	>4.60	5.00	>4.87	0.00	4.00	>5.50	>4.50	>5.00
15	0.25	>4.70	4.20	5.00	>4.87	0.00	>4.50	>5.50	3.75	>5.00
16	0.90	>4.70	4.60	3.85	>4.87	0.00	4.50	4.90	3.75	>5.00
17	1.75	>4.70	3.85	>5.00	>4.87	0.40	4.90	5.15	>4.50	>5.00
18	0.25	4.10	4.02	4.75	>4.87	0.25	2.75	2.25	1.82	3.40
19	0.50	3.95	>4.60	>5.00	>4.87	0.25	4.25	3.50	2.50	2.20
20	2.50	>4.70	>4.60	–	–	0.91	4.10	5.25	–	–
21	1.50	4.45	>4.60	>5.00	3.12	1.51	3.63	5.00	>4.50	3.00
22	0.90	>4.70	>4.60	–	–	0.50	>4.50	4.84	–	–
23	0.25	>4.70	4.35	5.00	>4.87	0.40	4.90	3.10	3.84	4.00
24	>3.50	>4.70	–	>5.00	–	3.25	2.10	–	>4.50	–

[a] After 6 months of the first vaccination.
– Not bled.

REFERENCES

1. AUGE DE MELLO, P. Consideraciones sobre la profilaxis de la fiebre aftosa en la especie porcina. (Reflexions on the prevention of foot-and-mouth disease in swine). *Boln Centr. Panam. Fiebre Aftosa 35-36:* 55-58, 59-61, 1975.
2. AUGE DE MELLO, P.; GOMES, I. Respuesta anamnéstica en bovinos a la revacunación con vacuna antiaftosa con adyuvante oleoso. (Anamnestic response in cattle after revaccination with oil adjuvant foot-and-mouth disease vaccines). *Boln Centr. Panam. Fiebre Aftosa 27-28:* 49-54, 55-60, 1977.
3. AUGE DE MELLO, P.; GOMES, I. Vacuna antiaftosa con adyuvante oleoso para cerdos. I. Vacuna de emulsión doble aplicada por diferentes vías. (Foot-and-mouth disease oil adjuvanted vaccines for pigs. I. Double emulsion vaccine applied by different routes). *Boln Centr. Panam. Fiebre Aftosa 31-32:* 1-6, 7-12, 1978.

4. AUGE DE MELLO, P.; GOMES, I.; ALONSO FERNANDEZ, A.; MASCARENHAS, J.C. Vacuna antiaftosa con adyuvante oleoso para cerdos. II. Vacunación intraperitoneal de cerdos jóvenes con emulsión doble. (Foot-and-mouth disease oil adjuvanted vaccines for pigs. II. Intraperitoneal vaccination of young pigs with double emulsion vaccine). *Boln. Centr. Panam. Fiebre Aftosa 31-32:* 13-19, 21-27, 1978.
5. CUNHA, R.G.; BAPTISTA JUNIOR, J.A.; SERRÃO, U.M.; TORTURELLA, I. El uso de los ratones lactantes en la evaluación de los anticuerpos contra el virus de la fiebre aftosa y su significación inmunológica. *Gac. vet.* B. Aires *19* (110): 234-267, 1957.
6. GOMES, I.; AUGE DE MELLO, P.; ALONSO FERNANDEZ, A.; COSTA, K. de F. Vacuna antiaftosa con adyuvante oleoso para cerdos. III. Respuesta inmunitaria con vacunas emulsificadas por vibración ultrasónica o por agitación mecánica. (Foot-and-mouth disease oil adjuvanted vaccines for pigs. III. Immune response of vaccines emulsified by ultrasonic or mechanical equipment). *Boln Centr. Panam. Fiebre Aftosa 35-36:* 19-25, 27-33, 1979.