Experimental infections in animals using a foot-and-mouth disease virus isolated from the 2010 epidemic in Japan

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Introduction:
An outbreak of foot-and-mouth disease (FMD) occurred in Japan in 2010. It was the first outbreak since 2000. Two hundred and ninety-two cases were confirmed during this period. In our institute, several experimental infections in animals using an FMD virus (FMDV) isolated from the 2010 epidemic in Japan have been carried out to analyze clinical manifestations, virus shedding patterns, antibody responses and pathological features in the animals. In this presentation, I will introduce results of the experimental infections.

Materials and methods:
In this study, two cattle, two goats and two pigs were inoculated intradermally with approximately $10^6$ TCID$_{50}$ of the isolate at tongues, at coronary bands of heels and at heel bulbs, respectively. At 1 day post-inoculation (dpi), two cattle, two goats and four pigs cohabitated with the inoculated animals of the same species, respectively. Clinical signs were observed daily. Clinical samples were collected routinely from the animals. Virus isolation and titration were carried out using the IB-RS-2 cells and the ZZ-R 127 cells. Detection and quantification of viral genes were carried out by an RT-PCR assay and a real-time RT-PCR assay, respectively. Antibody titers were determined by a neutralization test and a liquid-phase blocking ELISA.

Results:
Vesicular development was observed on snouts, tongues, lips and feet in the inoculated and the direct contact animals. They also showed elevations in body temperatures, salivation, depression, reduced appetites and lameness. Viral genes were detected from sera, saliva, nasal swabs, feces and oropharyngeal fluids collected from the animals. Viruses were also isolated from the clinical samples. Antibodies were observed in the inoculated and the direct contact animals.

Discussion:
The results of the experimental infections showed that the FMDV isolated from the 2010 epidemic in Japan was virulent in cattle, goats and pigs, producing synchronous diseases in the inoculated animals and efficient spread to the direct contact animals.
Biography: Katsuhiko Fukai, Ph.D., D.V.M.

Dr. Fukai is a Senior Researcher at the National Institute of Animal Health. He obtained Ph.D. at the Nihon University in 2002 on “Study on molecular epidemiology of bovine group A rotavirus”. He has been engaged in studies of FMDV. He has also been in charge of emergency diagnoses of FMD in Japan.