

10th International Virology Summit & 4th International Conference on Influenza & Zoonotic Diseases

July 02-04, 2018 | Vienna, Austria

Generation of monoclonal antibodies against foot-and-mouth disease virus SAT 2 and development of lateral flow strip test for virus detection

Ming Yang¹, Kaye Quizon¹, Boitumelo Mudabuka² and Charles Nfon¹

¹National Centre for Foreign Animal Disease, Canada

²Botswana Institute for Technology Research and Innovation, Botswana

Foot-and-mouth disease (FMD) remains one of the world's most widespread epizootic and highly contagious animal diseases affecting a wide host range species. More than 100 countries worldwide are not yet accepted as FMD free by the World Organisation for Animal Health. FMD virus (FMDV) is recognized as seven serotypes: O, A, C, Asia 1, SAT 1, SAT 2 and SAT 3. Several FMD outbreaks due to SAT 2 had been reported from 1990 to 2012. The development of a rapid and easily performed test for FMD detection is critical for controlling FMD outbreaks and containing its spread. The aim of the project was to generate FMDV/SAT2 specific monoclonal antibodies (mAbs) and develop a lateral flow immuno chromatographic (LFI) strip test for the rapid detection of FMDV/SAT 2. A total of eight mAbs were generated and examined for their reactivity and specificity using ELISAs. The mAb #10 was selected as the capture mAb because it reacted with all tested SAT 2 isolates. The LFI strip test was developed using two mAbs. The LFI strip test was able to identify SAT 2 isolates (n=23) in culture supernatants. The calculated diagnostic specificities were 100% and 98% for the strip test and ELISA, respectively. Thirty four of 50 FMDV/SAT 2 PCR-positive tissue suspensions from experimental inoculated animals without application were identified as positive by the LFI strip test. While, sixteen samples were positive using an ELISA. Diagnostic sensitivity for LFI strip test and ELISA were 67% and 33%, respectively calculated based on the fifty samples. In conclusion, a lateral flow strip test for detection of FMDV/SAT 2 was developed. The performance of the strip test in terms diagnostic specificity and sensitivity was higher than the ELISA. The ability of strip tests to generate rapid results would be useful for the early diagnosis on-site during FMD outbreaks.

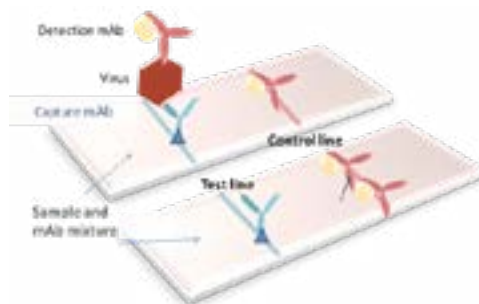


Figure 1: Diagram of the LFI strip test. A biotin-binding protein was sprayed on the test line that captures biotinylated capture mAb. An antibody that binds the mouse antibody was sprayed on the control line. Samples and antibodies were mixed in the running buffer. gRAD strips were dipped into the tube. After 30 minutes, results were determined by visualization. A positive result is demonstrated by reddish-purple bands at both lines (test and control). A negative result is demonstrated by single visible band at the control line only.

Recent Publications

1. Ferris N P, Nordengrahn A, Hutchings G H, Reid S M, King D P, Ebert K, Paton D J, Kristersson T, Brocchi E, Grazioli S and Merza M (2009) Development and laboratory validation of a lateral flow device for the detection of foot-and-mouth disease virus in clinical samples. *Journal of Virological Methods* 155(1):10-17.
2. Yang M, Goolia M, Xu W, Bittner H and Clavijo A (2013) Development of a quick and simple detection methodology for foot-and-mouth disease virus serotypes O, A and Asia 1 using a generic rapid assay device. *Virology Journal* 10:125.
3. Yang M, Nigel Caterer, Wanhong Xu and Melissa Goolia (2015) Development of a multiplex lateral flow strip test for foot-and-mouth disease virus detection using monoclonal antibodies. *Journal of Virological Methods* 221:119-26.

10th International Virology Summit
&
4th International Conference on Influenza & Zoonotic Diseases
July 02-04, 2018 | Vienna, Austria

Biography

Ming Yang is an Immunologist at the National Center for Foreign Animal Diseases/Canadian Food Inspection Agency, where she produces and characterizes monoclonal antibodies against vesicular disease viruses such as foot-and-mouth disease (FMD) virus, vesicular stomatitis (VS) virus and swine vesicular disease (SVD) virus. She developed several immune assays for the diagnoses of vesicular diseases, such as ELISA and lateral flow strip tests. She has published close to 40 manuscripts in the peer-reviewed journals. She graduated from University of Manitoba with MSc degree in Immunology and PhD in Microbiology.

ming.yang@inspection.gc.ca

Notes: