

Molecular detection and phylogenetic tree assay of *Pseudomonas aeruginosa* isolated from otitis cases of cats and humans, Iraq

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KEYWORDS

Pseudomonas aeruginosa, Otitis externa, Polymerase chain reaction, Phylogenetic tree

ABSTRACT

The aim of this study was toward isolation and identification of *P. aeruginosa* from cats with otitis externa in Basra city Using culture media, Biochemical tests and Polymerase chain reaction. *Pseudomonas aeruginosa* was isolated from 46 isolates that involved 32 cases out of 75 of feline otitis externa (21.3%) and in 14 (9.3%) from 75 human samples. The clinical signs of otitis externa were head shaking, scratching, excessive ear wax, malodor, pain during palpation, alopecia and pus and/or blood. Culture was done on *Pseudomonas* chrome agar revealed positive samples with production of greenish-blue pigmentation by the bacteria. Polymerase chain reaction revealed that isolates were *Pseudomonas aeruginosa* using specific primers for *P. aeruginosa* identification 16S rRNA and the result was positive for the 15 isolates. A phylogenetic tree analysis of *P. aeruginosa* was performed using the 16S rRNA gene sequence analysis which illustrated the phylogenetic relationship between *P. aeruginosa* strains isolated from cats and other related genera. In conclusion, this study confirmed the higher prevalence of *P. aeruginosa* in otitis externa infection of cats when compared to human. The using of molecular assay and 16S rRNA gene contributed effectively in detection of *P. aeruginosa*. Therefore, this study suggests the application of molecular techniques in identification of different microorganisms. Additionally, more studies are necessary to detect the prevalence of *P. aeruginosa* in different infections in animals as well as human.

1. Introduction

Otitis externa is an inflammatory disease of the external ear canal, including the ear pinna. Otitis externa may be acute or chronic (persistent or recurrent otitis lasting for 3 months or longer). Changes that occur in the external ear canal in response to chronic inflammation may include glandular hyperplasia, glandular dilation, epithelial hyperplasia, and hyperkeratosis. These changes usually result in increased cerumen production along the external ear canal, which contributes to increase in local humidity and pH of the external ear canal, thus predisposing the ear to secondary infection (Quim *et al.*, 1996). *Pseudomonas aeruginosa* of the Pseudomonadaceae family classified as an opportunistic pathogen, which causes disease infrequently in normal hosts but is a major cause of infection in patients with underlying or immunocompromising conditions. Quinn *et al.* (2005) mentioned that *P. aeruginosa* can continue in severe environmental conditions and shows essential resistance to a various antimicrobial agents. Among the pathogenic microorganisms that cause human infections, *P. aeruginosa* remains one of the most common agents of outbreaks in hospitals worldwide (Saitou and Nei, 1987). This pathogen is the most common species in the *Pseudomonas* genus, comprising 144 species, 25% of which are associated with human illnesses (Felsenstein, 1985).

Pseudomonas aeruginosa is the most common cause of infections (both within the genus and among Gram-negative bacteria in humans and animals (Pachori *et al.*, 2019). This pathogen is abundant in wide variety of environments and can colonize and infect livestock and companion animals. *P. aeruginosa* can cause mastitis in dairy cows and multiple diseases in sheep and goat including ovine mastitis, respiratory manifestations, urogenital disorders, gastrointestinal illness, sinusitis and osteomyelitis (Saha *et al.*, 2008). *Pseudomonas aeruginosa* is an opportunistic pathogen and infection is preceded by a breach in host defenses, such as breaks in the skin. This organism produces a variety of toxins and enzymes which promote tissue invasion and damage. Although *P. aeruginosa* is an environmental organism, it is also infrequently found on the skin, mucous membranes, and in the feces of some healthy animals wild, companion, or farm animal (Broglia *et al.*, 2020).

2. Methodology

Identification of *Pseudomonas*