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## Gene signatures associated with foot-and-mouth disease virus infection and persistence part I: persistent FMDV in a three-dimensional model of the bovine soft palate

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**BACKGROUND**

Foot-and-mouth disease virus (FMDV) causes devastating vesicular disease in livestock and persists in epithelial cells of the dorsal soft palate (DSP) in cattle.

**OBJECTIVE**

To enable the study of mechanisms, or the screening of molecules to detect or interfere in persistence, the objective was to establish persistent FMDV infection in vitro.

**MATERIAL AND METHODS**

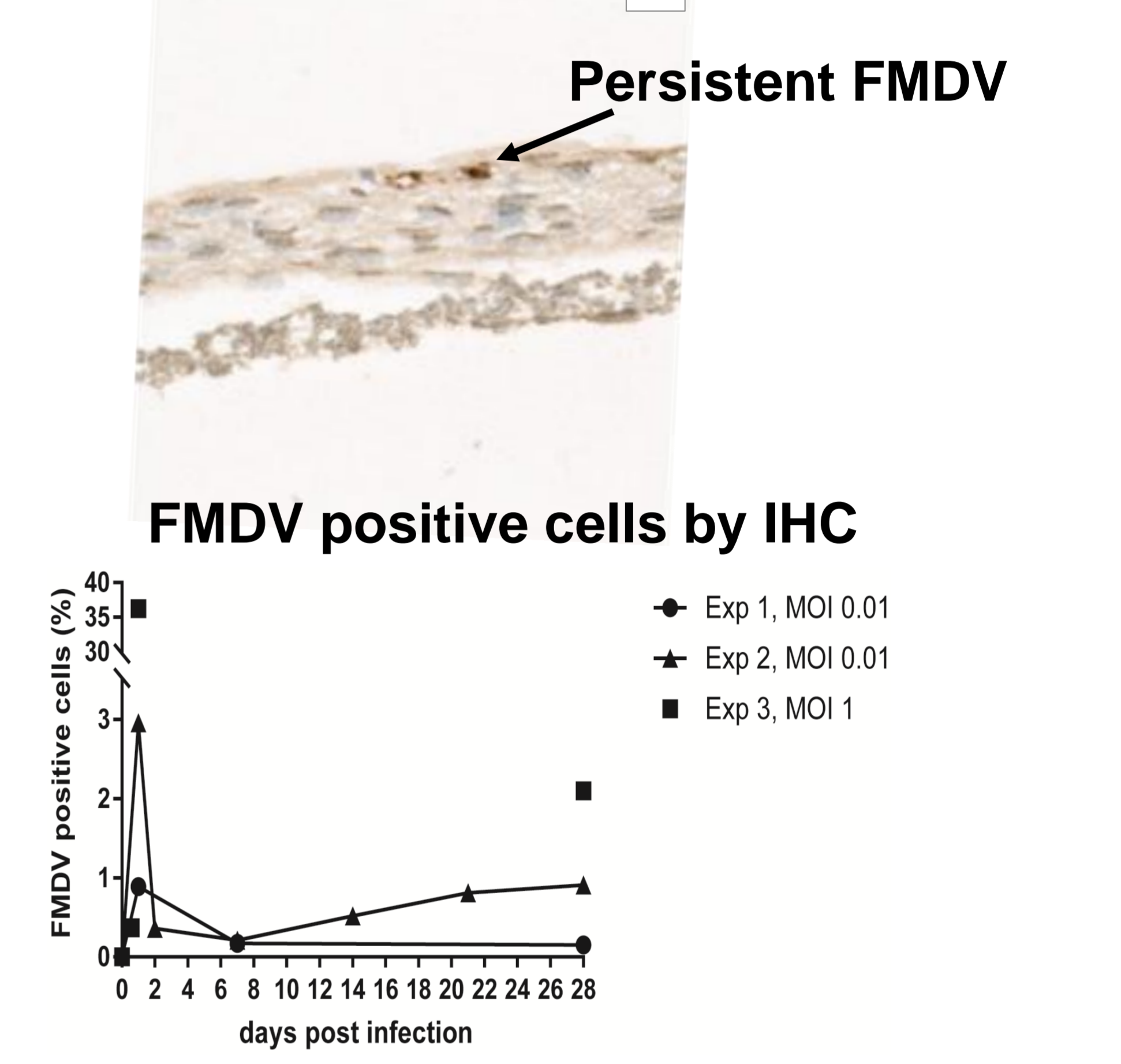
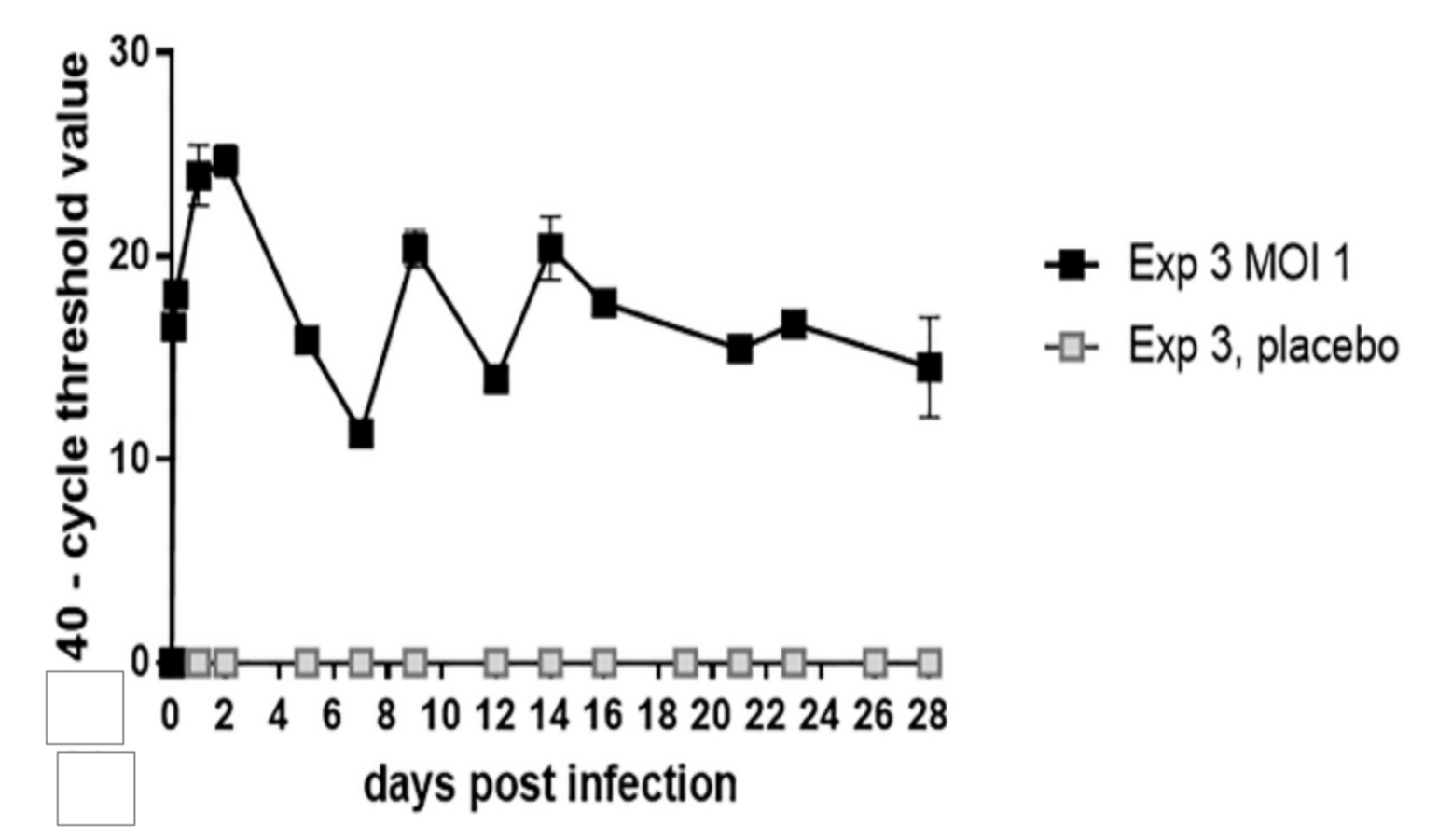
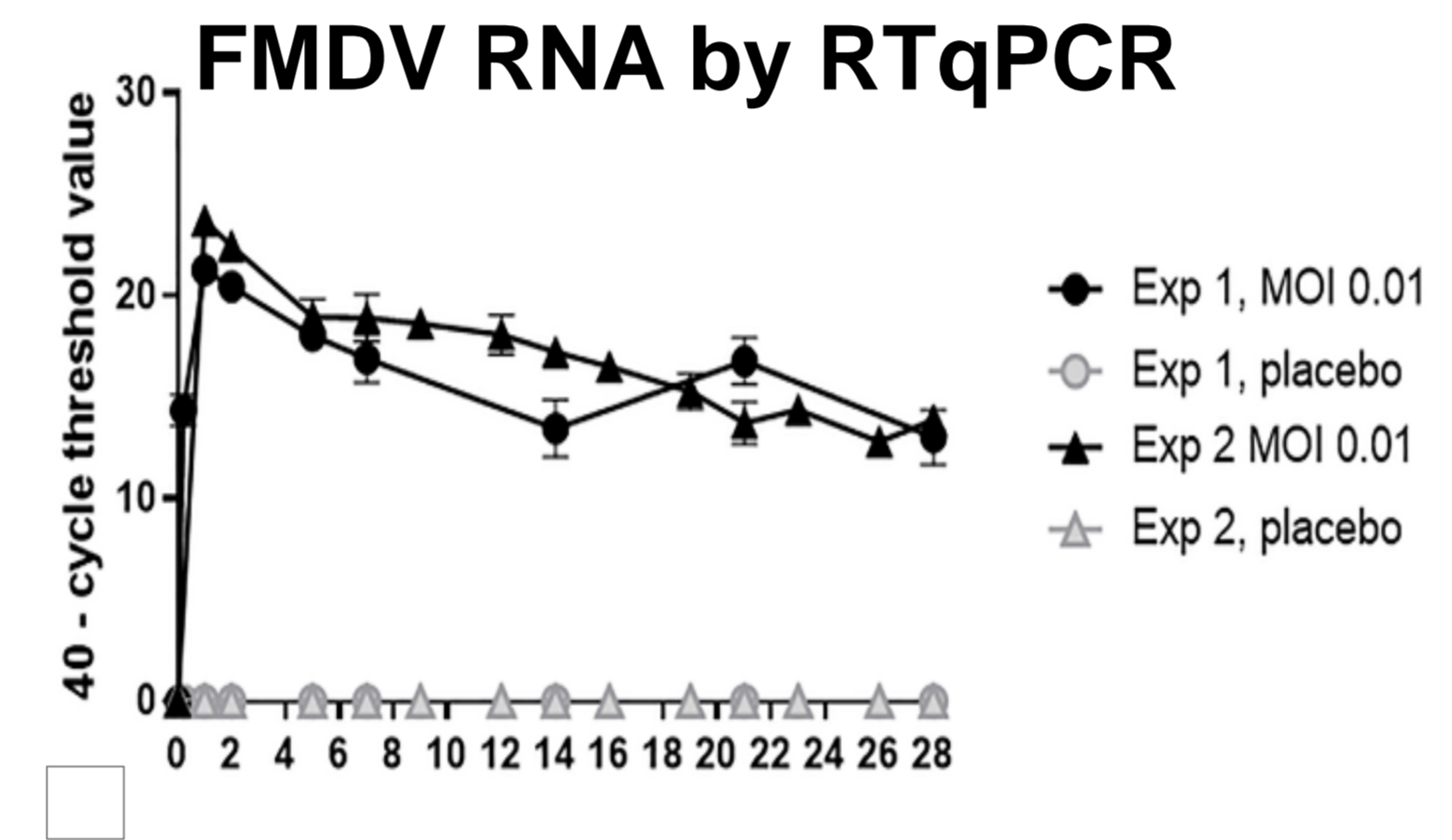
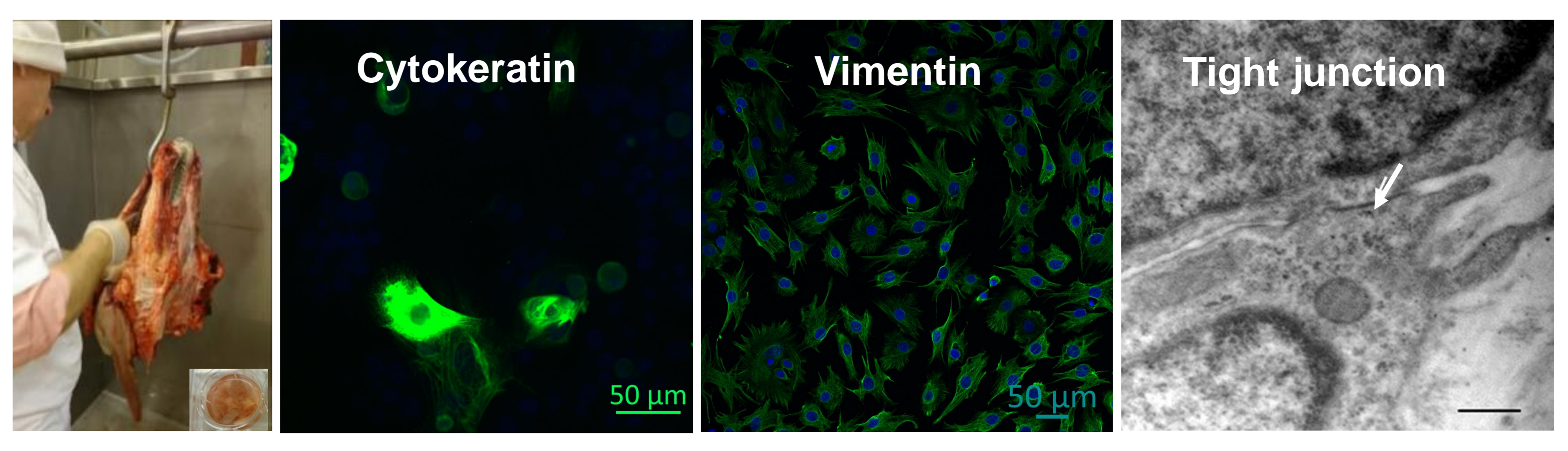
SP cells were isolated after commercial slaughter and were cultured in multilayers at the air-liquid interface. After 5 weeks of culture without passage, the cells were infected with a viral clone FMDV O derived from the FMDV/FRA/1/2001 strain.

**RESULTS AND DISCUSSION**

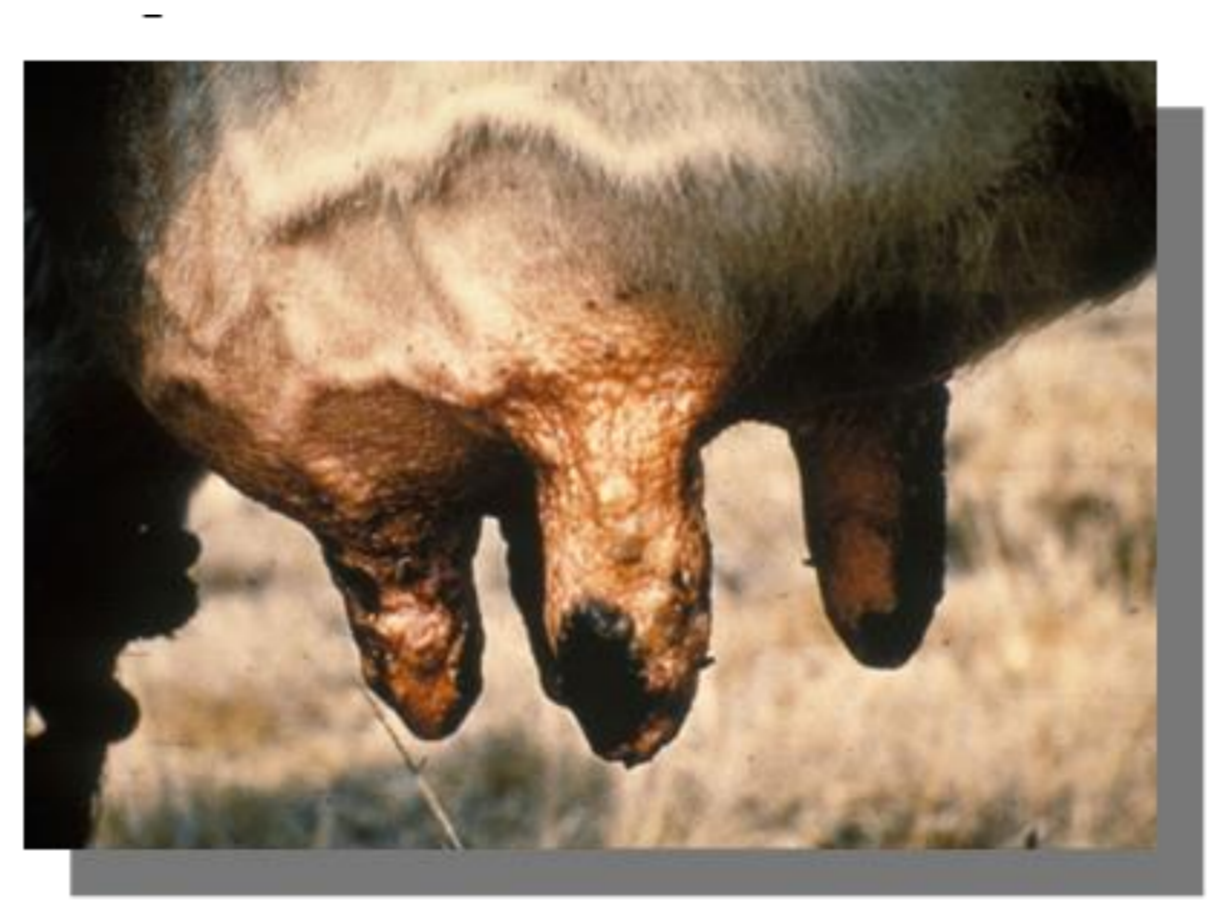
At infection, ~20% of cells had a polygonal morphology and displayed tight junctions, such as in stratified squamous epithelia. Some cells expressed cytokeratin and most or all cells expressed vimentin, which characterises epithelial cells in culture.

A limited cytopathic effect was observed, restricted to the upper cell layers. FMDV antigen, FMDV RNA and live FMDV were detected through day 1 to 28, with peaks at day 1 and 2. A maximum of infected cells (36%) was detected 24 hours after infection at an MOI of 1. At day 28, when animals are considered as carriers, FMDV antigen could still be detected in sparse cells (0.2%-2.1%) and live virus was isolated from supernatants of 6/8 cultures.

*Transcriptomic data are presented in an oral communication and have been published (Pfaff et al., viruses, 2019).*



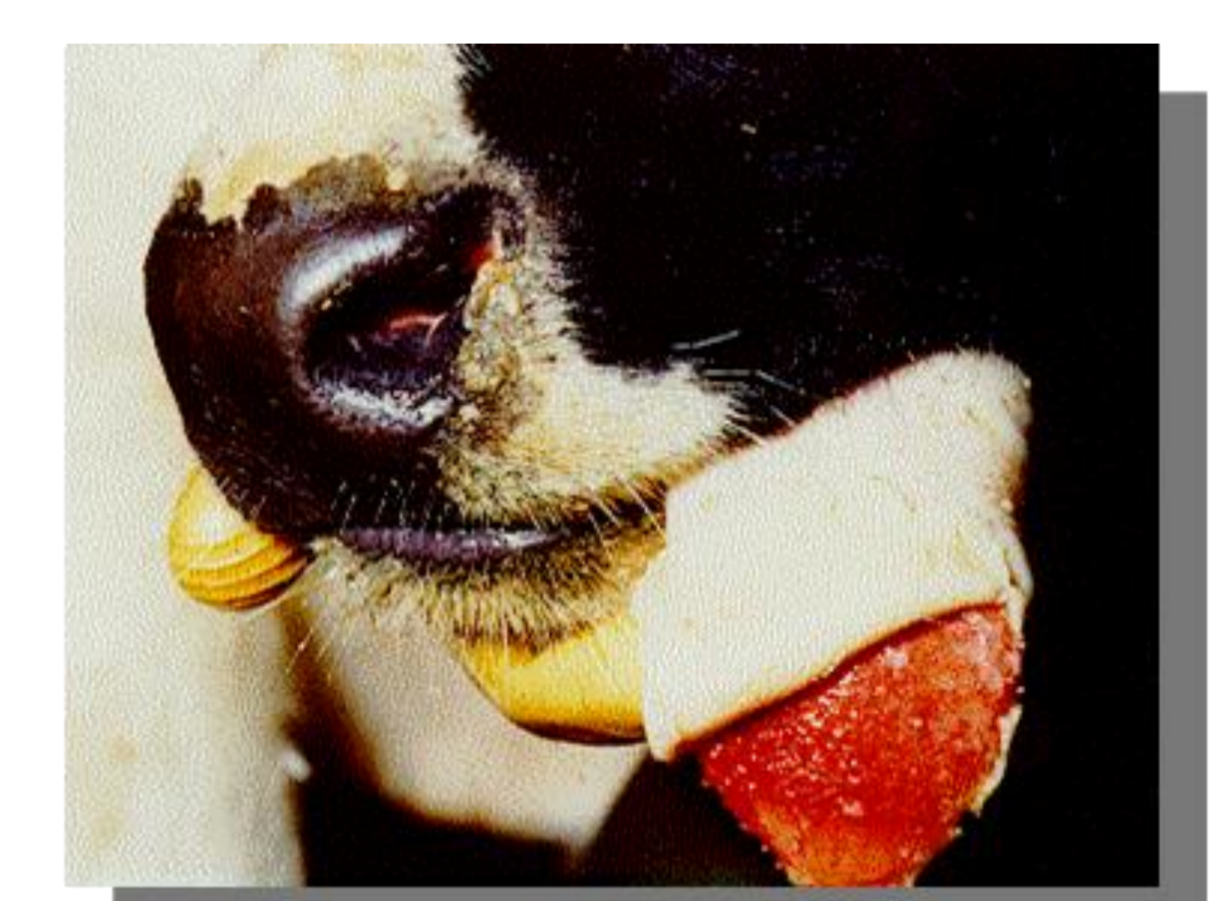
- Isolation, characterisation and FMDV infection of bovine dorsal soft palate cells



<http://www.afrivip.org/sites/default/files/FMD/diagnosis.html>



Photo: Jean-François Valarcher, SLU



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- Vesicular lesions caused by foot-and-mouth disease virus in cattle

**CONCLUSION**

Bovine dorsal soft palate cells were propagated in multilayers at the air-liquid interface. Persistent FMDV infection was established in sparse cells in all layers. The model will enable to get a better understanding of the mechanisms underlying persistence in order to develop ways to control this infection and to improve the diagnostics.

