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RESEARCH ON DIAGNOSTIC TESTS: KEY TOPICS AND NEW APPLICATIONS

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Historically, disease diagnosis together with confirmation in the laboratory has relied on the isolation of the pathogen and/or measurement of antibodies in sera collected from targeted hosts. For serological diagnosis it was usually recommended that paired test sera should be sampled, collected at least 15 days apart. Such recommendations are not compatible with effective management of those diseases that are liable to spread quickly, such as transboundary animal diseases, particularly those where there are difficulties in isolating the pathogens.

Advances in biology, in particular molecular biology, in combination with other disciplines have allowed the development of new technologies for highly sensitive and early disease diagnosis. The main breakthrough was made with the advent of the classical polymerase reaction (PCR) that made it possible to amplify nucleic acid molecules to very high levels. The use of fluorogenic molecules in the PCR reaction has not only improved the sensitivity of the assay but has also made possible the detection of the amplified products in real-time. For most laboratories in developing countries, where there are often important budget constraints, the promising nucleic amplification technology is the loop-mediated isothermal amplification (LAMP). As the reaction is carried out at a constant temperature, this method needs only a simple thermoblock, which is cheaper than a PCR machine but retains the performance levels of a conventional PCR. Moreover, the result can be visualised by the addition of a fluorescent dye into the test tube, thereby making it possible to easily perform the test in the field. Indeed, a topic which is being addressed presently is to bring an improved diagnostic capacity to the field to enable early detection of disease. Among the developments that will make this achievable are the use of portable PCR machines and immunochromatography lateral flow strips for antigen detection. Another topic of disease diagnosis, the capability to identify, or even genotype, multiple pathogens in a single assay is being addressed by the microarray-based technology.

All these new technologies will be reviewed by the authors.



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