

## Occurrence of *Malassezia pachydermatis* in the external ear canals of dogs with and without otitis externa

Bahador Bardshiri<sup>1\*</sup>, Mehdi Tavana<sup>1</sup>, Seyedeh Zeinab Peighambarzadeh<sup>1</sup>, Maziar Abdolrahimi<sup>2</sup>

<sup>1</sup>Department of Veterinary Medicine, Faculty of Agriculture and Veterinary Medicine, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran

<sup>2</sup>Faculty of Veterinary Medicine, Garmsar Branch, Islamic Azad University, Garmsar, Iran

**Abstract:** The purpose of this study was to evaluate the frequency of *Malassezia pachydermatis* infection in dogs with external otitis and with healthy auditory tubes. This study was conducted from March 2012 to March 2013 in Karaj, Iran. Samples from the auditory tube of 27 dogs with otitis and from 93 healthy dogs were submitted to direct microscopic examination and cultured in Sabouraud dextrose agar with chloramphenicol and cycloheximide. *M. pachydermatis* was isolated in 20.4% of the samples (19 out of 93 samples) from dogs with healthy auditory tube and 66.7% ( $p < 0.01$ ) of the samples from dogs with otitis (18 out of 27 otitis dogs). Also, the prevalence of *Malassezia pachydermatis* was significantly different according to the anatomy of the pinna and it was higher in dogs with pendulous ears. Infection by *M. pachydermatis* was most prevalent in Terriers and Iranian Shepherds. No differences were found in frequency of the infection in relation to age, sex of the dogs.

**Key words:** *Malassezia pachydermatis*; Dog; Otitis externa

### 1. Introduction

Otitis externa is defined as inflammation of the skin and adnexal structures of the ear canal. This condition is one of the most common and frustrating problems encountered in small animal practice. *Malassezia pachydermatis* is considered as perpetuating factor of otitis externa that exacerbate the inflammatory process and can maintain the disease after the primary factor has been eliminated. They can induce permanent pathologic changes to the ear canal and are the main reason for treatment failure in otitis externa (Noxon, 2005).

*Malassezia pachydermatis* is a budding yeast that has been identified on ear cytology of normal dogs (up to 50%) and cats (up to 23%). *Malassezia pachydermatis* is considered part of the normal flora and an opportunist in cases of otitis externa, particularly in cases of erythematous ceruminous otitis. *Malassezia* other than *Malassezia pachydermatis* are lipid dependent yeast that overgrow in conditions of increased moisture, increased surface lipids, and compromised barrier function of the stratum corneum.

Enzymes produced by the yeast may allow depolymerization of the interstitial matrix (e.g., hyaluronidase, chondroitin-sulphatase) and cell membranes (e.g., proteinase, phospholipase), increasing tissue invasion and penetration. However recent study has shown that direct examination was not as sensitive as culture. *Malassezia* spp were

present in up to 66% of canine otitis cases and more pathogenic genotypes were only recovered from dogs with otitis (Radlinsky, 2005).

### 2. Materials and Methods

The presence of *Malassezia pachydermatis* was explored in the ear canal of 120 healthy and otitis dogs with no limitation for age, gender and breed. This study was conducted from March 2012 to March 2013 in Karaj, Iran and samples were gathered from different private veterinary clinics and dog shelters around the city. All dogs were evaluated before sampling and were categorized as healthy or otitis according to their history, clinical and otoscopic examination.

The samples were taken by a sterile swab, moistened in saline solution and rubbed in the anterior ear canal. The detection of *Malassezia pachydermatis* in the ear discharge was performed by direct examination of the smear. Slides were stained by methylene blue for cytological examination. Smear evaluation was done according to a scale of 1+ to 4+ in describing numbers of yeast, bacteria, and inflammatory cells to allow evaluation of the progression of the disease process.

Dogs and cats should have  $\leq 2$  yeast/hpf. Yeast numbers  $\geq 5$ /hpf in dogs was considered as abnormal. The samples were also cultivated in Sabouraud dextrose agar with chloramphenicol (0.4 g/l) and cycloheximide (0.5 g/l) that kept at 37°C for up to seven days and were characterized using standard microbiological procedures.

\* Corresponding Author.

The results were analyzed by the SPSS version 16.0. Afterwards the variables were codified and crossed by using the Qui-square and Fischer's tests.

### 3. Results

Prevalence of *Malassezia pachydermatis* in healthy and otitis dogs were 20.4 per cent (19 out of 93 samples) and 66.7 percent (18 out of 27 otitis dogs), respectively. This difference was statistically significant ( $p < 0.01$ ).

Also, the prevalence of *Malassezia pachydermatis* was significantly different according to the anatomy of the pinna and it was higher in dogs with pendulous ears. 24 out of 56 dogs (42.8 %) were positive for *M. pachydermatis* according to direct smear and culture results, and in contrast the prevalence was 20.3% (16 out of 64 dogs) for dogs with erected ears.

Occurrence of *Malassezia pachydermatis* was more prevalent in Terriers (9 out of 16 samples) and Iranian Mix Shepherds (8 out of 33 samples) but this difference was not significant. The prevalence of *M. pachydermatis* in male and female dogs was 22.4% and 22.7%, respectively.

Positive results for *Malassezia pachydermatis* were more prevalent in adult dogs (1 to 8 years old). The differences in frequency of the *M. pachydermatis* infection in relation to age and sex of the dogs were not statistically significant.

### 4. Discussion

The isolation of *Malassezia pachydermatis* was larger ( $p < 0.01$ ) in dogs with external otitis in relation to the healthy one. *Malassezia pachydermatis* was isolated in 18 (66.7%) out of 27 samples of otitis dogs and in 19 (20.4%) of the samples of healthy dogs. These findings were in accordance with results of other studies in Japan (Masuda, 2000), Spain (62 % and 50% of dogs with and without otitis externa, respectively) (Crespo, 2002). The presence of yeast in healthy auditory tubes was also found by (Fraser, 1995) and (Langoni, 1991) (36.0% and 43.0%, respectively). On the other hand, Nunes, 1995 reported the isolation of *M. pachydermatis* in 91% of samples from healthy dogs.

*Malassezia pachydermatis* was isolated in 42.8 of pendulous ears and 20.3 of erect ones in healthy and otitis dogs. The results obtained were similar to Baxter who obtained in healthy pendulous ears 59.0% of *Malassezia pachydermatis* and 23.0% in the erect ones. Our data from pendulous ears of otitis dogs was also similar to Baxter in 71.0% of samples. As mentioned above, the majority of the positive samples (24 out of 37) came from dogs with pendulous ears, reinforcing the affirmative of Stewart et al. who indicated the pendulous ears as a predisposing factor for the establishment of otitis. The results obtained also agree with Lobell et al. who considered

the pendulous ears a predisposing condition for otitis, although dogs with erect ears, mainly the German shepherd, are also susceptible. The results were also in accordance with other previous studies conducted by in Japan (Uchida, 1992) and Spain (Crespo, 2002).

On the other hand, the reported prevalence of *Malassezia pachydermatis* especially in otitis dogs was significantly higher in studies of (Kumar, 2002), (Baxter, 1976) and (Hajsig, 1985).

There were no statistical differences for sex, breed and age in relation to the isolation of *Malassezia pachydermatis*.

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