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# Variability of fungi detection in the respiratory tract of racehorses according to the sampling site

Louise C. LEMONNIER<sup>1</sup>, A. COUROUCE<sup>1,2</sup>, M. CESSANS<sup>1</sup>, L. PETIT<sup>3</sup>, J.M. CARDWELL<sup>4</sup>, M. P. TOQUET<sup>3</sup>, E.A. RICHARD<sup>2,3</sup>

<sup>1</sup>Department of Equine Internal Medicine, University Animal Hospital, CISCO-Oniris, Route de Gachet, 44300 Nantes, France

<sup>2</sup>BIOTARGEN, Normandie Univ, UNICAEN, 14000 Caen, France

<sup>3</sup>Labeo-Frank Duncombe Laboratory, 1 route de Rosel, 14053 Caen, France

<sup>4</sup>Department of Pathobiology and Population Sciences, Royal Veterinary College, Hatfield, Hertfordshire, UK

## INTRODUCTION

The potential involvement of fungi in equine asthma was previously investigated based on tracheal wash (TW) rather than bronchoalveolar lavage (BAL) (1). However, the reliability of airway samples and laboratory methods has not been investigated and the clinical relevance of fungal detection in equine airways still remains controversial.

## OBJECTIVES

Preliminary study to 1) characterize fungi from upper and lower airways of racehorses and 2) determine the most reliable methodology for fungal detection

## HYPOTHESIS

Fungal cytology of a pooled BAL (BAL<sub>p</sub>) is representative of corresponding left (BAL<sub>L</sub>) and right (BAL<sub>R</sub>) samples, and is more reliable than TW for fungal detection.

## METHODS

- 30 Standardbred racehorses in active training, aged  $4.6 \pm 1.6$  years, from 3 different training stables
- TW, followed by BAL from each lung separately, collected through a guarded catheter and gastroscope
- Fungi detection, identification and characterization by cytology and culture
- Comparison was made between:
  - Cytology and culture of TW vs BAL<sub>p</sub>
  - Cytology of BAL<sub>p</sub> vs BAL<sub>L</sub> and BAL<sub>R</sub>

## RESULTS

### Fungal culture

TW: 28/30 (93%) positive ; BAL<sub>p</sub>: 4/30 (13%) positive

- 4/4 positive in TW
- 3/4 with same fungi in BAL<sub>p</sub> and TW
- 9 genus (alone or concomitant)
- *Aspergillus* (5 genus) 13/28 (46%)
- *Penicillium* 12/28 (43%)
- *Chrysosporium*, *Cladosporium*, *Scopulariospisis*

### Fungal cytology (Table 1)

TW:

- 12/22 (55%) with both spores and hyphae, frequently phagocyted

BAL – Comparison between aliquots (Table 2):

- Poor agreement between BAL<sub>L</sub> and BAL<sub>R</sub> ( $\kappa = 0.015$ )
- Poor agreement between culture and cytology ( $\kappa = 0.015$ ) (Figure 1)
- **Substantial agreement between BAL<sub>p</sub> and separate lungs** ( $\kappa = 0.627$ ; **Se = 0,58** ; **Sp = 1,00**)
  - 7/7 BAL<sub>p</sub> positive on cytology were positive on BAL<sub>L</sub> or BAL<sub>R</sub>
  - 5 BAL<sub>p</sub> negative on cytology were positive on BAL<sub>L</sub> or BAL<sub>R</sub>

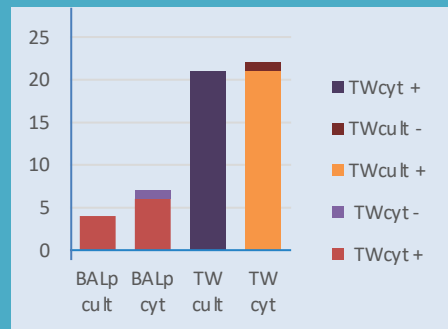


Figure 1: Distribution of results based on sampling site and method of analysis (cyt: cytology ; cult: culture ; - : negative ; + : positive)

Table 1: Cytology of pooled and individual BALF, and of TW

	Cytology positive	Spores	Hyphae	Phagocyted
TW	22/30	18/22	16/22	14/22
BAL <sub>p</sub>	7/30 3 bilateral 4 unilateral	7/7	2/7	6/7
BAL <sub>R</sub>	8/30	5/8	6/8	5/8
BAL <sub>L</sub>	7/30	7/7	0/7	6/7

Table 2: Comparison of BALF sample sites, and of BALF methods of analysis

	BAL <sub>L</sub> only	BAL <sub>R</sub> only	BAL <sub>L+R</sub>	Agreement ( $\kappa$ )
Cytology	4/7	5/8	3	0,015
	Culture only	Cytology only	Culture + cytology	Agreement ( $\kappa$ )
BAL <sub>p</sub>	3/4	6/7	1/7	0,015

## DISCUSSION

Despite a similar prevalence of fungi detection in left and right BAL, a large disparity and a poor agreement were found between lungs. BAL<sub>p</sub> cytology however exhibited a substantial agreement with corresponding samples from each lung. TW fungal culture was overly positive amongst healthy individuals and most likely poorly specific for fungal detection

## CONCLUSION

BAL is preferred over TW for fungal analysis. Pooled BAL is a highly specific while fairly sensitive alternative to combined cytology of individual left/right samples for mold/fungi detection.

## REFERENCES

1) Dauvillier J, ter Woort F, van Erck-Westergren E. Fungi in respiratory samples of horses with inflammatory airway disease. J Vet Intern Med. 2019;33:968-975