KEYNOTE DIAGNOSTICS: A NEW ERA IN ACCESS TO HIGH PERFORMANCE DIAGNOSTICS

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This presentation reviews the changing face of diagnostic virology, highlighting new assay formats that have been developed over the past decade. Deployment of molecular assays into laboratories has revolutionised the way in which samples from infected animals are processed. These molecular tests are now widely used for the detection and characterisation of FMD virus: complementing, and on occasions replacing established approaches such as immunoassays and in-vitro cell culture methods. The role of these assays was recently demonstrated during the cases of FMD that occurred in the United Kingdom during the summer of 2007. In contrast to the 2001 epidemic, diagnostic support for these outbreaks was characterised by the use of real-time RT-PCR (rRT-PCR) as a principal tool for decision making. In addition to confirming the presence of FMDV on all 8 infected farms, for the first time, rRT-PCR results were also used to recognise preclinical FMD in a cattle herd. Furthermore, during the later stages of the outbreaks, the rRT-PCR assay also supported an active surveillance program within high-risk cattle herds. Full-genome sequencing approaches were also used to generate data to rapidly reconstruct the transmission histories that occurred during these outbreaks.

In addition to laboratory-based tests, there are opportunities to use new technologies to provide diagnostic capability away from a centralised laboratory. Work in this area has developed simple-to-use lateral-flow devices for the detection of FMD virus, as well as new hardware platforms to allow PCR testing to be devolved to local laboratories and into the field for use by non-specialists. The driving force for these improvements has largely been influenced by the priorities of developed countries with FMD-free (without vaccination) status. In these settings, speed of the assays and the ability to detect all seven FMDV serotypes are primary considerations. However, it is important to recognise that these diagnostic approaches also show considerable promise for use in FMD-endemic countries, although region-specific modifications (such as sample archiving and serotype/strain characterisation) may be required to tailor these tests for use. Using PCR-based and other antigen-detection technologies, it is now possible to imagine a completely new diagnostic paradigm for how sample collection, testing of infected animals and monitoring of the spread of FMD might be achieved.