PETBIOME

Analysis and Report of Gut Health

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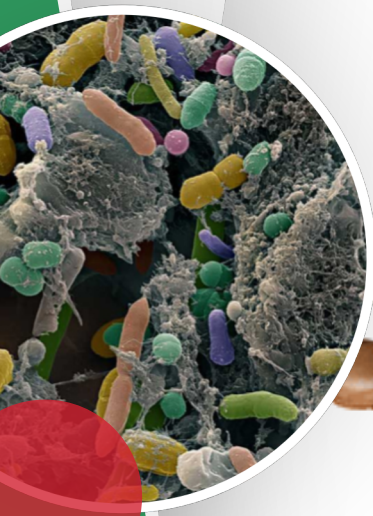


Good health starts with a health gut community, the microbiome is a complex and diverse environment. Imbalances can happen with diet changes, as your dog ages, with the use of long term medication such as antibiotics and NSAID's. Understanding how these changes affect the biome is key.

Name: website example | Date: 22/06/2022

ABOUT THE MICROBIOME

The Microbiome

Your pet's biome has a community of micro-organisms, the good (host friendly), the bad (linked to disease) and the not so bad (don't do any harm but don't contribute to good nutrition). The bacteria community is influenced by many factors including the breed of your dog, their age and the food they eat. Although most bacteria contribute towards your pet's health, many are pathogenic and if there is an overgrowth of these bad bacteria, they can have harmful effects. It is important to maintain the right balance between the beneficial and pathogenic bacteria. This balance can alter through stress, the use of medications and with a change in diet. Some imbalances may show as gastrointestinal discomfort and other imbalance show as allergies, diarrhea or poor gastrointestinal health. Bacteria have jobs to do and contributions to make, some provide energy, vitamins and help to make nutrients, such as carbohydrates, more available. Other microbes interact with the immune, endocrine, nervous system and brain.

Why is it important ?

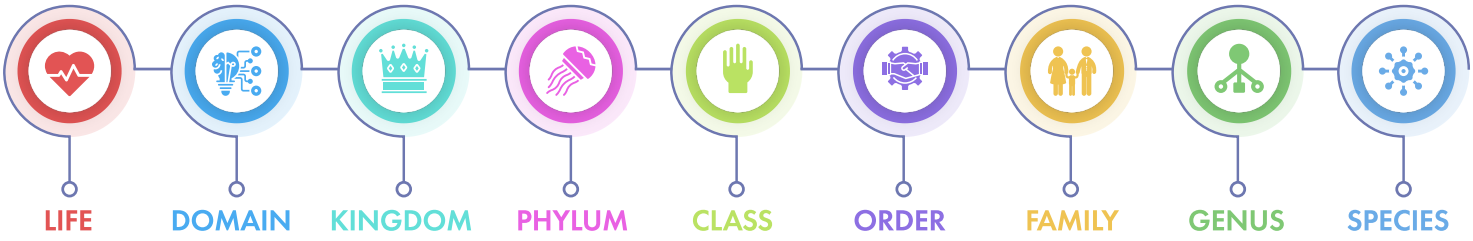
Having lots of different species of bacteria and a high enough percentage of them is key to a balanced biome. The charts in this report compare target ranges to your own dog's biome extracted from the faecal sample.

REPORT

PART 01

Who's in There ?

The first part of the report looks at the top groups of bacteria at genus level. Bacteria are divided into groups to make them easier to understand and identify, (see diagram below). Part One of this report identifies the major players and highlights the nutritional contributions and benefits made by them.



You will see in Part One, how important certain bacteria are to your pets health. You will also see how by making some small changes to the diet, beneficial bacteria can be encouraged to increase in number, providing more benefits. Some of the dietary changes mentioned in part one are made by adding prebiotic ingredients such as inulin. The definition of a prebiotic is "a nondigestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon and thus improves host health." Inulin is only one example of how important plant chemicals can be to the biome, another group you will hear mentioned is plant polyphenols. Other recommended dietary changes will relate to imbalances between the groups of bacteria that feed or digest carbohydrates, fats and protein. Making small changes in the amount or quality of these major nutrients will significantly improve the health of the gut and prevent any future opportunity for inflammation and colitis.

PART 02

What are they doing ?

Part two refers to the bacteria identified across all of the taxonomic groups illustrated in the diagram above. It explains how and why the bacteria contribute to the health and well being. For example, some bacteria help rebuild the gut wall, some trigger an immune response and some talk to the brain about what and how to act, eat and sleep. Other bacteria 'take over' and form biofilms, taking nutrients away from the host and reducing the pH of the hind gut preventing fermentation and causing discomfort.

Who are they doing it with?

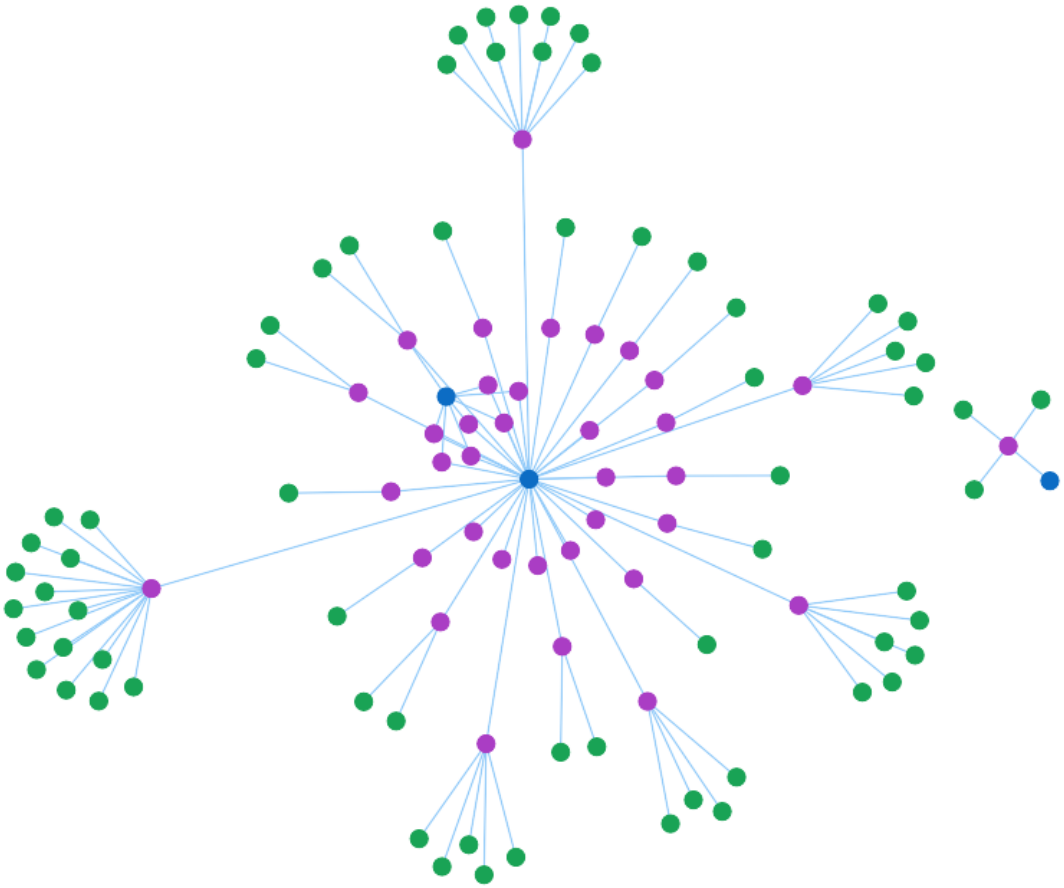
Part two also looks at the relationships and the conversations between the bacteria, some relationships contribute to health, especially the health of the immune system and some contribute to ill health, increasing the opportunity for inflammation and dysbiosis.

VETERINARY SUMMARY

The Veterinary Summary contains an individual assessment of each dog, linking the phenotype to the data produced. It is produced by a qualified specialist animal microbiologist and is specific to your dog and the data produced, by the PetBiome analysis, you are then invited to speak to the specialist direct to go through the report and results together.

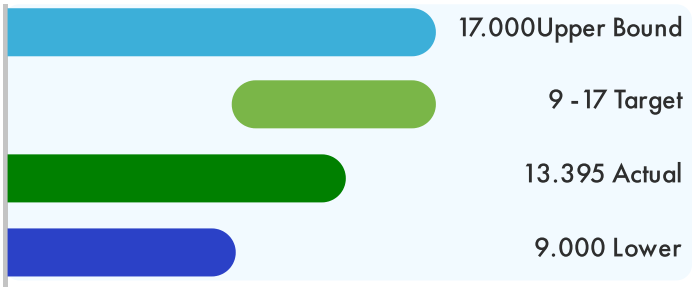
BIOME ANALYSIS CHART

Kingdom	**3**
Phylum	**37**
Class	**75**



Order	**1**
Family	**222**
Genus	**634**
Species	**942**

PART 01 BACTEROIDES



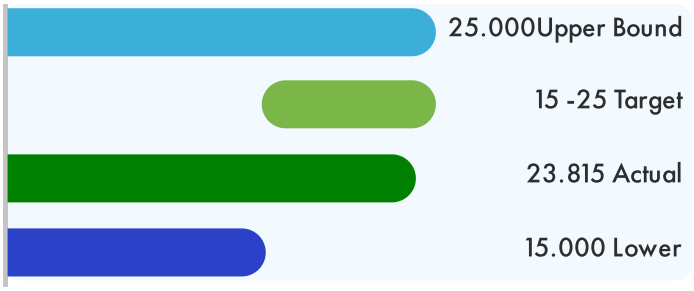
Bacteroides belong to the family that help digest carbohydrates, the dog is more likely to gain weight easily when the ratio of bacteroides is too high. Bacteroides are extremely flexible and can adjust to any dietary ingredients containing sugar/carbohydrates and able to extract nutrients as easily from kibble as from a digestive biscuit! At (between 10- 17%) of the total biome your dog is close to the recommended healthy average of bacteriodes, which is 13%. At healthy levels, the risk of inflammation in the biome is significantly reduced, as is metabolic dysregulation and type 2 diabetes.

Dietary Advice

None needed as levels are levels are within recommended!

PART 01 FUSOBACTERIA

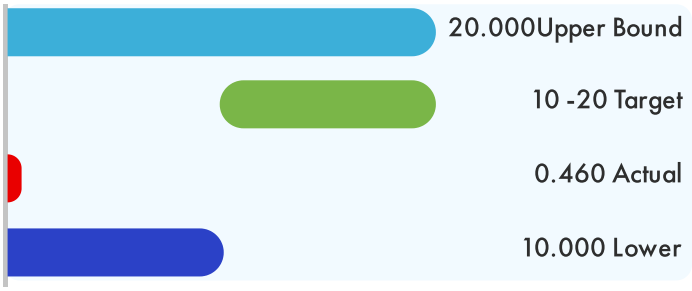
Fusobacteria is an important member of the healthy canine gut, which gets its energy from fermenting select carbohydrates and amino acids. In high numbers it has been linked to colitis and inflammatory bowel disease in dogs. Average levels of fusobacteria indicate a balance within the carbohydrate and the protein intake. The diet you are feeding is suitable for your dog.



Dietary Advice

No changes are necessary as fusobacteria levels are normal.

PART 01 PREVOTELLA

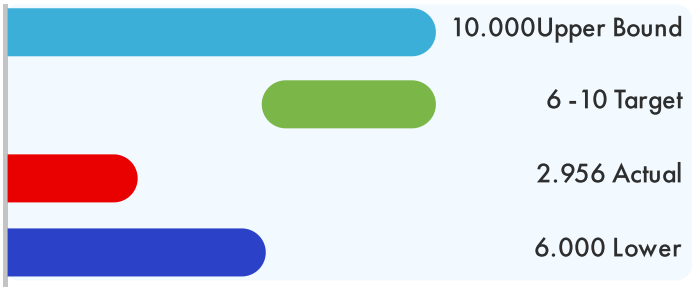


Prevotella are part of the normal healthy biome and contribute to the health of the dog by helping to digest carbohydrates and protein, they also produce an important supply of energy for the dog. If there is an overgrowth (high levels), these bacteria can then be linked to infections of the gastrointestinal tract. In dogs 93% of the prevotella are identified as copri, this species increases the risk of arthritis and other inflammatory conditions. Prevotella levels increase in diets high in complex carbohydrates but low in protein. Slightly increasing the complex carbohydrate content of the dog's diet should help raise Prevotella and improve overall glucose metabolism.

Dietary Advice

Increase the Prevotella. Complex carbohydrates are found in many formulated dog foods and include unprocessed grains, oat bran, hulls of brown rice, and beet pulp or prebiotics containing arabinoxylan. Avoid 'grain-free' feeds as these contain carbohydrates such as tapioca, sweet potatoes and potatoes but don't have the type of complex carbohydrates required to increase the levels of Prevotella (Neyrinck et al 2011).

PART 01 BLAUTIA



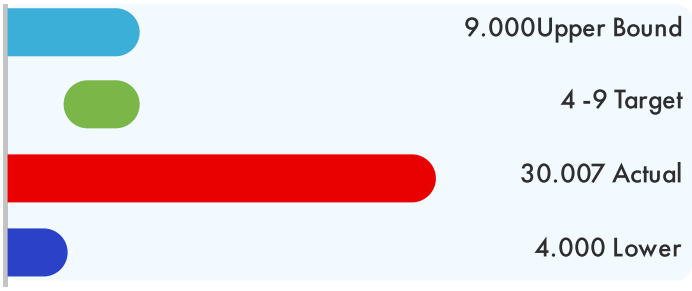
An abundance of Blautia are linked to a healthy biome with recommended levels at 8%. Blautia is an important member of the gut- brain communication axis and contributes to the feeling of well -being and satiety or fullness after eating. Low levels may indicate oxidative stress, which is the balance between the release of free radicals and the ability of the body to deal with toxins. Blautia bacteria are an important component in the management of free radical damage within the gastrointestinal tract.

Dietary Advice

Increase the levels of Blautia. Increase the polyphenol content of the diet. There are many polyphenol dietary supplements available for dogs, the highest polyphenol content can be found in grape seed extract, resveratrol, blueberry extract, quercitin, seaweed, beans, nuts. etc. Many plant polyphenols are xenobiotic ie. they are chemicals found in nature that can't be digested by the animal and whilst they can't be digested, they are still a benefit to the blautia bacteria.

PART 01 CLOSTRIDIUM

Clostridia are very important members of the biome, although some are pathogens, ie. bacteria that can cause disease, most are host friendly. They form part of the police force that defend the gut wall barrier against invading bacteria, they also signal for an immune response and make sure that members of the biome get along together. They should make up 7% of the total biome. Certain clostridia species increase in infections and illness (c. difficile, botulin).

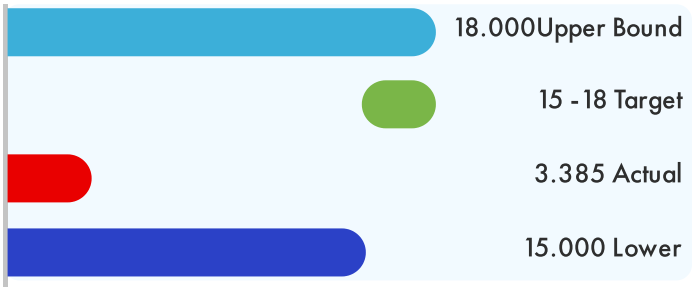


Dietary Advice

Clostridia are higher than recommended, follow the advice given in the report, as diversity increases this should help increase the good gut bacteria species and Clostridia should reduce naturally.

PART 01 MEGAMONAS

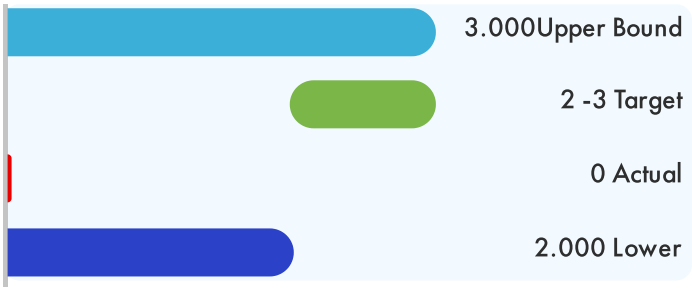
Megamonas is a core member of a healthy carnivore gut community and is recommended at levels of around 17% of the total biome. Low levels of megamonas relate to a poor metabolic rate, higher levels indicate more protection against weight loss and stress. Megamonas are higher in healthy individuals than those with inflammation of the hind gut, indicating a protective role. Low levels relate to poor metabolism and inflammation.



Dietary Advice

Feed the megamonas by adding a prebiotic containing inulin. Prebiotics work by feeding the good gut bacteria helping them to overcome the bad. Levels of Megamonas will increase with the addition of complex carbohydrates they thrive on the indigestible fibre part of the ration. Follow the advice given on the Prevotella section and the levels of Megamonas will increase naturally.

PART 01 BIFIDOBACTERIA

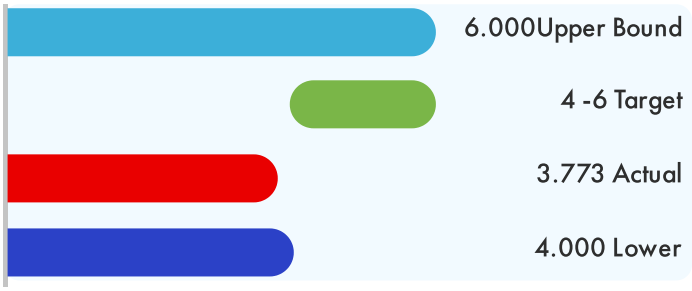


Bifidobacteria are the good gut bacteria, producing thiamine, riboflavin, vitamin B6 and vitamin K. They also synthesize folic acid, niacin and pyridoxine. Good levels of bifidobacteria help increase the bioavailability of calcium and zinc because they lower the pH of the gut. The recommended average is 2% though many animals and humans have low levels. Bifidobacteria levels are low in a high percentage of animals and humans, bifidobacteria support health in many ways including protection against, colitis, cancer, inflammation, infections and gut motility. Changing the diet to feed these important bacteria is a priority for overall host health.

Dietary Advice

Feed the bifidobacteria by including fermented food or by giving a probiotic. Some inulin probiotics (recommended in the section on megamonas) often also contain bifidobacteria as an ingredient. Increase the levels of bifidobacteria by adding fermented foods such as kimchi or sauerkraut. Both can be added to the diet. Add 1 teaspoon of keffir/ kimchi or sauerkraut per day for 7 days then increase the dose to 2 teaspoons for a small dog, 3 for a medium sized dog and 4 teaspoons for a large dog.

PART 01 SUTTERELLA



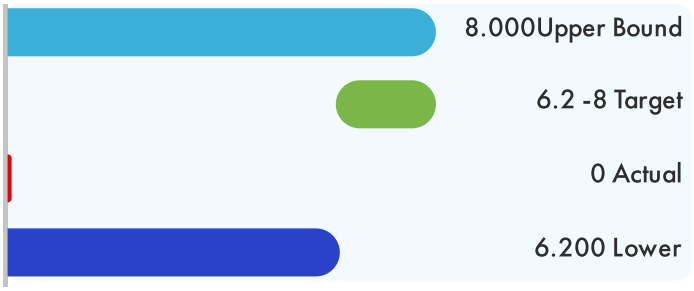
Sutterella is a gram-negative bacterium, from the betaproteobacteria family, whilst little is known about its contribution to the host nutrition, it is a commonly found inhabitant of the biome. Though generally host friendly, as numbers rise then there is the potential to cause inflammation and when present in very high numbers there are links from Sutterella to diseases such as IBD in dogs and autism in humans. This bacteria lives and adheres to the gut wall but is not mucin degrading and therefore does not contribute to a reduction in the gut wall integrity. Sutterella is a commensal bacterium living in the gut wall, reduced numbers may indicate a higher level of other biofilm bacteria.

Dietary Advice

Please read the appropriate sections on gut health in Part Two.

PART 01

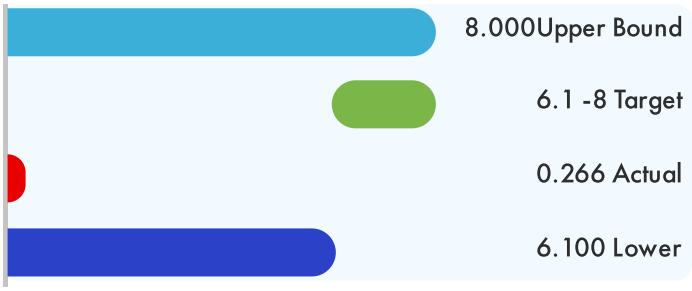
FAECALBACTERIA



Dietary Advice

PART 01

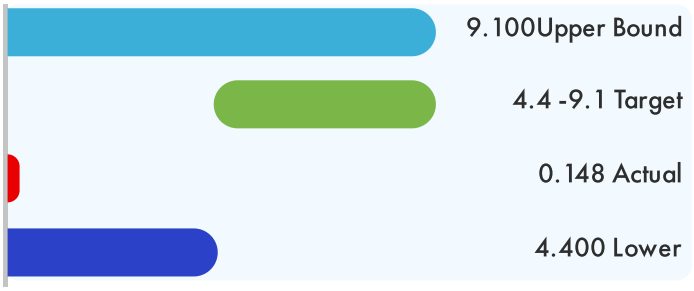
TURICIBACTER



Dietary Advice

PART 01

STREPTOCOCCUS

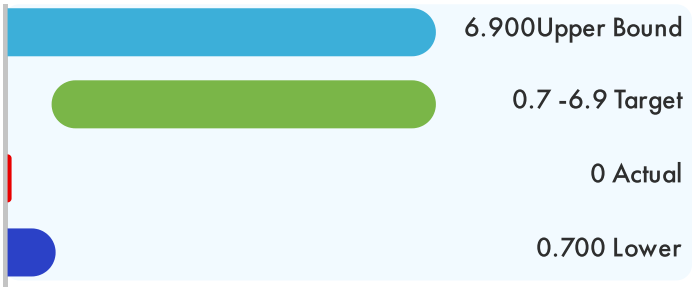


Dietary Advice

PART 01

CLOSTRIDIUM HIRANONIS

Hiranonis helps to restore the gut wall and the depth of the mucin layer. It also reduces pathogenic and biome film bacteria that attack the tight junctions, allowing pathogens to translocate across the gut wall where they cause disease within the host.



Dietary Advice

Add a hydrolysed protein supplement to the diet or feed the PetBiome Prebiotic which has the recommended daily dose of hydrolysed protein. Feed for 3 months to help restore levels.

PART 02 METABOLISM

Dietary Advice

Name of Bacteria	Lower Bound	Actual Value	Upper Bound	Target	Action
Blautia	6.000	2.956	10.000	6 -10	BeAware
Verrucomicrobia Akkermansia	2.000	0.000	3.000	2 -3	BeAware
Verrucomicrobia Methylacidaphales	0.200	0.000	0.250	0.2 -0.25	BeAware
Akkermansia Muciniphila	0.100	0.000	0.250	0.1 -0.25	BeAware

Verrucomicrobia Akkermansia are low, optimum glucose metabolism is calculated to be 2.5- 3%, absence indicates a sluggish/poor glucose metabolism.

Verrucomicrobia Methylacidaphalesare also too low indicating a reduced insulin/GLP -1 function.

Akkermansia Muciniphila is considered to be a good measure of a healthy biome it is directly linked to insulin sensitivity. It is also an important anti-inflammatory, helps repair the gut wall and has a direct relationship with the immune system. A. muciniphila is linked to improved metabolism and is absent your pet.

Blautia is anti-inflammatory, antimicrobial and correlated to good metabolism, blautia contribute greatly to the overall health of the biome, though it should not be above or below the 8-10% as it then seems to disrupt rather than help metabolism, your pet is well below recommended levels.

The advice would be to feed a plant steroid to stimulate the increase of the bacteria linked to metabolism. This can be given as a dietary supplement, we are able to supply you with such a product please contact us for further info. sharon@equibiome.org Foods containing the active plant steroid compounds are quinoa and spinach. Adding a small portion of both to the diet will help to improve metabolism.

PART 02 GUT WALL RENEWAL

Dietary Advice

Name of Bacteria	Lower Bound	Actual Value	Upper Bound	Target	Action
Akkermansia Muciniphila	0.100	0.000	0.250	0.1 -0.25	BeAware
Roseburia	0.100	0.106	0.200	0.1 -0.2	Healthy
Eubacteria	0.100	0.000	0.200	0.1 -0.2	BeAware

The members of this group help to renew the gut wall, if enough are present within the biome then the gut wall will be stronger and healthier.

The gut wall exists to protect the inside of the dog from any outside environmental or bacteria invaders which may cause ill health. Some bacteria are pathogenic and can cause disease if allowed to translocate or travel across the gut wall.

Action is needed to improve the low levels of all three, numbers can be encourage by increasing important plant polyphenols, the strongest can be found in oregano, thyme and rosemary, these can be added to the diet in the form of concentrated oils eg. https://gb.pipingrock.com

PART 02 GUT WALL INTEGRITY

Dietary Advice

Name of Bacteria	Lower Bound	Actual Value	Upper Bound	Target	Action
Bifidobacteria pt2	0.600	0.000	0.600	0.6 -0.6	BeAware
Lactobacillus	0.600	0.312	0.800	0.6 -0.8	BeAware
Escherichia coli	0.700	0.000	0.800	0.7 -0.8	BeAware

The addition of a live probiotic is recommended alternatively adding the Petbiome prebiotic, cost £30 for an eight week course (to order please email sharon@equibiome.org). Contains ingredients such as inulin and beta glycans to encourage the growth of the good gut bacteria.

PART 02 INFLAMMATION/COLITIS/IBD

Dietary Advice

Name of Bacteria	Lower Bound	Actual Value	Upper Bound	Target	Action
Proteobacteria	34.000	14.188	40.000	34 -40	BeAware
Planctomycetes		0.008	1.500	0 -1.5	Healthy
Fusobacteria pt2	15.000	24.080	25.000	15 -25	Healthy
Actinobacteria	1.500	0.487	3.000	1.5 -3	BeAware
Cyanobacter		0.024	0.100	0 -0.1	Healthy
Bacteriodetes	24.200	0.000	45.000	24.2 -45	BeAware
Tenericutes	0.600	0.401	0.800	0.6 -0.8	BeAware
Burkholderiales	1.600	4.331	5.000	1.6 -5	Healthy
Enterobacter	0.005	2.223	0.008	0.005 -0.008	BeAware

Many bacteria are pathogenic and inflammatory in nature, if the bad bacteria out number the good, then disease, dysbiosis and inflammation is the result. Remedial action would be to increase the numbers of good gut bacteria whilst decreasing the bad. Adding the Petbiome prebiotic and making the dietary changes as described in Part One will help to restore a healthy balance.

PART 02 ANXIOUS PHYLOGENIC TYPE

Dietary Advice

Name of Bacteria	Lower Bound	Actual Value	Upper Bound	Target	Action
Fragilis	0.010	0.000	0.500	0.01 -0.5	BeAware
Lactobacillus Rhamnosus	0.010	0.000	0.500	0.01 -0.5	BeAware

Both of these bacteria are linked to good health and temperament, low levels are indicative of an anxious phylogenic type. It is possible to supplement with a live probiotic for both species or alternatively consider a faecal transplant from a healthy/calm donor.

PART 02 AGGRESSIVE PHYLOGENIC TYPE

Dietary Advice

Name of Bacteria	Lower Bound	Actual Value	Upper Bound	Target	Action
Lactobacillus	0.600	0.312	0.800	0.6 -0.8	BeAware
Lactobacillacea	0.200	0.000	0.250	0.2 -0.25	BeAware
Paraprevotellacea	2.000	0.000	3.400	2 -3.4	BeAware
Firmicutes	18.000	37.413	28.000	18 -28	BeAware

Higher percentages are indicative of greater aggression.

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PART 02 TRUE PATHOGENS

Dietary Advice

Name of Bacteria	Lower Bound	Actual Value	Upper Bound	Target	Action
Bartonella	0.002	0.000	0.003	0.002 -0.003	BeAware
Borrelia	0.005	0.000	0.007	0.005 -0.007	BeAware
Rickettsia	0.018	0.002	0.020	0.018 -0.02	BeAware
Piscrickettsia	0.001	0.000	0.018	0.001 -0.018	BeAware
Ehrlichia	0.004	0.001	0.010	0.004 -0.01	BeAware
Helminthoeca	0.001	0.000	0.010	0.001 -0.01	BeAware
Neorickettsia	0.002	0.000	0.010	0.002 -0.01	BeAware
Leptospira	0.002	0.000	0.010	0.002 -0.01	BeAware
Shewanella	0.011	0.002	0.020	0.011 -0.02	BeAware

True Pathogens always cause disease, although there is a place for them in the microbiome, they should be within the target zone or lower. Please seek veterinary advice if levels are high.

PetBiome

Analysis of the Microbiome

Get in Touch

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