

Advances in Molecular Biological Detection Methods of Tick-borne *Anaplasma Phagocytophilum*

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Abstract

Anaplasma phagocytophilum (AP) is a tick-borne pathogen that infects human and animal neutrophils to cause anaplasmosis. Accurate and rapid detection of AP is of great significance for early diagnosis, prevention and control of anaplasmosis. At present, the clinical diagnosis methods of AP infection mainly include epidemiological history, clinical manifestations and laboratory tests. The conventional diagnostic methods for HGA mainly include morphological observation, serological diagnosis, and pathogen isolation and cultivation. However, due to limitations in time and technology, the detection rate is low. Therefore, some researchers have proposed molecular biology detection methods for AP. Molecular biology detection technology is an important method for AP detection because of its high specificity, simple and rapid operation. In this paper, we will review the application progress of common molecular detection techniques of AP in recent years, such as nested PCR, fluorescent quantitative PCR, multiplex PCR amplicon sequencing, loop-mediated isothermal amplification (LAMP) and single-cell sequencing, etc. Among them, nested PCR has a wide range of applications, strong specificity, and is not prone to errors. However, due to the need for two amplifications and the need to open the lid during operation, this method is susceptible to contamination, which can affect detection accuracy. Fluorescence quantitative PCR has a high degree of automation, strong specificity, and can perform quantitative analysis, but it also requires high primer specificity and is expensive. LAMP does not require a PCR instrument or special reagents, and there is no need to change the temperature during amplification. It is simple and convenient to operate, and is more easily popularized, making it suitable for early detection. Single cell sequencing and multiplex PCR amplicon sequencing are both recent research hotspots. These methods above mentioned provide reference for the future research and development direction, and also for the diagnosis of anaplasmosis.

Keywords

Anaplasma Phagocytophilum, Tick-borne Diseases, Molecular Detection Technology, Application, Prospect