

Patient Name: Harley	Health Status: Other	Account #:
Owner's Name:	Ordered by:	Sample ID:
Breed: Belgian Malinois	Email:	Sample Type: Ear, left
Age: 9	Hospital:	Received Date: 11/12/2024
Species: Dog	Location: Columbiana, OH	Report Date:

Potential Clinically Relevant Microbes Detected:

Listed are those bacteria and fungi detected in the specimen that are of potential clinical relevance. Results from this report should be considered together with clinical data gathered by the veterinarian (physical examination, medical history, cytology, etc.) as the microbes detected may or may not be the cause of the clinical condition. For a comprehensive list of all microorganisms detected in this specimen see page 3 of this report. The purpose of Significance is to highlight those species that are outside the expected range for the average clinically healthy animals. Please consider that even commensals can become pathogenic in certain patients under certain circumstances. Further, novel or extremely rare pathogens may be found on page 3 for your consideration and clinical diagnosis.

1. Bacteria

Species Detected	AID*	Percentage	Cells per Sample	Normal Range	Significance
Pseudomonas aeruginosa [1][2][3]	[Link]	37.1 %	17,000,000	0-250	● High
Corynebacterium jeikeium [4]	[Link]	25.8 %	12,000,000	0-450	● High
Neisseria shayegani [1][2]	[Link]	8.2 %	3,700,000	0-4,100	● High
Escherichia coli [5][6][7]	[Link]	3.4 %	1,500,000	0-470	● High
Proteus mirabilis [8]	[Link]	2.8 %	1,300,000	0-0	● High

2. Fungi

Species Detected	AID*	Percentage	Cells per Sample	Normal Range	Significance
Malassezia pachydermatis [9]	[Link]	30.0 %	3	0-2,900	● Normal

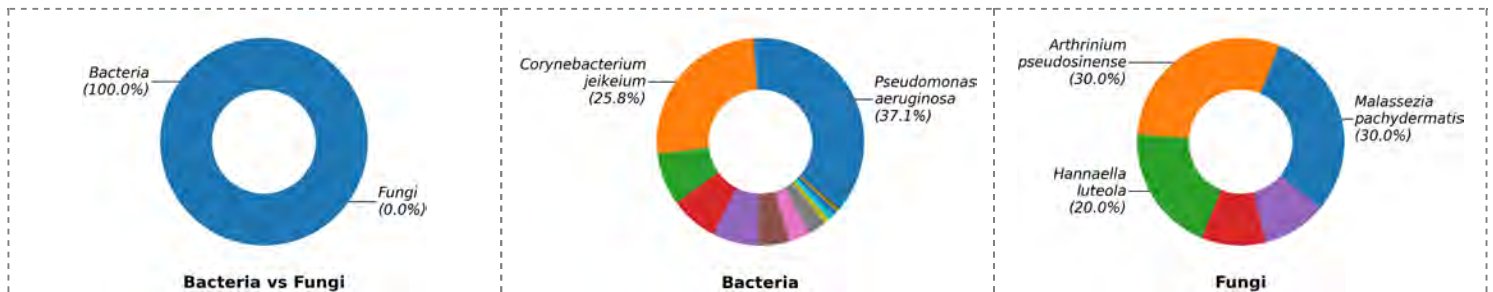
Abbreviation Key:

- **Normal.** Species detected within the reference range of clinically healthy animals.
- **Intermediate.** Species detected outside the reference range of clinically healthy animals.
- **High.** Species detected significantly higher than the reference range of clinically healthy animals.

The number of cells per sample is subject to variations based on sampling technique applied to collect the sample. Following the sampling protocol closely is highly recommended. Less than 1000 cells of Bacteria or less than 10 cells of Fungi are often not clinically relevant unless poor sampling technique was applied, or lower sample volume was submitted.

* AID stands for Animal Infection Database. It is a resource center to provide more information for microbes in animal microbiome settings.

Microbial Overview:



Bacteria vs Fungi: the relative abundance between Bacteria and Fungi. **Bacteria:** the percentage profile of bacterial species alone. **Fungi:** the percentage profile of fungi species alone. Each color represents a species. The larger the colored segment is, the more abundant the species is.

Antibiotic Resistance for Detected Clinically Relevant Microbes

The sample was screened for the presence of antibiotic resistance genes and intrinsic resistances of clinically relevant microorganisms. The cautious use of any antibiotic drug is highly recommended. Please follow the guidelines for antimicrobial stewardship in veterinary practice.

Drug Tiers*	Antibiotics	<i>Pseudomonas aeruginosa</i> (37.1 %)	<i>Corynebacterium jeikeium</i> (25.8 %)	<i>Neisseria shayegani</i> (8.2 %)	<i>Escherichia coli</i> (3.4 %)	<i>Proteus mirabilis</i> (2.8 %)	Suggested Dose†	Drug Delivery
1st	Cefazolin	NR	NR	NRD	G	F	15 mg/kg, q 12 hrs	IV, SC
	Cephalothin	NR	NR	NRD	NR	G	4-20 mg/kg, q 8 hrs	PO
	Cephalexin	NR	NR	NRD	G	G	22 mg/kg, q 12 hrs	PO
	Cefadroxil	NR	NR	NRD	F	F	22 mg/kg, q 12 hrs	PO
	Cefoxitin	NR	NR	NRD	G	G	15 mg/kg, q 12 hrs	IV, SC
	Penicillin	NR	NR	NRD	NR	NR	8-10 mg/kg, q 8 hrs	PO
	Penicillin G	NR	NR	NRD	NR	NR	--	--
	Oxacillin	NR	NR	NRD	NR	NR	22 mg/kg, q 8 hrs	IV
	Ampicillin	NR	NR	NRD	P	NR	22 mg/kg, q 8 hrs	IV, SC
	Amoxicillin	NR	NR	NRD	F	F	22 mg/kg, q 8 hrs	PO
	Clavamox	NR	NR	NRD	F	G	13.75 mg/kg, q 12 hrs	PO
	Gentamicin	F	NR	NRD	G	G	6 mg/kg, q 24 hrs	IV, SC
	Tobramycin	F	NR	NRD	F	F	--	IV/Topical Use
	Neomycin	NR	NR	NRD	F	F	--	Topical Use
	Clindamycin	NR	NR	NR	NR	NR	5.5 mg/kg, q 12 hrs	PO
	Lincomycin	NR	NR	NRD	NR	NR	15-25 mg/kg, q 24hrs	PO
	Doxycycline	NR	NR	NRD	G	NR	5 mg/kg, q 12 hrs	PO
	Minocycline	NR	NR	NRD	F	NR	10 mg/kg, q 12 hrs	PO
	Tetracycline	NR	NRD	NRD	G	NR	20 mg/kg, q 12 hrs	PO
	Sulfonamide	NRD	NRD	NRD	NRD	NRD	30 mg/kg, q 12 hrs	PO
Trimethoprim-sulfamethoxazole	NR	NR	NRD	G	G	15-30 mg/kg, q 24 hrs	PO	
Metronidazole	NR	NR	NRD	NR	NR	10 mg/kg, q 8 hrs	IV	
Cefovecin	NR	NR	NRD	G	G	8 mg/kg, once	SC	
Cefpodoxime	NR	NR	NRD	G	G	5 mg/kg, q 24 hrs	PO	
Ceftiofur	NR	NR	NRD	F	G	2.2 mg/kg, q 24 hrs	SC	
Timentin	F	NR	NRD	G	G	--	Topical Use	
2nd	Azithromycin	NR	NR	NRD	F	NR	5 mg/kg q 12 hrs	PO
	Orbifloxacin	F	NRD	NRD	G	G	2.5-7.5 mg/kg, q 24 hrs	PO
	Chloramphenicol	NR	NR	NRD	G	G	35 mg/kg q 8 hrs	PO
	Florfenicol	NR	NRD	NRD	F	NR	20 mg/kg, q 12 hrs	PO
	Amikacin	G	NR	NRD	G	G	15 mg/kg, q 24 hrs	IV, SC
3rd	Rifampin	NR	F	NRD	NR	NR	5-10 mg/kg, q 12 hrs	PO
	Imipenem	G	NR	NRD	G	F	10 or 20 mg/kg, q 8 hrs	--
	Levofloxacin	F	NRD	NRD	G	G	10-30 mg/kg, q 24 hrs	IV/PO
	Marbofloxacin	F	NRD	NRD	G	G	2.75-5.5 mg/kg, q 24 hrs	PO
	Pradofloxacin§	F	NRD	NRD	F	F	3.0 mg/kg, q 24 hrs	PO
	Enrofloxacin	P	NRD	NRD	G	G	5 mg/kg, q 24 hrs	PO
	Ciprofloxacin¶	F	NR	NRD	G	G	--	Topical Use
	Ceftazidime	G	NR	NRD	G	G	3-30 mg/kg, q 6-8 hrs	IV
	Mupirocin	NR	NRD	NRD	NR	NR	--	Topical Use
	Nitrofurantoin	NR	NR	NRD	F	NR	4.4-5mg/kg, q 24 hrs	PO
	Colistin	F	F	NRD	F	F	8-9g/kg, q 24 hrs	PO
	Ticarillin	F	NR	NRD	F	G	3.1 g, q 4-6 hrs	IV
	Piperacillin-Tazobactam	G	NR	NRD	G	G	90 mg/kg, 30min q 8 hrs	IV

Drug Class	Antibiotics	<i>Malassezia pachydermatis</i> (30.0 %)	Suggested Dose†	Drug Delivery
Triazole	Fluconazole	NRD	5-10mg/kg, q 24 hrs	PO,IV
	Itraconazole	NRD	5-10mg/kg, q 24hrs	PO
	Voriconazole	NRD	10mg/kg, 12hrs	PO
Echinocandin	Caspofungin	NR	1mg/kg, q 24hrs	PO
	Micafungin	NR	1mg/kg, q 24hrs	PO
	Anidulfungin	NRD	1mg/kg, q 24hrs	PO
Polyene	Amphotericin B	NRD	0.5-1mg/kg, q 48 hrs	IV
Fluoropyrimidine	Flucytosine	NRD	25-50 mg/kg, q 6-8hrs	PO

Abbreviation Keys and Symbols:

NR	Not Recommended (Due to either Resistance Genes Detected, Intrinsic Resistance, or < 10% Effectiveness in Antibiogram Studies)
P	Poor Performance (< 50% Effectiveness in Antibiogram Studies)
F	Fair Performance (< 75% Effectiveness in Antibiogram Studies)
G	Good Performance (> 75% Effectiveness in Antibiogram Studies)
NRD	No Antibiotic Resistance Detected Based on the MiDOG Analysis

PO	Oral, by mouth
IV	Intravenous Injection
SC	Subcutaneous Injection
TU	Topical Use
--	No Info

*	Antibiotic Drug Tiers for Companion Animals, Antimicrobial Resistance and Stewardship Initiative, University of Minnesota
†	Dosis may vary based on patient species and/or type of infection. Reference at: www.midogtest.com/antibiotics
§	Variable bioavailability in animal patients
¶	Contraindicated in animal patients

Supplemental Data

Total Bacteria Composition

Charts below depict the relative abundance of all detected bacterial species. Each color represents a different bacterial species. The larger the colored segment is, the more abundant that species is in the specimen.

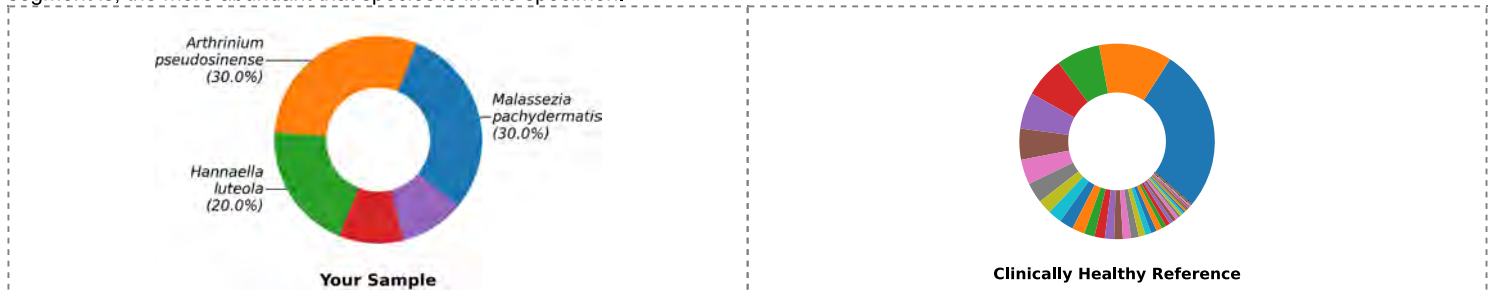


The table below lists top 8 bacterial species detected within the limit of detection. The absolute and relative abundances of each species is shown. Potential clinically relevant microbes are highlighted in red.

Species Detected	AID*	Percentage	Cells per Sample	Normal Range	Significance
<i>Pseudomonas aeruginosa</i> [1][2][3]	[Link]	37.1 %	17,000,000	0-250	● High
<i>Corynebacterium jeikeium</i> [4]	[Link]	25.8 %	12,000,000	0-450	● High
<i>Neisseria shayeganii</i> [1][2]	[Link]	8.2 %	3,700,000	0-4,100	● High
<i>Parvimonas micra</i>	[Link]	7.4 %	3,400,000	0-240	● High
<i>Haemophilus sp.</i>	--	7.2 %	3,300,000	0-2,200	● Intermediate
<i>Haemophilus haemoglobinophilus</i>	--	4.8 %	2,200,000	0-380	● High
<i>Escherichia coli</i> [5][6][7]	[Link]	3.4 %	1,500,000	0-470	● High
<i>Proteus mirabilis</i> [8]	[Link]	2.8 %	1,300,000	0-0	● High

Total Fungal Composition

Charts below depict the relative abundance of all detected fungal species. Each color represents a different fungal species. The larger the colored segment is, the more abundant that species is in the specimen.



The table below lists top 8 fungal species detected within the limit of detection. The absolute and relative abundances of each species is shown. Potential clinically relevant microbes are highlighted in red.

Species Detected	AID*	Percentage	Cells per Sample	Normal Range	Significance
<i>Arthrimum pseudosinense</i>	--	30.0 %	3	NA	NA
<i>Malassezia pachydermatis</i> [9]	[Link]	30.0 %	3	0-2,900	● Normal
<i>Hannaella luteola</i>	--	20.0 %	2	NA	NA
<i>Vishniacozyma foliicola</i>	--	10.0 %	1	0-42	● Normal
<i>Vishniacozyma victoriae</i>	--	10.0 %	1	0-130	● Normal

Abbreviation Key:

- **Normal.** Species detected within the reference range of clinically healthy animals.
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Antimicrobial Resistance Genes Detected

The table below lists antimicrobial resistance genes that are detected in this sample. For antibiotics usage guidance, please first refer to the "Antibiotic Resistance" table shown in Page 2. Use this table only as an additional resource when needed. Inferring antimicrobial resistance from the resistance genes detected should be cautious, especially in a mixed microbial population.

AMR_Gene_Detected	Resistance_Against	Function
<i>ermX</i>	streptogramin, macrolide, lincosamide	ribosomal RNA methyltransferase
<i>ermB</i>	streptogramin, macrolide, lincosamide	ribosomal methylase
<i>msrD</i>	streptogramin, tetracycline, phenicol, macrolide, lincosamide	ABC-F ribosomal protection protein
<i>tetW</i>	tetracycline	ribosomal protection protein

References

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2. Sykes, Jane E., and Craig E. Greene. Infectious Diseases of the Dog and Cat-E-Book. Elsevier Health Sciences, 2013.
3. Williams, Elizabeth S., and Ian K. Barker, eds. Infectious diseases of wild mammals. John Wiley & Sons, 2008.
4. Puskar M, Lemons C, Papich MG, Vaden SL, Birkenheuer A. Antibiotic-resistant *Corynebacterium jeikeium* urinary tract infection in a cat. *J Am Anim Hosp Assoc.* 2007 Jan-Feb;43(1):61-4. doi: 10.5326/0430061. PMID: 17209087.
5. Liu X., Thungrat K., Boothe D. M. Occurrence of OXA-48 carbapenemase and other -lactamase genes in ESBL-producing multidrug resistant *Escherichia coli* from dogs and cats in the United States, 2009*2013. (2016) *Frontiers in microbiology*, 7:1057.
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7. Wallach, Joel D., and William J. Boever. Diseases of exotic animals. Medical and surgical management. WB Saunders Co., 1983.
8. Morrissey I., Moyaert H., de Jong A., El Garch F., Klein U., Ludwig C., Thiry J., Youala, M. Antimicrobial susceptibility monitoring of bacterial pathogens isolated from respiratory tract infections in dogs and cats across Europe: ComPath results. (2016) *Veterinary microbiology*, 191:44-53
9. Meason-Smith, C., Diesel, A., Patterson, A. P., Older, C. E., Mansell, J. M., Suchodolski, J. S., & Rodrigues Hoffmann, A. What is living on your dog's skin Characterization of the canine cutaneous mycobiota and fungal dysbiosis in canine allergic dermatitis. (2015) *FEMS Microbiology Ecology*, 91(12):fiv139

Methods

The MiDOG® All-in-One Microbial Test is a targeted, Next-generation DNA sequencing testing service able to identify molecular signatures unique to the identity and character of a specific microorganism. This test relies on safeguarded preservation and transport of collected samples, thorough extraction of DNA from all microbes present in the specimen, select amplification of microbial DNA followed by Next-generation DNA sequencing using the latest technologies from Illumina (Illumina, Inc., San Diego, CA). Data handling is done via curated microbial databases to accurately align DNA sequences to ensure precise and accurate (species-level) identification of all bacteria and fungi present in the specimen.

When no Bacterial or Fungal Species are Detected:

When no bacterial or fungal species are detected in this test, this result may be due to a very low microbial load and/or low concentration of microbial DNA in the sample provided. In this case, we recommend re-sampling the area of interest and re-submitting specimen for analysis.

Phylogenetic Rank Abbreviations

If the detected bacterial or fungal taxon could not be identified down to the genus level, the closest phylogenetic rank identified is provided. An abbreviation indicating the level of the rank is displayed aside. The meaning of the abbreviations is shown as:(p) Phylum level, (c) Class level, (o) Order level, and (f) Family level.

Disclaimer

The information contained in this MiDOG® report is intended only to be factor for use in a diagnosis and treatment regime for the animal patient. As with any diagnosis or treatment regime, you should use clinical discretion with each animal patient based on a complete evaluation of the animal patient, including history, physical presentation and complete laboratory data, including confirmatory tests. All test results should be evaluated in the context of the patients individual clinical presentation. The information in the MiDOG® report has not been evaluated by the FDA.

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