ATTACHMENT:

Useful remarks for patient and doctor, to be associated to the analytical results. Your doctor should interpret this report.

Cod. ID: 123456
CCV: 000
Date: 01/01/2014
Patient: Rossi Mario

INFLORA SCAN
(Assessment of intestinal health)

THE INTESTINE

INTESTINAL BACTERIAL FLORA (DYSBIO CHECK; PRO-FLORA CHECK)

STOOL TEST (PATHO-FLORA CHECK)

INFLAMMATION (INFLAMMATION CHECK)

DIGESTION (DIGESTION CHECK)

PERMEABILITY (PERMEABILITY CHECK)

USEFUL ADVICE AND INTERPRETING THE REPORT

REPEATING THE TEST

IMPORTANT

GUIDE TO READING THE TEST

THE INTESTINE

The **intestine** is the last portion of the digestive apparatus, and is also known as the **second brain** as it contains a real nervous system in its walls. It is the longest part of the human organism (measuring up to 7 meters), and seat of the most important immune station in our body. Consequently it is subjected to continuous antigenic and stressful stimuli from food, pollutants, pathogenic agents, and therefore involved in various disorders, mainly due to **stress and poor diet.** During a person's lifetime around 30 tons of food and 50 thousand litres of liquids pass along the digestive tract, so it is clear how important it is to choose the correct type and quality of food and to look after our food hygiene.

The intestine is divided in:

1. The small intestine: about 5-7 meters long, and formed of the duodenum, jejunum and ileum. Its job is to complete digesting the food that arrives from the stomach partly digested, and to absorb the nutrients.
2. The large intestine: the last segment of the digestive canal and formed of the cecum, colon and rectum. By reabsorbing water, its job is to form the faeces made from the indigestible part of the ingested food.

Three main functions are performed in the small intestine and are connected with each other:

1. Absorb the nutrients. Up to 90% of the nutrients are absorbed in the small intestine. In the large intestine the water is absorbed that was contained in the food, mineral salts, biliary salts and certain vitamins, like K, that are mainly produced by the intestine bacterial flora.
2. Secrete substances to aid digestion.
3. Intestinal movement and passage.
4. Endocrine, as the intestinal cells regulate the digestive processes and hunger pangs, thanks to secreting certain important hormones.
5. Immune system: the intestine contains the most important immune station in the body.

The colon performs the following functions:

1. Mobility
2. Absorbs water and biliary salts
3. Forms the faeces and eliminates them.

The functions of this apparatus depend on numerous factors, including:

- Balanced **bacterial flora**
- Presence of pathogenic bacteria, viruses, fungi/mycetes
- The **immune system** in the mucosa
- The correct intestinal **permeability**
- Absence of chronic or acute **inflammations**

Intestinal alterations, called DYSBIOSIS, are a social problem that affects more than 70% of the population. Diet in the western world aids these imbalances as too many refined carbohydrates, simple sugars, animal fats and industrial food, containing preservatives, colorants and chemical substances, are eaten. To this we have to add infections, and the massive use of drugs and stress.

INTESTINAL BACTERIAL FLORA

Our digestive system, and the intestine in particular, is colonized by numerous microorganisms which together form the bacterial flora.Intestinal flora comprises a range of bacteria which, living in a certain balance, help our general state of health. We could say it is an ecosystem formed of different species of microorganisms that begin developing right in the first days after a child is born.

The balance between the various species of bacteria is called eubiosis.
However, if there is a prevalence of fungi or other germs that can cause pathologies, then the intestine is in a state of dysbiosis. In fact, the beneficial bacterial flora acts as a defence barrier, creating an uninhabitable environment for the pathogens, altering the intestinal pH and making the target cells and the nutrients that are introduced with them unusable. In the gastrointestinal tract there is an organ called the Microbiota, which is formed of at least 500 species of microorganisms that are part of the intestinal flora.

Intestinal flora performs various functions, including:

- Producing fundamental enzymes for the digestive processes.
- Vitamin synthesis (vitamin K, B group vitamins, such as B12) that are important for the health of the entire organism.
- Producing medium and short chain fatty acids, that are the main source of energy for the colon cells and the bacteria that live there, and also source of energy for man.
- Activating the production of biliary acids for the correct digestion of proteins and lipids.
- Producing antimicrobial and antimycotic substances, essential to defend the intestinal tract against attack from pathogens.
- Modulating the immune system, whose most important base is in the intestine, by producing proinflammatory molecules (e.g. LPS), which guarantee a basic physiological inflammation that keeps the immune system active always, ready to defend the intestine from external attack.
- Boosting the function of the intestinal barrier to prevent excessive permeability.
- Regulating the mobility in the digestive tract and intestinal passage.

Regulating the pH in the gastrointestinal apparatus, to aid the digestive processes, the absorption of vitamins and mineral salts, and the elimination of pathogens that grow at different pH levels.

DYSBIO CHECK

Intestinal Dysbiosis is an alteration in the balance and composition of intestinal bacterial flora.

This alteration occurs when the healthy bacteria (including Lactobacillus Acidophilus and Biphidus) decrease and the harmful ones (including Escherichia Coli) increase. Other times certain types of bacteria may mutate and become pathogens. This alteration to the intestinal flora makes it impossible to completely process the faecal materials, therefore abnormal fermentation and putrefaction occur which, besides changing the intestinal temperature, inflame the mucosa and intoxicate the intestine, and consequently the entire organism, and drastically reduce the immune defences.

This all leads to a series of symptoms and disorders in the gastrointestinal apparatus that can have consequences on other organs and apparatuses that are distant from the intestine, such as:

- Poor digestion which results in alterations to the intestinal passage (frequent constipation or diarrhoea, meteorism, irritable colon, intestinal irregularity).
- Sense of being bloated and abdominal tautness, with pain, flatulence, general feeling of being indisposed and unwell.
- Increased susceptibility to infection due to the decreased immune defences.
- Increased probability of mycosis in the intestine (candidosis), vaginitis and cystitis in women.
- General disorders: nervousness, anxiety, sleep disorders, tiredness, asthenia and mood swings.

Of the main causes for Intestinal Dysbiosis we should list:

- Food intolerance and allergies (which can be both cause and consequence).
- Poor eating habits:
    - Hyperproteic diet
    - Diet rich in simple sugars and refined cereals
    - Hyperlipidic diet, especially saturated animal fats and hydrogenated fats
    - Diet poor in fibre (found in fruit, vegetables, unrefined foods)
    - Low liquid intake.
- Scarce digestive secretions, such as biliary acids and digestive enzymes.
- Psychophysical stress caused by hectic living pace and psychological stress.
- Antibiotic and drug treatment for infections.
- Weakened immune system due to vitamin deficiency, previous illnesses or the use of cortisones or other drugs (antibiotics, antacids, protein pump inhibitors, abuse of laxatives).
- Poor nutrient absorption by the intestine due to altered permeability.
- Chronic inflammation (Chron's disease, ulcerous colitis, celiac, etc.)
- Sedentary life

At least five different types of Intestinal Dysbiosis can be identified:

- Deficiency dysbiosis: due to a deficit of intestinal bacterial flora (bifid bacterium and lactobacillus), mainly caused by a diet poor in soluble fibre and/or rich in prepacked, refined, sterilized foods or after antibiotic treatment.
- Putrefactive dysbiosis: aided by a diet too rich in animal fat and meat, poor in fibre (increase in the number of bacterioids, clostridium, peptococcus and eubacteria).
- Fermentative dysbiosis: characterised by a relative intolerance to carbohydrates or due to an excessive intake of simple sugars, leading to accentuated bacterial fermentation (excessive bacterial growth in the small intestine, normally less populated by microorganisms).
- Sensitisation dysbiosis: caused by an immune response to components in the physiological intestinal bacterial micro flora (deficit in the immune barrier formed of the IgA secretions).
- Fungi dysbiosis (intestinal candida and excessive yeast): due to the overgrowth of saccharomycetes (fungi) or Candida, aided by a diet rich in simple sugars, leavened foods, refined carbohydrates and poor in fibre.

Intestinal Dysbiosis can be assessed through a simple urine test that highlights the excess or lack of metabolites derived from the metabolic activity of the intestinal bacterial flora. The test reveals the presence in the urine of two tryptophan metabolites, called Indican and Skatole, thus enabling to test whether there are any fermentative or putrefactive events occurring in the intestine.

INDICAN

The Tryptophan amino acid normally consumed in the diet undergoes a metabolisation process, by certain species of intestinal bacteria, that produces the metabolite called Indole. The concentration of Indican in the urine shows there are putrefactive phenomena occurring in the proteins and azotized compounds. A high Indican concentration in the urine due to increased putrefactive events by certain species of bacteria (Proteus, Klebsiella), reduces the urine and faeces acidity and determines an alkaline pH. As the small intestine is scarcely populated by bacterial flora, there are low levels of Indican in the urine of a clinically healthy person. A high level of Indican in the urine shows there is dysbiosis in the small intestine. False negatives can be recorded if the urine contains formalin, metamine, azulfidine or biliary pigments. Alternatively, false positives could be recorded if it contains iodine, salicylic acid, methylene blue.

SKATOLE

Intestinal bacterial flora does not perform a metabolic function for the protein compounds but also has an elevated fermentative capacity. In fact, all the carbohydrates that reach the large intestine undergo fermentation by a single species of bacteria or by a number of species. Altered intestinal bacterial flora with an overgrowth of fermentative species, determines an alteration in the digestion of sugars and fats and consequently the production of Skatole.

PRO-FLORA CHECK

Unbalanced intestinal bacterial flora can be assessed using a direct method, based on the growing of the microorganisms that physiologically inhabit our intestine, and help in absorbing and digesting the food we eat. The analysis represents an important first level screening to assess the overall composition of the resident bacterial flora, in order to define a correct balance of the bacterial species examined.

Lactobacillus SPP

Lactobacilli are symbionts in the human intestine, compulsory residents, who mostly colonize the colon, mouth and vagina. They inhibit the growth of pathogens, thanks to the production of lactic acid and bactericines, preventing fermentative and putrefactive phenomena. They slightly acidify the intestinal pH. Lactobacilli also positively stimulate the human immune system and produce short chain fatty acids that have trophic function for intestinal cells.

Bifidobacterium SPP

Bifidobacteria are an important part of the human bacterial flora who mostly colonize the colon, mouth and vagina and are the most represented bacterial population in the first weeks of human life. In fact, with age their concentration tends to decrease, especially in the elderly. These organisms are extremely useful for intestinal health by preventing the proliferation of pathogenic bacteria and actively stimulating the immune system in adaptive responses. They have effect on the metabolism of sugars and thanks to the production of short chain

fatty acids and acidification of the intestinal pH, inhibit the growth of pathogens in synergy with Lactobacilli. *Bifidobacteria* are also used in the food industry for the production of yogurt.

Escherichia Coli

E. coli is found in low concentrations in the lower section of the human gut where it provides many functions. It is able to regulate the response and the activation of the immune system, to construct a stable immune barrier, and has a fundamental function in the completion of the digestive phenomena, in particular of proteins, leading to the formation of short chain fatty acids with trophic function for intestinal cells. It is able to inhibit the growth of others intestinal pathogenic microorganisms thanks to the competition for resources. Escherichia coli is also able to produce the K vitamin and several vitamins of the B group. Some strains of E. coli can be pathogens, especially if their growth is excessive.

Enterococcus Spp

Enterococcus are bacteria of various species, saprophytes of the human digestive tract, which allow the protein metabolism in the intestine. Their concentration among the bacterial flora is controlled by the immune system and by the presence of probiotic bacteria antagonists, capable to limit their proliferation. In the case of immunosuppression these species can colonize other districts of the organism causing infections of urinary tract or intestinal illness.

PMP Group (*Proteus spp, Morganella spp, Providencia spp*)

Proteus, Morganella and *Providencia*, considered as part of the PMP group for their similar characteristics, are commensal organisms of the human gut. Their proliferation is controlled by the immune system and by the presence of antagonistic bacteria. The colonization of other districts of the organism can cause infections, especially cystitis and other urinary tract infections.

Streptococcus SPP

This is a group of different species, which differ in characteristics and ability to hemolyze the blood and symptomology associated with their excessive colonization of a district. Some of these species normally colonize the mucous of the body (especially oral, pharyngeal, intestinal and vaginal). Other species have a great pathogenic potential, in particular if they colonize other organs and apparatuses. In the oral cavity can produce caries, pharyngitis and other respiratory tract infections.

KES Group (*Klebsiella spp, Enterobacter spp, Serratia spp*)

Klebsiella, Enterobacter, and *Serratia*, for their similar characteristics, are considered as part of the KES group that is represented by microorganisms commonly found in the human gut. Their proliferation is controlled by the immune system and by the presence of probiotics antagonists but an excessive proliferation or colonization of other districts of the organism can lead to different inflammatory diseases. Some of these bacterial strains are able to produce a toxin that induces acute or persistent diarrhea, especially in children.

STOOL TEST (PATHO-FLORA CHECK)

A stool test is the search in the feces for bacteria that are responsible for gastrointestinal infections that are shown with: diarrhea, abdominal pain, sickness and fever in the majority of cases. Numerous species of bacteria are responsible for these infections.

In the test are analyzed many bacterial species belonging to the genus examined, most of which can give bland symptoms but not pathogenic. Most of the gastro-intestinal disorders accompanied by dysbiosis lead an overgrowth of bacteria that normally should not colonize the intestine or that should be present in low quantity. This does not mean that the presence of bacterial species that are not normally present is an indication of an acute pathology in progress.

Candida SPP

Candida is a mycete saprophyte of the gastrointestinal tract and skin that is found in low concentrations in the intestine. Its overgrowth can cause a state of chronic intestinal imbalance because its presence produces alterations in the digestive system, in the urinary system and of the immune response. Chronic inflammation of

the intestinal mucosa, resulting in a lowered capacity of absorption of nutrients and increased intestinal permeability. Furthermore, especially in women, a higher concentration of *Candida* in the gut, can lead to recurrent vaginal candidiasis, hardly treatable with antimycotics. The concentration of *Candida* can increase especially in the case of diets rich in simple sugars and refined carbohydrates, antibiotics and/or cortisone treatments, or general weakening of the immune system.

Campylobacter SPP

The group of Campylobacter, is composed of pathogenic bacteria whose growth causes acute symptoms, such as diarrhea, abdominal pain, fever, headache. They are also able to colonize the gastrointestinal tract causing chronic annoying symptoms, typically characterized by abdominal pain, irregular bowel, bloating and flatulence. The main vehicles of these bacteria are the chicken meat and poorly processed dairy products.

Shigella SPP

The genus *Shigella* includes pathogenic microorganisms, of which growth can determine the appearance of important symptoms as abdominal pain, diarrhea, fever, vomit. Shigellas can remain chronic in the body after the resolution of acute infection, for months or years causing symptoms less intense (constipation and reduced capacity to produce and activate the biliary acid). The spread of these bacteria is mainly due to poor hygiene handling foods.

Salmonella SPP

Salmonella are pathogenic bacteria responsible for numerous gastrointestinal problems. Some serotypes of Salmonella such as *typhi* and *typhimurium* can cause acute gastroenteritis and typhoid fever in humans, while other serotypes such as *enteritidis* and *infantis* are ubiquitous. The colonization of other districts of the organism can cause infections in other organs, in particular lymphatic system. The chronical presence of this organism in the intestine causes symptoms such as bloating, smelly stools and malabsorption syndromes. Environmental sources of these organisms include water, soil, animal feces, raw seafood. Symptoms of contagion can be diarrhea, abdominal pain, nausea, sickness and fever.

Clostridium difficile

Clostridium difficile is an anaerobic bacterium that produce enterotoxin with strong tropism for smooth muscle and the nervous system, and produce a hyaluronidase a lytic enzyme of the intestinal mucosa. It can cause symptoms including severe gastroenteritis characterized by abdominal cramps, malabsorption and digestive difficulties. Clostridium is frequently found in the intestinal flora and strongly proliferates after use of antibiotics. The disease usually is self-limiting but often determines a chronic presence of the bacteria in the intestine.

Yersinia enterocolitica

It is a pathogen transmitted by food, responsible of gastroenteritis in humans whose main symptoms are represented by diarrhea. Yersinia can chronically colonize the intestine, causing poor digestion, flatulence and unformed stools. Some serotypes of *Yersinia* have strong tropism for the lymphatic system and can cause reactive arthritis, urinary tract infections and autoimmune disorders.

INFLAMMATION (INFLAMMATION CHECK)

Chronic intestinal pathologies are affecting more and more people and can be very varied. The most benign or common, is the irritable colon syndrome, or commonly called 'colitis'. This disorder is caused by inflamed intestinal mucosa, of often unknown aetiology, and is aggravated by poor eating habits, stress and lifestyle.

Symptoms of an irritable colon are:

- Abdominal pain or cramp
- Constipation alternated with diarrhoea (irregular intestine)
- Mucous in the faeces
- Meteorism
- Abdominal swelling
- Halitosis
- Slow and difficult digestion

These symptoms are extremely aspecific and can be associated with intestinal polyps, or more serious disorders like Chron's disease or ulcerous colitis, and even celiac disease. Stress plays a fundamental role in intestinal wellbeing. An increase in psychophysical stress leads to a reduction of blood flow in the mucosa, which alters the function of the protective barrier against attack from external pathogenic or polluting agents, consequently altering the intestinal permeability. This condition of reduced blood flow also alters mobility in the intestine and peristalsis. In the case of irritable colon there is also a strong bond with lifestyle. Every day the intestine is submitted to a slight level of inflammation due to the presence of bacteria that maintain its immune level active. The problem arises when the level of inflammation increases to such a point that it is no longer positive, but alters the barrier and, therefore, intestinal permeability.

CALPROTECTIN

Calprotectin is a protein and the major part is produced by neutrophil granulocytes, however a small part has also been found in monocytes and macrophages. It is very stable over time and its concentration is not altered by the use of drugs, food and is not degraded during the digestive process, therefore it reaches the faeces unchanged. Calprotectin has a strong antimicrobial activity, which is why it plays an important defensive role for the organism. An increase in its concentration can be sign of damage to the intestinal mucosa.

SYMPTOMS OF INTESTINAL INFLAMMATION

- Swelling, diarrhoea, cramp
- Altered faeces consistency
- Poor digestion, difficult digestion
- Abdominal burning, swelling, tension
- Presence and monitoring of chronic intestinal inflammatory disorders (Chron's disease, rectum, ulcerous colitis)
- Poorly absorbed nutrients

DIGESTION (DIGESTION CHECK)

During a lifetime a human eats an average of around 30 tons of food, which is broken down inside the digestive apparatus until it becomes the base, the bricks, used to build our entire organism: amino acids, sugars and fats. The digestive process begins in the mouth: chewing is the first phase to demolish the food. Thanks to the saliva, the bolus is formed that travels from the mouth to the oesophagus, the pipe that carries it to the stomach. There are specific enzymes in saliva that begin the digestion of the starches. Once the bolus reaches the stomach, it is attacked by the gastric juices that contain hydrochloric acid, that enables digesting the food further. The pH level in the stomach can reach very low levels (from 0.9 to 3.5). Hydrochloric acid also enables neutralizing any pathogens that may have been introduced with the food, and improves the absorption of important minerals like Calcium and Iron. Inside the stomach the proteins are digested by the pepsin, an enzyme that is normally found in its inactive form, as pepsinogen, and is activated by the acid pH.
From the stomach the bolus takes on the name of chyme, and it passes onto the first part of the small intestine, the duodenum. At this point the carbohydrates and proteins have been partly digested, while the fats are still unchanged. Pancreatic juices and bile are now released, that finish digesting the macronutrients. Pancreatic juice is rich in bicarbonate of soda to absorb the acidity from the chyme, lipase, amylase, and protease to complete digestion. Continuing its journey inside the intestine, the food is completely digested and the base molecules just have to be absorbed. Anything that is not absorbed continues travelling along the intestine to the large intestine, where the residue mineral salts are absorbed and the faeces are formed, containing fibre, undigested food, bacteria and other waste products.

CAUSES AND CONSEQUENCES OF POOR DIGESTION

Digestion is a lengthy process that involves many organs. Knowing which organs and how they are involved in the digestive process enables us to have a clear and precise idea of how to act, in the case of digestive disorders. The most common symptoms associated with poor digestion are: stomach pains, sensation of being full, flatulence, nausea and acid reflux, aerophagia, abdominal tension and abdominal swelling.

The main causes are:

- Poor or insufficient chewing
- Drinking sugary or alcoholic drinks that alter the physiological pH in the stomach
- Eating too many animal fats and proteins in the same meal

- Allergies, gluten and lactose intolerance, adverse reactions to IgG-mediate foods, can all affect digestion
- Excessive stress
- Physical exercise or resting immediately after a main meal.

STOOL TEST

The stool test includes macroscopic assessments (appearance, colour, consistency, presence of gas, presence of undigested material, presence of concealed blood, mucous), chemical (pH) and microscopic (presence of fibres, protein, undigested sugar and fat, crystals). The stool test can be of great help in evaluating digestive disorders involving the intestine, liver or pancreas. Anomalies can also be caused by overeating, taking drugs or medication, stressful lifestyle and incorrect physical exercise.

MACROSCOPIC TEST

COLOUR

The normal colour of faeces is brown, consequently they can be:

- Normal colour.
- Hypochromic or achromic – could lead to presume a possible reduction in the liver's excretive function.
- Hyperchromic – could indicate a greater production and release of bile by the liver.

If the faeces are not normal colour, it is advisable to consult one's own doctor or a specialist.

CONSISTENCY

According to their consistency faeces are divided in:

- Formed or pultaceous, in physiological cases
- Caprate or hard, in the case of stubborn constipation
- Semi-formed, in the case of intestinal problems
- Liquid or diarrhoeic, in case of diarrhoea

PRESENCE OF UNDIGESTED MATERIAL/BLOOD/MUCOUS

Mucous may be found in the faeces in the case of irritable colon, colitis or other important intestinal inflammations. There should be none in a clinically healthy person. If the faeces are not analysed within 24-28 hours from when they were collected, the mucous could be reabsorbed and absent in the test result, even if it is effectively present. If blood is found in the faeces, we must distinguish between acute and chronic, abundant or slight, bleeding. Blood must be distinguished from concealed blood, which can be symptomatic of more serious problems and require additional tests after this first exam. If vegetable or animal fibres or fat are found, this could indicate poor chewing, digestive difficulties or dysbiosis.

GAS

If there is gas it could indicate dysbiosis, or an excessive growth of microorganisms that are not physiologically present in the bacterial flora, that lead to fermentation or putrefaction.

MICROSCOPIC EXAM

DIGESTION OF PROTEINS/CARBOHYDRATES/FATS

Normal protein values in an adult are up to 6 grams in 24 hours. Increased fat in faeces indicates digestive problems with fats, which are eliminated without being absorbed, as happens in the case of pancreatic or epatobiliary insufficiency or diarrhoea. The results envisage:

PROTEINS:

- Normal presence
- Poorly digested fibre – indicates possible inflammation in the small intestine and increased intestinal movement
- Poorly absorbed fibre – indicates scarce presence of gastric and pancreatic enzymes that prevents complete digestion.

CARBOHYDRATES:

- Normal presence
- Undigested sugars – indicates possible inflammation in the small intestine and increased intestinal movement
- Unabsorbed sugars - indicates scarce secretion of pancreatic juices and secreted enzymes in the intestinal mucosa

FATS:

- Normal presence
- Undigested fats - indicates possible inflammation in the small intestine and increased intestinal movement
- Unabsorbed fats – could indicate low secretion of bile and pancreatic juices

FIBRES

Presence or absence indicates that vegetable fibres have been eaten in the diet.

CRYSTALS

- Absent
- Presence of Calcium or Bilirubin crystals – indicates possible alteration in biliary secretion

BIOCHEMICAL TEST

PH

Faeces pH is **neutral** or slightly acid. The expected pH should be between 6.5 and 7. More acid pH could indicate fermentation processes due to pancreatic insufficiency or to the eating of food that increases fermentation (sugars and fats). Alkaline pH is caused by the putrefaction process of poorly digested proteins, which produces ammonia compounds and biogenic amine.

CONCEALED BLOOD

We talk of "concealed blood in the faeces" where there a just slight traces of blood, which are not visible to the naked eye but only found in specific laboratory analyses. The search for concealed blood is conducted in the faeces when we suspect bleeding along the digestive tract: the research is positive if there are more than 5 ml in 24 hours. Signs of visible red blood generally indicate bleeding in the last intestinal tract or internal or external haemorrhoids. Searching for concealed blood in faeces is an important screening test for colon-rectum cancer, but a positive result is given by various conditions such as: duodenal and/or gastric ulcer), oesophagus varix, ulcerous colitis, Chron's disease, diverticulitis, anal fistula, haemorrhoids, anal rhagas.
Therefore if the test is positive, further investigations are needed to evaluate the effective presence by analysing three samples taken on three consecutive days.

PANCREATIC ELASTASE

An enzyme found in pancreatic juice, that enables digesting the elastin, a protein found in connective tissues. It is assessed in the faeces because it is a stable parameter and the concentration increases by 5-6 times in the faeces. Its concentration gives a good reflection of the exocrine function of the pancreas. Low levels of this enzyme could indicate pancreatic insufficiency, but lower levels are also found in the case of diabetes mellitus, osteoporosis, intestinal inflammatory illnesses (Chron's disease, ulcerous rectocolitis), celiac disease and kidney failure. Altered levels of elastase can also be found in the case of diarrhoea and other acute inflammations.

INTESTINAL PERMEABILITY (PERMEABILITY CHECK)

Unbalanced composition of bacterial flora could compromise the good intestinal functions, which would alter the production of digestive enzymes, and normal biochemical conditions of pH and vitamins. This all causes an increased inflammatory response. In this condition, the intestinal villi are unable to guarantee a correct absorption of nutrients after digestion, and certain macromolecules manage to pass the intestinal barrier and can be identified as non-self, triggering off the immune response. Permeability is to all effects a weakening of the joins between the various cells in the intestinal barrier, which make the lumen more permeable to molecules

and food that has not been completely digested. Experiments have shown that the dysfunction in these joins is the pre-existing cause for systemic immunological inflammatory illnesses, chronic intestinal inflammatory illnesses, food allergies, adverse reactions to food and celiac disease.

The barrier capacity is also altered by other factors like stress, incorrect eating habits, environmental pollutants, drugs and alcohol. This alteration, called the permeable intestine syndrome or "leaky gut" (SAPI or LGS) is accompanied by a chronic inflammatory state. Intestinal inflammation and permeability are directly correlated, the cause and consequence of each other.

Subjects most at risk are those who suffer from:

- Gastrointestinal problems, like meteorism, swelling, cramp, diarrhoea or irritable bowel syndrome (IBS) or periods of diarrhoea alternated with periods of constipation.
- Food allergies and intolerance of any nature.
- Tiredness, lack of energy, chronic fatigue or fibromyalgia
- Hormonal imbalance, including intense premenstrual syndrome or polycystic ovaries.
- Autoimmune pathologies, such as rheumatoid arthritis, Hashimoto thyroiditis, lupus, psoriasis or celiac disease.
- Dermatological problems like acne, rosacea or eczema
- Candidosis or recurring genital infections.

ALPHA 1 ANTITRYPSIN

This is mainly produced by the liver, macrophages and respiratory epithelial cells and is then introduced into the blood circulation. At pulmonary level, the function of alpha-1 antitrypsin is needed to prevent that neutrophil elastase (a protease) damages the pulmonary alveoli: alpha-1 antitrypsin constitutes the most important defence system for the lower respiratory tracts against damage caused by these proteases on the walls of the alveoli. Deficiency in alpha-1 antitrypsin function means its defensive role is missing and prepares the way for developing pulmonary emphysema. Smoke, among other things, inhibits the creation of this protein and is one of the reasons why smoke is one of the causes for pulmonary emphysema.
Hepatic illness is presumably determined by the build-up of cells in the liver (hepatocytes) of an anomalous form of alpha-1 antitrypsin, that constitutes one of the insoluble compounds inside the cells. In Chron's disease and modest or serious ulcerous colitis, alpha-1 antitrypsin is high. The faecal dose can be used as intestinal inflammatory markers. In other cases, especially in paediatric age, the dose of alpha-1 antitrypsin is used to study the protodispersant intestinal malabsorption, or to evaluate the passage of plasmatic proteins in the intestinal lumen after an increase in the wall permeability caused by an inflammatory process.

USEFUL ADVICE AND INTERPRETING THE REPORT

In the case of intestinal disorders, the results should be followed by a careful study of the person's medical history and additional tests, to evaluate the aetiology of the symptoms. Diet is our first weapon to manage or improve any symptoms in the gastrointestinal tract. There are foods that promote inflammation and others that reduce it: among these we mention PLANT origin including fresh fruit and vegetables (preferably those rich in soluble fibres like carrots, aubergines, courgettes, apples, pears, damsons and nuts, but without overdoing it with the latter), unrefined cereals, potatoes, rice. Furthermore it is advisable to reduce animal origin food and prefer those low in fat. Also the correct hydration is also important, without overdoing it with water however to prevent risk of over-hydration. Foods that promote inflammation are all those that are leavened or fermented, including alcohol, coffee, tea, fatty foods. We should not eat excessive amounts of pulses or vegetables high in fibre (broccoli, cabbage, lettuce, for example). Useful supplements can be those based on L-Glutamine, which helps improve cell repair and exchange, together with important vitamins and minerals, such as zinc, iodine, selenium, group B vitamins and vitamin A. We should not forget the utility of natural antioxidants and anti-inflammatory supplements (aloe, curcuma).

The profile can give indications about which intestinal tract has unbalanced bacterial flora:

- Alterations in **Indican** values indicate Dysbiosis in the small intestine – fermentative dysbiosis, advisable to take supplements with strains of **Lactobacilli** (Acidophilus, Rhamnosus, Salivarius, Casei, Plantarum, Reuteri);
- Alterations in **Skatole** values indicated Dysbiosis in the colon – putrefactive dysbiosis, advisable to take supplements with strains of **Bifidus bacteria.**
- Alterations in both parameters indicate Intestinal Dysbiosis in both the small intestine and the colon, to

be treated with various strains of probiotics.

In the same way, it is useful to know which strain of bacteria is missing and which pathogenic strain is in overgrowth, to enable specifically treating the problem. Besides integrating with probiotics (bacteria that repopulate the gastrointestinal tract) it can be useful to integrate prebiotics, i.e. soluble food fibres able to aid the growth of "good" bacterial flora. Some examples of prebiotics are: inulin, fructose-oligo-saccharides and alcohol-sugars. Inulin aids the growth of bifidus bacteria and lactobacilli in the intestine. Fructose-oligo-saccharides (FOS) stimulate the selective growth of bifidus bacteria, inhibiting the growth of pathogenic bacteria, not able to break the FOS chemical bonds. Lactitol (alcohol-sugar) reaches the colon intact, where it promotes acidification locally, aiding the growth of lactobacilli to the detriment of putrefactive coliforms.

In the case of digestive problems, as a good rule it is always important:

- To limit the amount of food eaten at each meal, so as not to overload the stomach and make its work more difficult.
- Chew and swallow slowly, so as to grind down the food as far as possible before it goes to the stomach
- Choose the right combination of macronutrients: meals with high fat and protein content are more difficult to digest and slow down overall digestion
- Choose the right type of exercise at the right time of day

REPEATING THE TEST

If the test is positive, it is advisable to repeat it after 2/3 months, after following treatment based on supplements and good diet. In the case of therapeutic monitoring or pathologies, it is advisable to repeat the test according to the advice from the doctor who prescribes it. If there are problems in interpreting the results, or if there are any pathologies in progress, a specialist's opinion is recommended, who is able to provide the specific therapeutic assistance. If only a few of the analysed parameters are out of range, the test can be repeated of just those parameters in the complete Inflora Scan profile.

IMPORTANT

The test results must always be interpreted and integrated by the doctor into each patient's case. This test cannot be reproduced partially. The laboratory results, graphs and explanations contained in this leaflet must not be taken as a medical diagnosis. Therefore they are exclusively an extra instrument for the doctor, who is able to use them and integrate them with the other factors that emerge during the check up or other diagnostic tests, to then formulate the correct treatment and diagnosis of the patient's health.

GUIDE TO READING THE TEST

- **GREEN TRAFFIC LIGHT**: value in the norm
- **YELLOW TRAFFIC LIGHT**: borderline value
- **RED TRAFFIC LIGHT**: value out of normal range
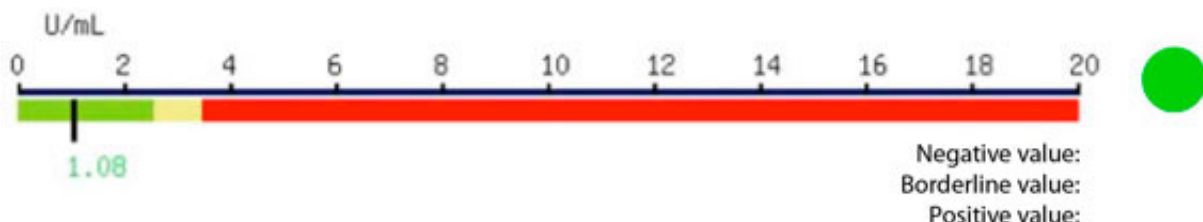
TEST RESULTS:

Cod. ID: 123456
CCV: 000
Date: 01/01/2014
Patient: Rossi Mario

INFLORA SCAN
(Assessment of intestinal health)

Dott.ssa Ausilia Rausa

Rossi Mario

Cod. ID: 123456
01/01/2014

NatrixLab
Via Cavallotti, 16
42122 Reggio Emilia
Tel. (+39) 0522 232606

Results

DYSBIO CHECK

Indican   29.80 mg/L

mg/L

| 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 |

29.80
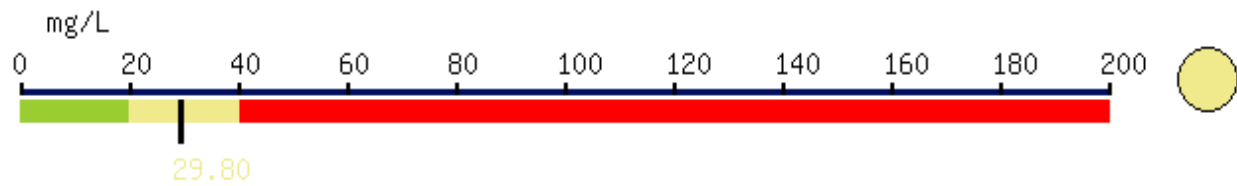
No dysbiosis: 0-20
Medium dysbiosis: 20-40
Serious dysbiosis: 40-200

Skatole   3.1 ug/L

ug/L

| 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 |

3.1
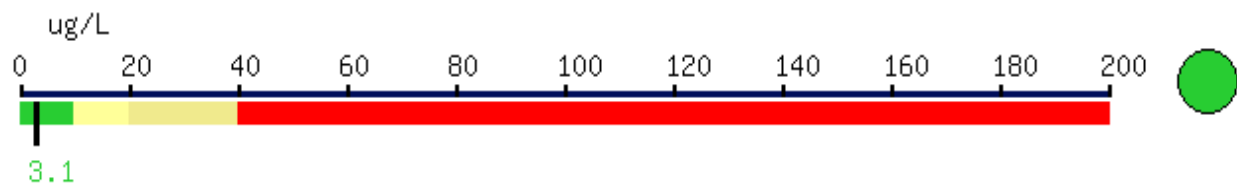
No dysbiosis: 0 - 10
Dysbiosis Slight: 10 - 20
Medium dysbiosis: 20 - 40
Dysbiosis: 40 - 200

PRO-FLORA CHECK

Lactobacillus SPP   0 cfu*10^5/ml

cfu*10^5/ml

| 0 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 |

0
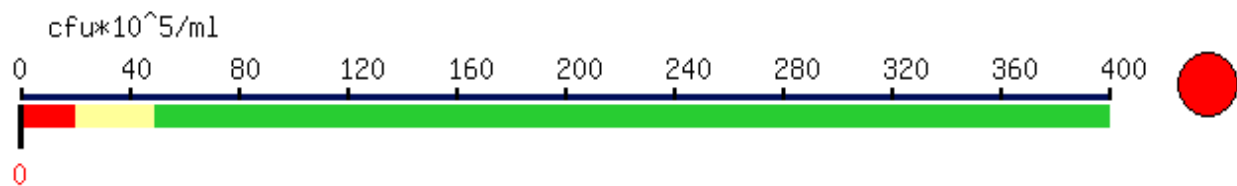
RED LIGHT: 0 - 20
YELLOW LIGHT: 21 - 49
GREEN LIGHT: 50 - 400

Bifidobacterium SPP   130 cfu*10^5/ml

cfu*10^5/ml

| 0 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 |

130
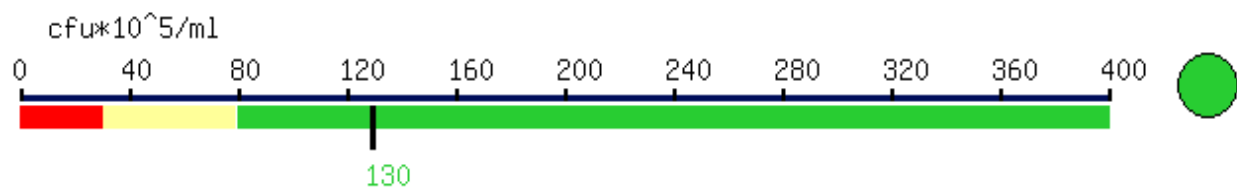
RED LIGHT: 0 - 30
YELLOW LIGHT: 31 - 79
GREEN LIGHT: 80 - 400

Escherichia Coli

cfu*10^5/ml

| 0 | 40 | 80 | 120 | 160 | 200 | 240 | 280 | 320 | 360 | 400 |

150
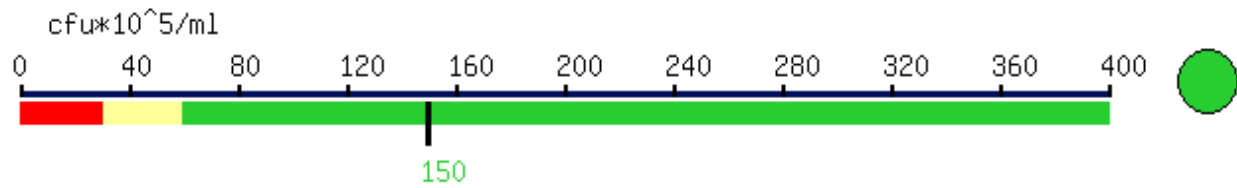
150 cfu*10^5/ml

RED LIGHT: 0 - 30
YELLOW LIGHT: 31 - 59
GREEN LIGHT: 60 - 400

Enterococcus SPP

cfu*10^5/ml

| 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |

0
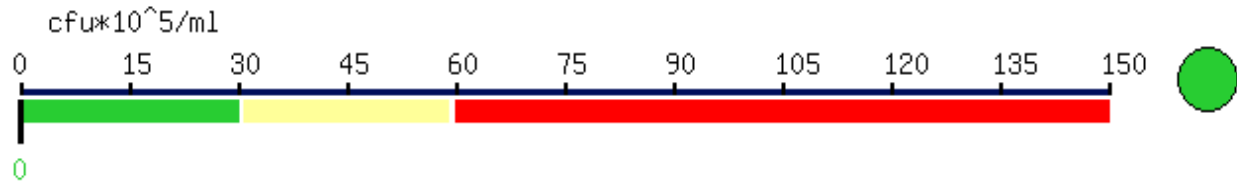
0 cfu*10^5/ml

RED LIGHT: 60 - 150
YELLOW LIGHT: 31 - 59
GREEN LIGHT: 0 - 30

PMP Group

cfu*10^5/ml

| 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |

0
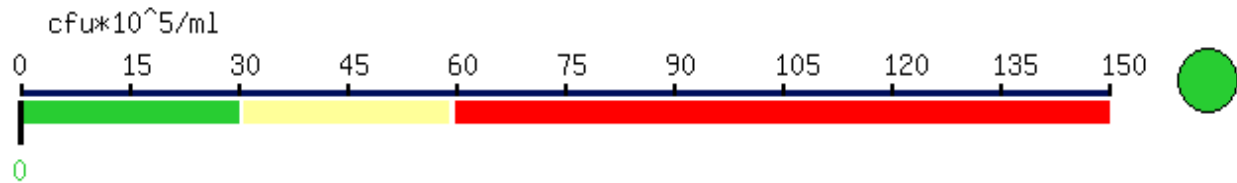
0 cfu*10^5/ml

RED LIGHT: 60 - 150
YELLOW LIGHT: 31 - 59
GREEN LIGHT: 0 - 30

Streptococcus SPP

cfu*10^5/ml

| 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |

0
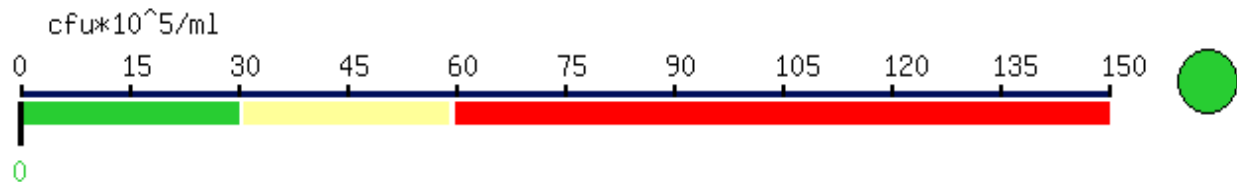
0 cfu*10^5/ml

RED LIGHT: 60 - 150
YELLOW LIGHT: 31 - 59
GREEN LIGHT: 0 - 30

KES Group

cfu*10^5/ml

| 0 | 25 | 50 | 75 | 100 | 125 | 150 | 175 | 200 | 225 | 250 |

50
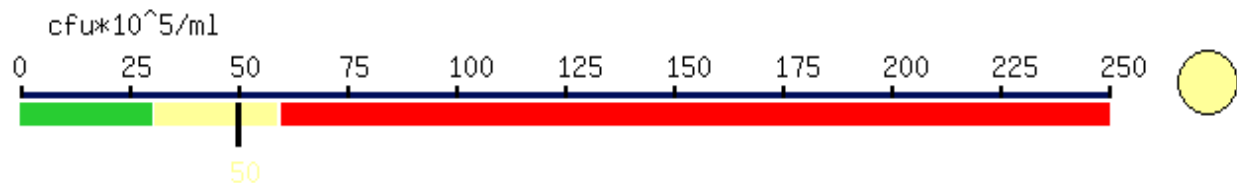
50 cfu*10^5/ml

RED LIGHT: 60 - 250
YELLOW LIGHT: 31 - 59
GREEN LIGHT: 0 - 30

PATHO-FLORA CHECK

Candida SPP

0 cfu*10^5/ml

cfu*10^5/ml

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

0
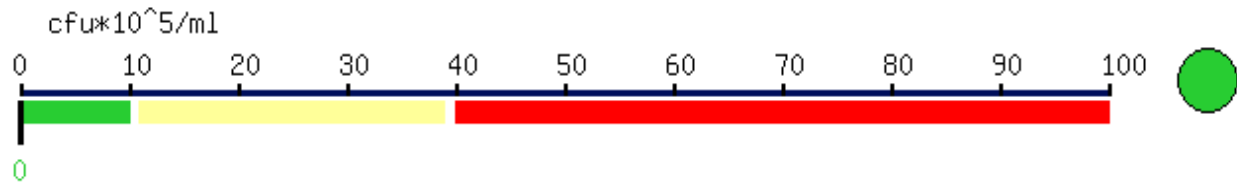
RED LIGHT: 40 - 100
YELLOW LIGHT: 11 - 39
GREEN LIGHT: 0 - 10

Campylobacter SPP

20 cfu*10^5/ml

cfu*10^5/ml

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

20
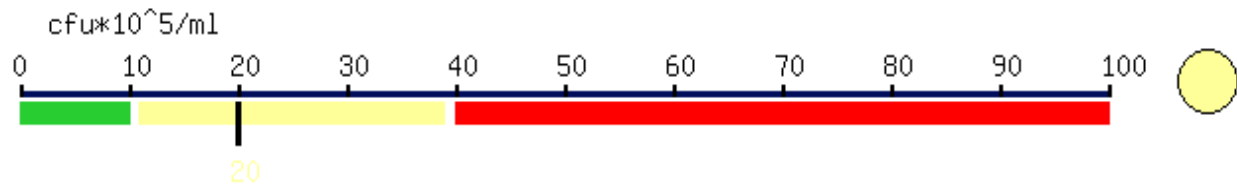
RED LIGHT: 40 - 100
YELLOW LIGHT: 11 - 39
GREEN LIGHT: 0 - 10

Shigella SPP

0 cfu*10^5/ml

cfu*10^5/ml

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

0
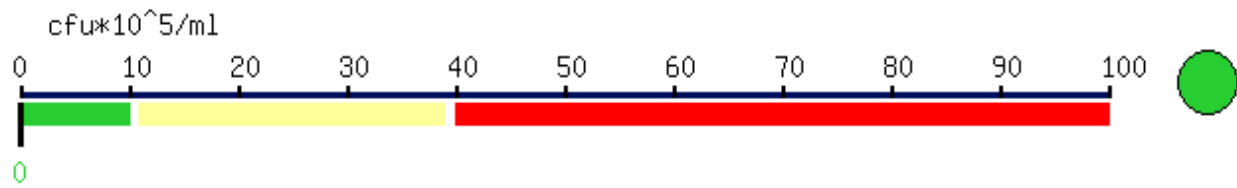
RED LIGHT: 40 - 100
YELLOW LIGHT: 11 - 39
GREEN LIGHT: 0 - 10

Salmonella SPP

2 cfu*10^5/ml

cfu*10^5/ml

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

2
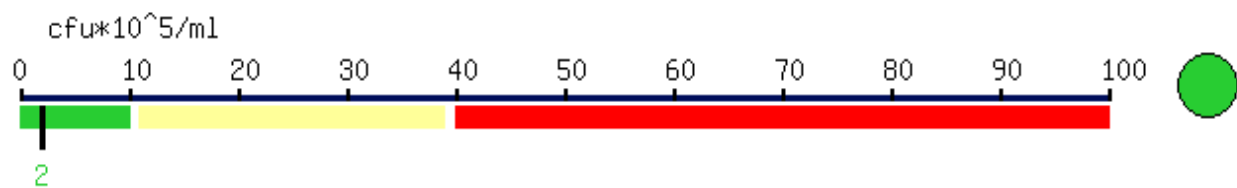
RED LIGHT: 40 - 100
YELLOW LIGHT: 11 - 39
GREEN LIGHT: 0 - 10

Yersinia Enterocolitica

0 cfu*10^5/ml

cfu*10^5/ml

| 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |

0
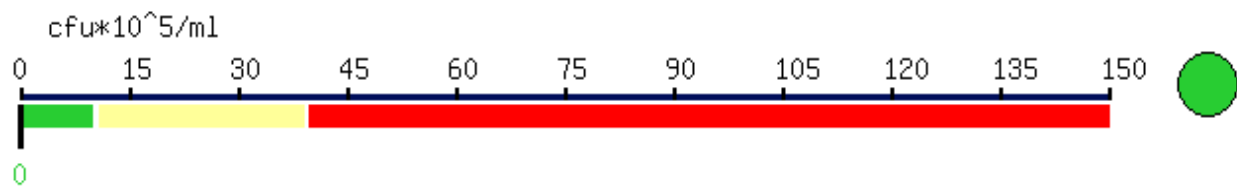
RED LIGHT: 40 - 150
YELLOW LIGHT: 11 - 39
GREEN LIGHT: 0 - 10

Clostridium difficile

0 cfu*10^5/ml

cfu*10^5/ml

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

0

GREEN LIGHT: = 0
RED LIGHT: ≥ 1
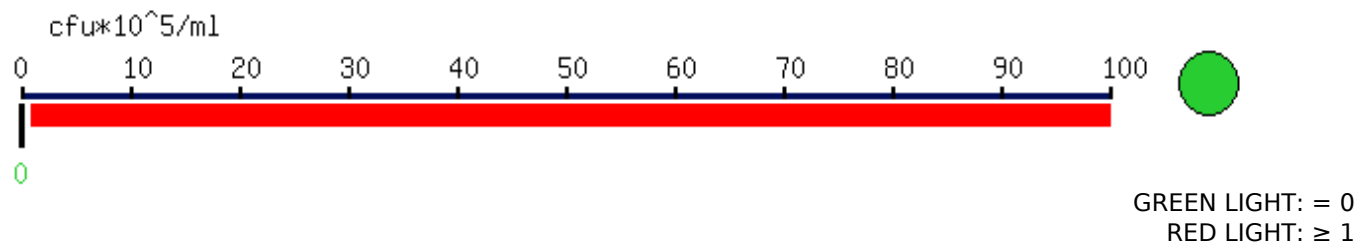
INFLAMMATION CHECK

Calprotectin

5.5 ug/g

ug/g

| 0 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |

5.5

GREEN LIGHT: 0-50
YELLOW LIGHT: 50-200
RED LIGHT: 200-500
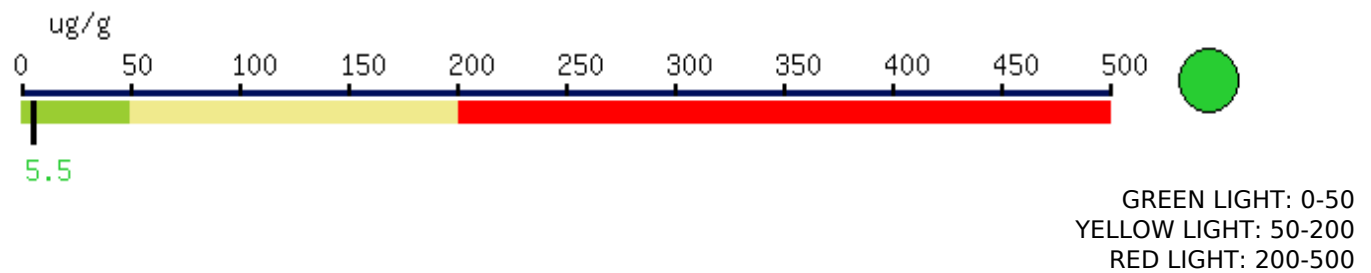
DIGESTION CHECK

Test	Results	reference level
Starch/sugar	normal presence	
Colour	normal colour	
Consistency	caprate	
Crystals	absent	
Pancreatic elastase	473	[>200 ug/g]
Fibers	normal presence	
Gas	absent	
Fat	undigested fats	
Undigested material	present	
Mucous	absent	
pH	7.5	[6.5 - 7.5]
Protein	normal presence	
Blood (macroscopic)	absent	
Concealed blood	absent	

PERMEABILITY CHECK

Alpha-1-Antitripsina

66 ug/g

ug/g

| 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |

66

GREEN LIGHT: < 400
RED LIGHT: ≥ 400