protected both heterologous (SNU50-5) and homologous [HN(50-5)]heterosubtypic challenges but 10^4 EID_{50} of rPR8-NS(0028)protected only homologous heterosubtypic challenge.

Conclusions: Antigenic matching of internal genes between vaccine and field viruses may guarantee better protection of heterosubtypic viruses as well as antigenic variants

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Cultivation of *Foot-and-Mouth Disease Virus* vaccine candidates of serotype O in bioreactor

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Introduction: Foot-and-mouth disease (FMD) is an economically important disease and affects cloven-hoofed animals, including pigs, cattle, goats, swine or sheep, and wild animals. Vaccination is one of the most effective ways for control and prevention of FMD outbreak. Since 2011, all the susceptible livestock in the Republic of Korea (ROK) have been vaccinated with inactivated FMDV vaccine~~in~~ of double oil emulsion form. Nevertheless, FMD outbreak occurred in Uiseong and Hapcheon in July 2014, thereafter another outbreak was reported in Jincheon in November 2014 and recently new outbreaks ~~was~~ occurred in Gimje in January 2016. The problem is that all the commercial vaccine are imported, and we rely on the foreign companies for the FMD prevention in the ROK. Therefore, we need to establish FMD vaccine ~~bulk~~ production system ~~for~~ suitable for domestic consumption. In relation to this grand project, this study, we performed cultivation of BHK-21 suspension cell-line in the 2L bioreactor and infected them wih FMDV of serotype O from 2014 ROK outbreaks ~~virus~~. After repeating the production cycle of this scale, these results would lead to the large scale vaccine production in the future.

Materials and Methods: Ten of the vaccine candidate viruses were obtained from FMD viruses isolated in Korea in December 2010 and from December 2014 to February 2015. They were subjected to serial passage~~d~~s in ZZ-R cells and LF-BK cells and was subsequently adapted to BHK- 21 cells. From the virus titer and sequence analysis we selected ~~to~~ one final vaccine candidate virus; Jincheon/O/SKR-02/2014. This virus was passaged in BHK-21 suspension cell-line (BHK-21S) for adaptation. BHK-21S cell was cultivated in ProVero media. Before seeding the cell in the bioreactor, pH and pO2 probes were calibrated and vessel pipelines were connected to the tubes and filters before vessel sterilization(121^{o}Cin 15 min) and dehydrate~~i~~on of the filter for 24h. Then vessel connected to the control tower and probes were re-calibrated. After feeding media, cells were seeded in the vessel with a total of $1x10^9$cells per liter. Everyday, nutrient level and cell concentration were checked and deficient nutrient was supplied. BHK-21S cells were grown until $1x10^7$cells/ml. Finally media the fresh media and cells were infected with Jincheon/O/SKR-02/2014 virus to be 0.01 MOI.

Results: We cultivated high concentration of BHK-21S cell in the 2L bioreactor. Total cell number almost equals the product from 600 tissue culture 175T-flasks. BHK-21S cells ~~was~~ were infected with the 0.01 MOI of Jincheon virus and viruses were harvest after 24 h.

Conclusions: This cultivation protocol of the suspension cells appear to be promising considering the cell growth capacity. ~~s~~In the future, we will compare the productivity of viral antigen for inactivated vaccine between adherent cell and suspension cell.

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Sensitive detection method of Foot-and-mouth disease virus in pigs by oral-fluid using cotton rope

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Introduction: Foot-and-mouth disease (FMD) is a highly contagious disease affecting cloven-hoofed animals caused by a single-stranded RNA virus belonging to the *Picornaviridae*. As a pigs amplify FMD virus by producing and excreting large amount of virus, it is important to detect the virus quickly.