All-in-One Microbial Test

Patient Name:		**Health Status:**		**Account #:**	
Owner's Name:		**Ordered by:**		**Sample ID:**	
Breed:	Boxer	**Email:**		**Sample Type:**	Skin, paw (Lesion)
Age:	3	**Hospital:**		**Received Date:**	
Species:	Dog	**Location:**		**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
Nocardia veterana [1]	--	98.2 %	1,900,000	NA	NA
Corynebacterium auriscanis [2]	[Link]	0.3 %	5,800	0-2,600	Intermediate
Corynebacterium lactis [3]	[Link]	0.3 %	5,300	0-4,500	Intermediate
Nocardia sp. [1]	--	0.1 %	1,800	0-5,900	Normal
Corynebacterium mastitidis [4]	[Link]	0.0 %	630	0-770	Normal

2.Fungi

No Known Fungal Pathogen Detected!

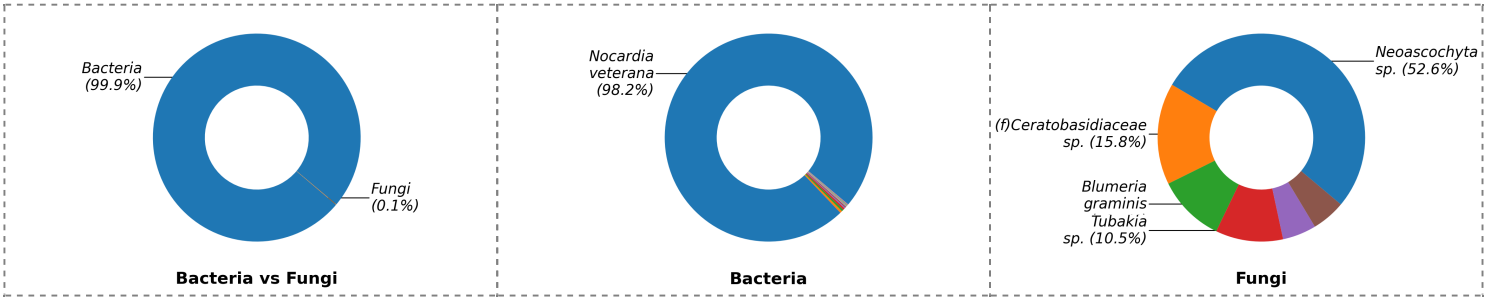
Abbreviation Key:

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.

Antimicrobial Resistance for Detected Clinically Relevant Microbes

The sample was screened for antibiotic resistance genes and intrinsic resistances. Please follow antimicrobial stewardship guidelines for cautious antibiotic use.

Drug Tiers*	Antibiotics	*Nocardia veterana* (98.2 %)	*Corynebacterium auriscanis* (0.3 %)	*Corynebacterium lactis* (0.3 %)	*Nocardia sp.* (0.1 %)	*Corynebacterium mastitidis* (0.0 %)	Suggested Dose†	Drug Delivery
1st	Cefazolin	NRD	NRD	NRD	NRD	NRD	15 mg/kg, q 12 hrs	IV, SC
	Cephalothin	NRD	NRD	NRD	NRD	NRD	4-20 mg/kg, q 8 hrs	PO
	Cephalexin	NRD	NRD	NRD	NRD	NRD	22 mg/kg, q 12 hrs	PO
	Cefadroxil	NRD	NRD	NRD	NRD	NRD	22 mg/kg, q 12 hrs	PO
	Cefoxitin	NRD	NRD	NRD	NRD	NRD	15 mg/kg, q 12 hrs	IV, SC
	Penicillin	NRD	NRD	NRD	NRD	NRD	8-10 mg/kg, q 8 hrs	PO
	Penicillin G	NRD	NRD	NRD	NRD	NRD	--	--
	Oxacillin	NRD	NRD	NRD	NRD	NRD	22 mg/kg, q 8 hrs	IV
	Ampicillin	NRD	NRD	NRD	NRD	NRD	22 mg/kg, q 8 hrs	IV, SC
	Amoxicillin	NRD	NRD	NRD	NRD	NRD	22 mg/kg, q 8 hrs	PO
	Clavamox	NRD	NRD	NRD	NRD	NRD	13.75 mg/kg, q 12 hrs	PO
	Gentamicin	NRD	G	NRD	NRD	NRD	6 mg/kg, q 24 hrs	IV, SC
	Tobramycin	NRD	NRD	NRD	NRD	NRD	--	IV/Topical Use
	Neomycin	NRD	NRD	NRD	NRD	NRD	--	Topical Use
	Clindamycin	NRD	NRD	NRD	NRD	NRD	5.5 mg/kg, q 12 hrs	PO
	Lincomycin	NRD	NRD	NRD	NRD	NRD	15-25 mg/kg, q 24hrs	PO
	Doxycycline	NRD	NRD	NRD	NRD	NRD	5 mg/kg, q 12 hrs	PO
	Minocycline	NRD	NRD	NRD	NRD	NRD	10 mg/kg, q 12 hrs	PO
	Tetracycline	NRD	NRD	NRD	NRD	NRD	20 mg/kg, q 12 hrs	PO
	Sulfonamide	NRD	NRD	NRD	NRD	NRD	30 mg/kg, q 12 hrs	PO
	Trimethoprim-sulfamethoxazole	NRD	NRD	NRD	NRD	NRD	15-30 mg/kg, q 24 hrs	PO
	Metronidazole	NRD	NR	NRD	NRD	NRD	10 mg/kg, q 8 hrs	IV
	Cefovecin	NRD	NRD	NRD	NRD	NRD	8 mg/kg, once	SC
2nd	Cefpodoxime	NRD	NRD	NRD	NRD	NRD	5 mg/kg, q 24 hrs	PO
	Ceftiofur	NRD	NRD	NRD	NRD	NRD	2.2 mg/kg, q 24 hrs	SC
	Timentin	NRD	NRD	NRD	NRD	NRD	--	Topical Use
	Azithromycin	NRD	NRD	NRD	NRD	NRD	5 mg/kg q 12 hrs	PO
	Orbifloxacin	NRD	NR	NRD	NRD	NRD	2.5-7.5 mg/kg, q 24 hrs	PO
	Chloramphenicol	NRD	G	NRD	NRD	NRD	35 mg/kg q 8 hrs	PO
	Florfenicol	NRD	NRD	NRD	NRD	NRD	20 mg/kg, q 12 hrs	PO
3rd	Amikacin	NRD	G	NRD	NRD	NRD	15 mg/kg, q 24 hrs	IV, SC
	Rifampin	NRD	NRD	NRD	NRD	NRD	5-10 mg/kg, q 12 hrs	PO
	Imipenem	NRD	NRD	NRD	NRD	NRD	10 or 20 mg/kg, q 8 hrs	--
	Levofloxacin	NRD	NR	NRD	NRD	NRD	10-30 mg/kg, q 24 hrs	IV/PO
	Marbofloxacin	NRD	NR	NRD	NRD	NRD	2.75-5.5 mg/kg, q 24 hrs	PO
	Pradofloxacin§	NRD	NR	NRD	NRD	NRD	3.0 mg/kg, q 24 hrs	PO
	Enrofloxacin	NRD	NR	NRD	NRD	NRD	5 mg/kg, q 24 hrs	PO
	Ciprofloxacin§¶	NRD	NR	NRD	NRD	NRD	--	Topical Use
	Ceftazidime	NRD	NRD	NRD	NRD	NRD	3-30 mg/kg, q 6-8 hrs	IV
	Mupirocin	NRD	NRD	NRD	NRD	NRD	--	Topical Use
	Nitrofurantoin	NRD	NRD	NRD	NRD	NRD	4.4-5mg/kg, q 24 hrs	PO
	Colistin	NRD	NRD	NR	NRD	NR	8-9g/kg, q 24 hrs	PO
	Ticarcillin	NRD	NRD	NRD	NRD	NRD	3.1 g, q 4-6 hrs	IV
	Piperacillin-Tazobactam	NRD	NRD	NRD	NRD	NRD	90 mg/kg, 30min q 8 hrs	IV

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

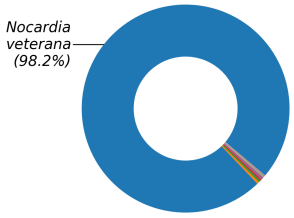
PO	Oral, by mouth
IV	Intravenous Injection
SC	Subcutaneous Injection
TU	Topical Use
--	No Info

*	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
§	Contraindicated in animal patients
¶	Variable bioavailability in animal patients

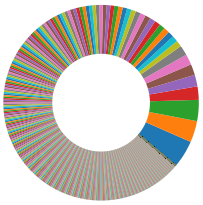
Supplemental Data

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.



Your Sample



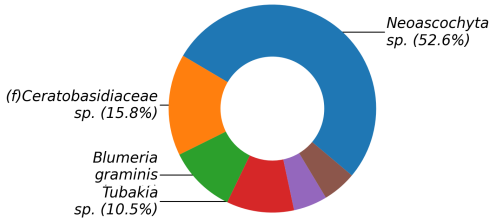
Clinically Healthy Reference

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.

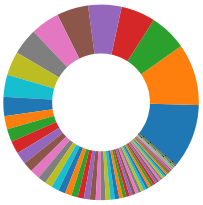
Species Detected	AID*	Percentage	Cells per Sample	Normal Range	Significance
Nocardia veterana [1]	--	98.2 %	1,900,000	NA	NA
(o)Corynebacteriales sp.	--	0.3 %	6,500	0-460	High
Corynebacterium auriscanis [2]	[Link]	0.3 %	5,800	0-2,600	Intermediate
Corynebacterium lactis [3]	[Link]	0.3 %	5,300	0-4,500	Intermediate
Corynebacterium sp.	--	0.2 %	3,400	0-23,000	Normal
(o)Pseudonocardiales sp.	--	0.2 %	3,300	0-2,400	Intermediate
Nocardia sp. [1]	--	0.1 %	1,800	0-5,900	Normal
(f)Pseudonocardiaceae sp.	--	0.1 %	1,400	0-6,200	Normal

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.



Your Sample



Clinically Healthy Reference

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
Neoascochyta sp.	--	52.6 %	10	0-63	Normal
(f)Ceratobasidiaceae sp.	--	15.8 %	3	0-0	Intermediate
Blumeria graminis	--	10.5 %	2	0-130	Normal
Tubakia sp.	--	10.5 %	2	NA	NA
(o)Hypocreales sp.	--	5.3 %	1	0-31	Normal
Fusarium sp.	--	5.3 %	1	0-14	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.

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

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 additioanl resource when needed. Inferring antibiomicrobial resistance from the resistance genes detected should be cautious, espeically in a mixed microbial population.

AMR_Gene_Detected	Resistance_Against	Function
APH(3')-Ia	aminoglycoside	aminoglycoside phosphotransferase
APH(3')-IIIa	aminoglycoside	aminoglycoside phosphotransferase
APH(3'')-Ib	aminoglycoside	aminoglycoside phosphotransferase
APH(6)-Id	aminoglycoside	aminoglycoside phosphotransferase
ANT(6)-Ia	aminoglycoside	aminoglycoside nucleotidyltransferase
gyrA (Corynebacterium auriscanis)	fluoroquinolone	DNA gyrase, subunit A (mutated)
gyrA	fluoroquinolone	DNA gyrase, subunit A (mutated)
mphC	macrolide	macrolide phosphotransferase
mupA	mupirocin	alternative isoleucyl-tRNA synthetase
blaZ	penam	class A beta-lactamase
cmx	phenicol	chloramphenicol exporter
ermB	streptogramin, macrolide, lincosamide	ribosomal methylase
ermX	streptogramin, macrolide, lincosamide	ribosomal RNA methyltransferase
msrD	streptogramin, tetracycline,phenicol, macrolide, lincosamide	ABC-F ribosomal protection protein
msrA	streptogramin, tetracycline,phenicol, macrolide, lincosamide	ABC-F ribosomal protection protein
sul1	sulfonamide	dihydropteroate synthase
tetWNW	tetracycline	ribosomal protection protein
tetK	tetracycline	tetracycline efflux pump
tetL	tetracycline	tetracycline efflux pump

References

1. Greene, Craig E. Infectious Diseases of the Dog and Cat-E-Book. Elsevier Health Sciences, 2013.
2. Bygott J. M., Malnick H., Shah J.J., Chattaway M.A., Karas J. A. First clinical case of Corynebacterium auriscanis isolated from localized dog bite infection. (2008) Journal of Medical Microbiology, 57: 899-900
3. de Paula Antunes, J. M. A., Ribeiro, M. G., de Castro Demoner, L., Ramos, J. N., Baio, P. V. P., Simpson-Louredo, L., ... & Mattos-Guaraldi, A. L. (2015). Cutaneous abscess caused by Corynebacterium lactis in a companion dog. Veterinary Microbiology, 178(1-2), 163-166.
4. Fernandez-Garayzabal JF, Collins MD, Hutson RA, Fernandez E, Monasterio R, Marco J, Dominguez L. Corynebacterium mastitidis sp. nov., isolated from milk of sheep with subclinical mastitis. Int J Syst Bacteriol. 1997 Oct;47(4):1082-5. doi: 10.1099/00207713-47-4-1082. PMID: 9336910

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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