Bastu - ALT2's Dental Health Report

APR 13TH
2020

basepaws

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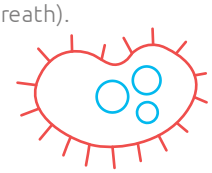
Dental Disease 101

Did you know?

Dental disease affects 50-90% of cats over the age of four.

Fortunately, most dental diseases are preventable with a good dental care routine. They are also mostly treatable, if caught early. The microbes in a cat's mouth can inform us of developing dental issues, before they are advanced enough to be visible by a veterinarian during a routine checkup. The Basepaws Dental Health test looks for microbial signatures associated with three of the most common dental conditions in cats - Periodontal Disease, Tooth Resorption, Halitosis (bad breath).

The oral microbiome



Environmental factors and various food sources make the feline oral cavity a fascinating place, characterized by unique interactions between a cat's mouth and the microbes within it (the oral microbiome). The almost constant exposure to foreign microbial organisms has made the oral microbiome fiercely competitive. Once in a while, pathogenic microbes manage to colonize parts of the oral cavity which can be associated with dental problems.

The feline oral microbiome can reveal information about developing dental issues.

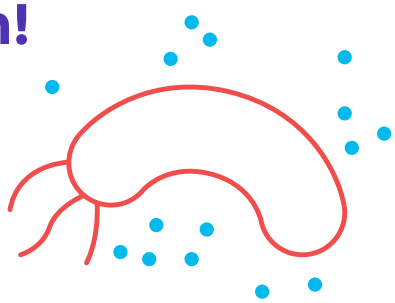
The oral microbiome also has implications for general health.

Can the oral microbiome change?

YES! The oral microbiome is not static.

Different factors such as diet (dry versus wet food), environment (indoor versus outdoor), supplement intake, medications (particularly antibiotics) and dental care routine can all influence the composition of the oral microbiome.

This is why testing early and testing often is key for optimal dental health!



Bastu - ALT2's Dental health summary

How does this test work? We used our oral microbiome database containing healthy cats and cats suffering from periodontal disease, tooth resorption or halitosis to identify a set of predictive microbes whose compositional abundance is associated with each condition. Based on these results, we developed a 0 - 10 risk score system for each condition. The results below show Bastu - ALT2's overall risk for each of the three conditions, as well as a breakdown of the predictive microbes whose compositional abundance is associated with high, medium or low risk for each dental condition. **The purple line and the number next to it indicate your cat's overall risk score for each condition.**

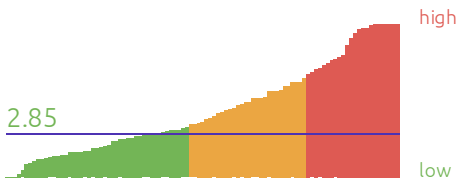
low risk: 0 - 3.3 medium risk: >3.3 - 6.6 high risk: >6.6 - 10

Risk for periodontal disease

Periodontal disease affects the tissues surrounding the teeth. Initial stages are classified as gingivitis, while advanced cases are known as periodontitis.

OVERALL RISK:

- (●) LOW
- ( ) MEDIUM
- ( ) HIGH



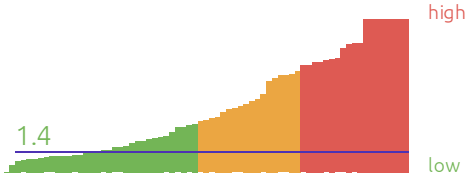
risk scores for 108 predictive microbes

Risk for tooth resorption

Tooth resorption is a relatively common condition characterized by progressive dentin erosion.

OVERALL RISK:

- (●) LOW
- ( ) MEDIUM
- ( ) HIGH



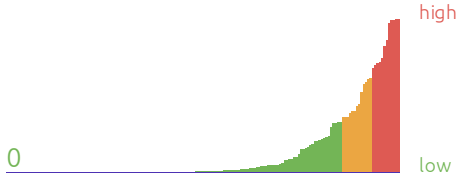
risk scores for 74 predictive microbes

Risk for bad breath (halitosis)

When bad breath is a persistent problem for a cat, this could be indicative of more serious general health issues.

OVERALL RISK:

- (●) LOW
- ( ) MEDIUM
- ( ) HIGH



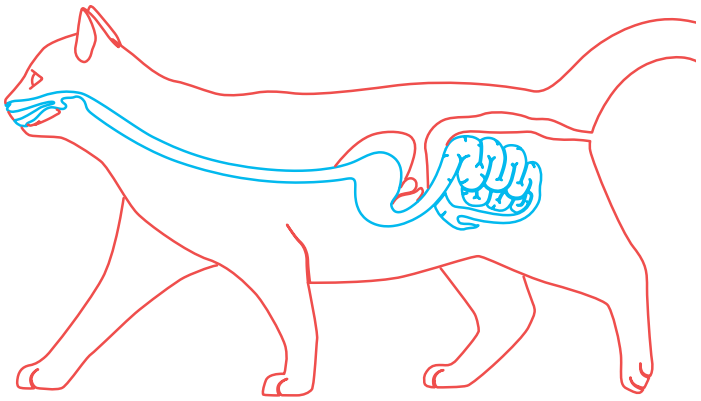
risk scores for 182 predictive microbes

What's next?

- Adopt a daily dental care routine to maintain Bastu - ALT2's dental health
- Check for emerging problems by doing regular 'flip the lip' exams
- Keep up with Bastu - ALT2's routine checkups with the veterinarian

Next recommended dental health test in: 6-8 months

What are Bastu - ALT2's health implications?



Great news! Currently, your cat's oral health is unlikely to be having a negative effect on their general health.

Cats with good oral health are less prone to developing chronic kidney disease, diabetes mellitus, cardiovascular problems and some autoimmune diseases.

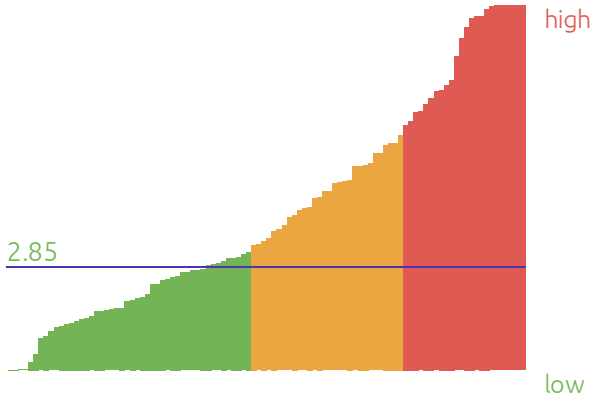
What can you do?

- It is important to regularly assess a cat's dental health in order to address any emerging issues early on and minimize chances of them negatively impacting general health.

- Adopting a thorough and consistent dental care routine at home can significantly reduce the chance of developing dental diseases. This will in turn reduce your cat's likelihood of developing more serious general health problems.

Periodontal Disease

Periodontal disease (PD) is a group of inflammatory disorders affecting the tissues surrounding the teeth. Periodontal disease is initiated by the build-up of plaque on the tooth surface resulting in the gingiva becoming inflamed (gingivitis). Without an effective oral care regime, inflammation can begin to destroy the structures that support the tooth (periodontitis). Periodontal disease affects up to 80% of the adult feline population. Below you will see how your cat's oral microbiome compares to a healthy population when it comes to microbial signatures of periodontal disease.



We analyzed Bastu - ALT2's oral microbiome to establish the compositional abundance of 108 microbes predictive of periodontal disease. We ranked each microbe's abundance on a scale from 1 to 5, where 1 represents abundance levels close to a healthy control population and 5 represents abundance levels close to cats with periodontal disease. Below are Bastu - ALT2's TOP 3 most significant microbes associated with high, medium, and low risk, respectively.

Currently, Bastu - ALT2's compositional abundance levels for 24 out of 108 microbes are consistent with having periodontal disease (22%).

Top 3 high risk microbes

Moraxella ovis

Corynebacterium xerosis

Actinomyces sp. Chiba101

Top 3 medium risk microbes

Ottowia sp. oral taxon 894

Roseburia hominis

Capnocytophaga canimorsus

Top 3 low risk microbes

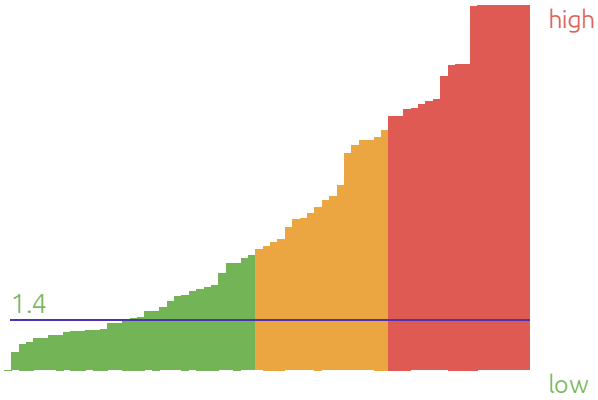
Rodentibacter pneumotropicus

Avibacterium paragallinarum

Lautropia mirabilis

Tooth Resorption

Every tooth is composed of a root canal (containing nerves, blood and lymphatic vessels) and bony substances called dentin and enamel. When a cat suffers from tooth resorption, the dentin of the affected tooth starts to progressively erode. Unfortunately, tooth resorption is relatively common, affecting 20-60% of all cats and over 70% of cats over the age of five. Below, you can see how your cat compares to the healthy feline population with regards to abundance of microbes associated with tooth resorption.



We analyzed Bastu - ALT2's oral microbiome to establish the compositional abundance of 74 microbes predictive of tooth resorption. We ranked each microbe's abundance on a scale from 1 to 5, where 1 represents abundance levels close to a healthy control population and 5 represents abundance levels close to cats with tooth resorption. Below are Bastu - ALT2's TOP 3 most significant microbes associated with high, medium, and low risk, respectively.

Currently, Bastu - ALT2's compositional abundance levels for 19 out of 74 microbes are consistent with having tooth resorption (26%).

Top 3 high risk microbes

Moraxella ovis

Corynebacterium xerosis

Wolinella succinogenes

Top 3 medium risk microbes

Parabacteroides distasonis

Capnocytophaga stomatis

Escherichia coli

Top 3 low risk microbes

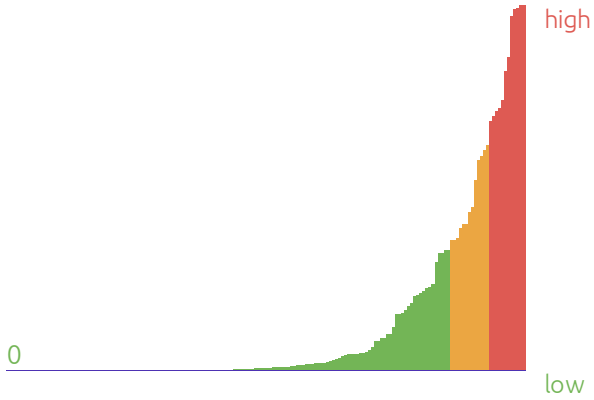
Avibacterium paragallinarum

Acinetobacter junii

Rodentibacter pneumotropicus

Bad Breath

Occasional bad breath is usually not something you should worry about. When bad breath is a persistent problem, this could be indicative of more serious issues. The most common cause of bad breath is periodontal disease. Different types of bad breath can also indicate general health problems, such as kidney disease, diabetes and some liver disorders. Here is how your cat's oral microbiome compares to the general healthy population when it comes to halitosis.



We analyzed Bastu - ALT2's oral microbiome to establish the compositional abundance of 182 microbes predictive of bad breath. We ranked each microbe's abundance on a scale from 1 to 5, where 1 represents abundance levels close to a healthy control population and 5 represents abundance levels close to cats with bad breath. Below are Bastu - ALT2's TOP 3 most significant microbes associated with high, medium, and low risk, respectively.

Currently, Bastu - ALT2's compositional abundance levels for 12 out of 182 microbes are consistent with having bad breath (7%).

Top 3 high risk microbes

Mycoplasma arginini

Gemella sp. oral taxon 928

Streptococcus anginosus

Top 3 medium risk microbes

Mannheimia pernigra

Frederiksenia canicola

A. sp.,oral,taxon,190

Top 3 low risk microbes

Alysiella filiformis

Avibacterium paragallinarum

Neisseria dentiae

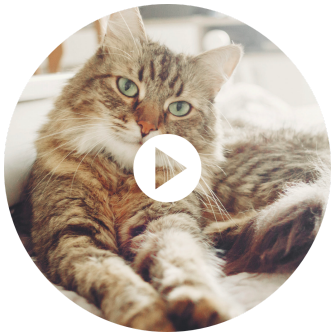
What's next for Bastu - ALT2?

At home care

Congratulations! Your cat seems to be at low risk for periodontal disease, tooth resorption and bad breath. If you have an established dental care routine, continue doing what you are doing. If you don't, consider adopting one, as it is likely that, as your cat ages, their dental health will deteriorate. If done properly, the most effective at home treatment is daily tooth brushing.

We teamed up with some of the world's top veterinary dentistry professionals to provide you with support and innovative solutions on how to approach brushing your cat's teeth and other tips and tricks for optimal dental hygiene.

Watch the video to learn how to tailor your routine to your cat's personality and comfort level.



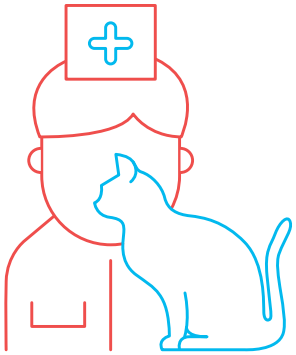
Learn More

You can also read about some effective, off-the-beaten-path ways to maximize the effect of your cat's dental care routine in this article.

In addition, you can also learn how to perform routine 'flip the lip' exams at home and recognize signs of dental pain in your cat (dropping food, loss of appetite, favoring one side over the other when chewing, drooling).

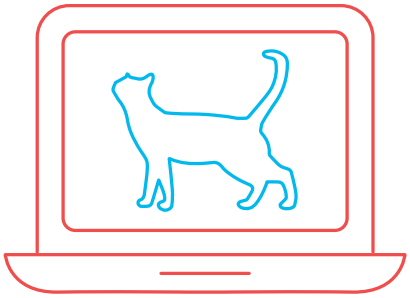
Finally, you can consider incorporating some of the products recommended by the Veterinary Oral Health Council (VOHC) to support your preventative dental care routine. These products have demonstrated efficacy in fighting plaque and tartar buildup, which are the root cause of many dental problems.

Veterinary oral exam



Have a question for Basepaws?

If you have a question about any part of this report, you can send us an email at: help@basepaws.com



While your cat's mouth looks good to us, it is much easier to resolve dental issues that are spotted early

Therefore, a proactive approach to feline dentistry is recommended - keep up with your cat's yearly vet visits.

Want to discuss your results with other cat parents? Join our facebook group!

Would you like to tell us more about your cat's dental and general health? Contribute to feline dental health research by filling out this survey.

Next dental health test recommended in:

6 - 8 months or sooner if any of the following change: diet, medications, supplements, general health

Appendix

Sequencing and analysis methodology

Most direct-to-consumer microbiome tests use a technique called '16S rRNA gene sequencing'. This technique can only provide information about the bacteria present in the microbiome.

However, it is well-known that the microbiome is composed of viruses, protozoa, fungi and archaea species, in addition to bacteria. This means that the 16S approach zooms in on just one part of the microbiome, ignoring the rest. Additionally, 16S sequencing does not provide sufficient resolution to reliably and consistently go beyond the genus level of bacterial classification. Therefore, in most cases, we don't know the exact species of bacteria in the microbiome, making analysis somewhat vague and relying on approximation.

To address these problems, Basepaws uses metagenomic sequencing instead of 16S sequencing. Our method allows us to capture organisms across all domains of life, not restricting us to just bacteria. In addition, we can reliably identify organisms to the species or even strain level, making our analysis more accurate and improving our confidence in the results. These results paint a much richer and unbiased picture of your feline companion's mouth. We used pairwise log ratio transformation to estimate the compositional abundance of microbial species and Gaussian mixture modeling to determine your cat's risk for periodontal disease, tooth resorption and bad breath.

Limitations

The Basepaws oral microbiome report is based on our ability to identify thousands of microbial species with each test.

Our large oral microbiome reference database allows us to identify a multitude of novel associations between microbes found in the mouth and a variety of diseases, as well as confirm previously reported findings. However, the field of feline oral microbiome science is extremely young and understudied, which is why we report only on conditions and microbes where previous knowledge exists and/or we see a particularly strong signal coming through in our data.

As we accumulate more data and conduct more analyses, we will aim to continuously enrich this report, providing even more helpful insights. We want to emphasize that the identification of a certain microbial signature associated with a dental disease does not constitute a diagnosis. Conversely, not detecting a particular microbial signature does not exclude the possibility of an unknown disease-causing pathogen being present or dental disease being caused by something other than pathogenic microbes. This report does not aim to substitute a diagnosis by a professional.

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