STUDY OF IMMUNOBIOLOGIC CHARACTERISTICS OF TYPE ASIA-1 NO. 1987/AMURSKY/2005 FMD VIRUS

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FMD is an acute contagious disease of cloven-hoofed animals caused by the agent with antigenically distinct serotypes and intratype variants. Convalescence from FMD or vaccination with one of FMD virus types provide no protection against the other serotypes. Moreover, the protection can be insufficient against other subtypes within one type.

In this view the study of matching between production and field strains is critical for the disease control.

In June 2005 an FMD outbreak caused by type Asia-1 FMD virus was reported in unvaccinated cattle in the village of Busse, Svobodnensky Rayon, Amurskaya Oblast, Russian Federation. Hereafter, in 2005-2006 FMD outbreaks caused by this serotype were registered in the Khabarovsky and Primorsky Krais of the Far East Region, in the aimak of Dornod in the east of Mongolia and in the Chitinskaya Oblast of the Sibirsky Federal Okrug.

The Asia-1 No. 1987/Amursky/2005 type FMD virus submitted to the OIE Regional Reference Laboratory for FMD (FGI "ARRIAH", Vladimir) was adapted to the primary and continuous cell cultures (SP, PGSK-30, IB-RS-2, BHK-21) and to guinea-pigs by 4-6 passages. The study of naturally susceptible animal sensitivity to the virus showed that primary aphthae at the site of inoculation appeared in cattle 48 hours after the inoculation and in pigs and sheep 72-96 hours after the inoculation.

Considering that the FMD vaccine from Shamir 3/89 strain is recommended for the immunization of animals against type Asia-1 FMD virus in the world, $r_1$ value was studied using microneutralization test to define the antigenic matching between the epidemic virus and production virus strain. The test was conducted using 2 series of sera from cattle vaccinated with monovalent Asia-1 Shamir 3/89 FMD vaccines against 100 TCID$_{50}$/50 µl of the homologues production strain and correspondent dose of the field isolate. The $r_1$ of the epidemic Asia-1 No.1987/Amursky/2005 FMDV was found to be 0.25 and 0.18 against production strain Asia-1 Shamir 3/89 and 0.25 against the epidemic FMDV strain Asia-1/Mongolia/2005 (using 2 series of sera). The data interpretation according to Paton et al. (2005) suggests that the field isolate differs from the production strain at $r_1<0.3$ and the vaccine produced from this strain cannot protect animals from the circulating virus.

The experiment on cross-infection of cattle vaccinated with monovalent sorbated vaccines against FMDV of A, O, Asia-1 types, with FMD virus of type Asia-1 (production and epidemic strains) demonstrated that PD$_{50}$ of the inoculation dose was 10.5 against the production Asia-1 strain and 3.4 against epidemic Asia-1 No.1987/Amursky/2005 isolate. This fact indicates that the vaccine is 3 times less immunogenic against the circulating epidemic virus.

Thus, performed investigations on the examination of immunobiological properties of type Asia-1 No.1987/Amursky/2005 FMD virus strain showed the significant antigenic difference between circulating virus and production strain of this type. Thereby, in May 2006 the Asia-1 No.1987/Amursky/2005 FMD virus strain was deposited to the All-Russian State Collection of Microorganism Strains, used in veterinary medicine and animal production. It is currently used as a production strain for vaccine and diagnostic preparation manufacture.

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