



CAH & ADRENAL INSUFFICIENCY
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THE MICROBIOME

PRE AND PRO-BIOTICS

Introduction

At our CAHISUS meeting in June 2017, Dr John Honour who is an eminent steroid biochemist, presented information on how the gut can alter steroid hormone metabolism and how this action could affect the absorption of steroid hormones, particularly those steroids which get into the small bowel.

Dr Honour described how gut bacteria change in the various areas of the gut and explained that a steroids action may alter, depending on which part of the gut the hormone is in.

He also illustrated this by showing the results from several studies of how individuals handle hormones differently, which is probably a reflection of the varying bacterial populations in these people. Antibiotic use will alter the proportion and types of bacteria, so the whole matter becomes rather complex.

Despite this complexity, it is really important for us to understand what is happening in the gut.

Oral medication is the mainstay of cortisol replacement therapy, so we need to appreciate what might happen in various circumstances to the medication we take.

At our October 2017 meeting, as a follow-on to Dr Honour's very well received and enlightening presentation, we asked Jacqui Mayes, a registered Nutritional Therapist, to speak about gut bacteria and what in our diet helps good bacteria to survive in their struggle with bacteria which are not helpful to us.

An article on Dr Honour's presentation can be read on our CAHISUS website Articles Page or by clicking on the link below:

<http://www.cahisus.co.uk/pdf/DR%20JOHN%20HONOUR%20ABSORPTION%20OF%20STEROIDS%20WHAT%20HAPPENS%20IN%20THE%20GUT.pdf>

Jacqui Mayes
Registered Nutritional Therapist

Background

In the human body, there are approximately 10 times more exogenous organisms as there are human cells. Microbes (bacteria) live both inside and outside of our bodies, particularly in our gut, digestive tract, genitals, mouth and nose.

We used to think that bacteria were harmful and the cause of illness or disease, but recently science has discovered the incredibly important role of the billions of beneficial bacteria that make up our microbiome, and it is now thought that these beneficial bacteria are crucial for keeping us healthy.

The human microbiome is more than just bacteria. It also contains human cells, viral strains, yeasts and fungi, but bacteria seem to be the most important part of our microbiome when it comes to controlling immune function and inflammation.

Researchers have identified over 10,000 different species of microbes living in or on the human body and its thought that each one of these has its own specific DNA and its own specific function. It is thought that there might be tens of thousands more bacteria yet to be identified.

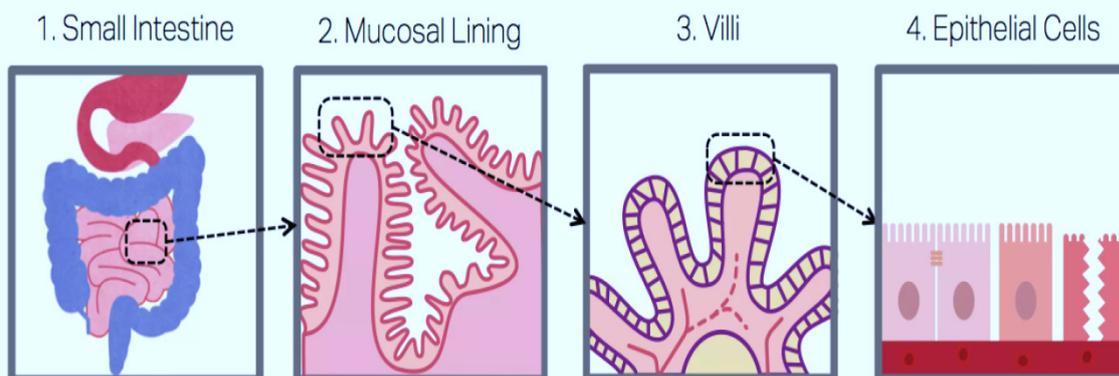


How do we interact with these bacteria?

We have a symbiotic relationship with these bacteria. The beneficial bacteria need a place to live, eat and reproduce and by giving them a home, we benefit by their metabolic activity which is thought to support our health in many ways. We literally cannot live without them because they defend us against harmful bacteria and other organisms, support our digestion and absorption, protect our stomach lining, ensure that our immune system functions well, help to balance our immune response (inflammation and allergy), help us to detoxify and excrete substances such as cholesterol and hormones, support our metabolism, support our nervous system and have an impact on our mood.

First and possibly most importantly, they defend us against and crowd out bad bugs that we are exposed to through our food. They are even able to produce anti-biotic like substances which keep these pathogens in check. By producing enzymes which help us break down our food, they support our digestion and help us to absorb our food properly.

They also ferment and feed off indigestible fibre which helps to keep our gut moving and avoid constipation. They produce helpful acids such as butyric acid and short chain fatty acids which help to fuel our gut cells and keep them healthy. Literally millions of these 'good' gut bacteria also line and protect our gut wall.



Most of our immune system is found in the gut which makes sense as often this is the first point of contact with invaders. Gut bacteria play a crucial role in training the immune system to react appropriately to its environment – helping it to learn which invaders need to be dealt with and which need to be tolerated.

Beneficial bacteria are also thought to prevent the immune system from overreacting or reacting inappropriately. This is thought to help prevent allergy or auto-immune conditions because gut bacteria are essential for programming our immune system's tolerance of things like pollen or animal fur and dander. Recent research has found that giving certain probiotics to pregnant mothers and new born babies reduces allergies such as hay fever, asthma and eczema later in life.

Several studies have shown that certain beneficial bacteria help to reduce or prevent the effects of coughs and colds in both children and adults, reducing the number of infections, the symptoms and how long it lasts.

Certain 'good' gut bacteria produce certain B vitamins and Vitamin K and they help to support our metabolism. There is evidence that our gut bacteria might influence levels of obesity and the development of visceral fat.

There is also evidence that our beneficial gut bacteria may influence our heart health because it is thought that gut bacteria may be involved in reducing cholesterol levels in our body and that there is a positive association with the 'healthy' HDL cholesterol and good triglyceride levels.

When there is a healthy balance of good gut bacterial steroid hormones are detoxified correctly and then excreted. Too many unfriendly bacteria and this detoxification can be impaired with hormones being allowed to recirculate into the system. Our gut bacteria are also involved in the metabolism of exogenous steroids and other medication.

Not only do we have beneficial bacteria living in and on us, but we also have many opportunistic or 'bad' bacteria that have taken up residence. What decides whether our microbiome is healthy or not all comes down to balance because we need a higher ratio of friendly, beneficial bacteria to outnumber the opportunistic, pathogenic bacteria for us to stay healthy and symptom free.

There are many lifestyle and other factors that can affect this balance.



Role of the Diet

Diet plays a very important role in protecting the microbiome because certain foods nourish and feed the beneficial bacteria and certain foods nourish and feed the unfriendly, opportunistic bacteria.

Vegetables and fruit contain fibres and plant chemicals which feed your good gut bacteria and help it grow which is why they're crucial to a healthy gut. Different microbes preferentially consume different complex carbohydrates and fibre, which strengthens the community of the gut and is the reason why many Nutritionists suggests adhering to the old Japanese admonition to eat at least 30 different whole-food ingredients every day, to ensure that our diets include a wide variety of foods.



Different coloured fruit and vegetables contain different plant compounds called flavonoids and just as plant fibres help the microbiome thrive, so do the flavonoids and other phytonutrients found in brightly coloured vegetables, fruits, herbs, and spices. These are also thought to encourage diversity in the gut microbiota and helps to control inflammation.

Prebiotics is the name for the food that feeds our probiotics or 'good' bacteria. Particularly prebiotic foods include Jerusalem artichokes, asparagus, under-ripe bananas, Brussels sprouts, chicory root, dandelion greens, raw garlic, leeks, legumes, onions, and peas.

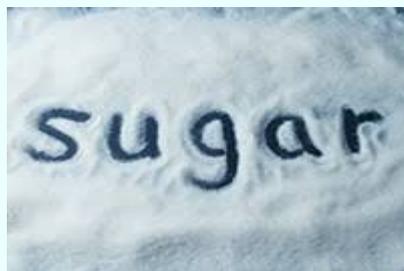
Whole grains also contain lots of fibre and non-digestible carbohydrates, such as beta-glucan. These carbohydrates are not absorbed in the small intestine and instead make their way to the large intestine where they are broken down by the microbiota and promote the growth of certain beneficial bacteria. Whole grains can promote the growth of the beneficial Bifidobacteria, lactobacilli and bacteroidetes in humans.

Fermented foods are foods altered by microbes. The process of fermenting usually involves bacteria or yeasts converting the sugars in food to organic acids or alcohol. Examples of fermented foods include: Yogurt, Kimchi, Sauerkraut, Kefir, Kombucha and Tempeh. Many of these foods are rich in beneficial lactobacilli species and other living organisms and it is thought that people who eat a lot of yoghurt appear to have more lactobacilli in their intestines and a number of studies have shown that yogurt consumption can beneficially modify the intestinal bacteria.

Beans, lentils and other legumes are particularly high in fibre and as with other plant based foods, this is thought to feed the beneficial gut bacteria, however, if beans and lentils make you very windy, it's a good indication that you may have a gut bacterial imbalance and the unfriendly bacteria are fermenting the fibre, rather than the good bacteria having a chance to feed on it.

Sugar in the Diet

Sugar, sugar containing foods and refined carbohydrates are the main fuel for the less beneficial, opportunistic bacteria. Eating a diet which contains a lot of sugar especially in the absence of fibre strengthens E. coli and other bacteria that feed on it.



Unfortunately, artificial sweeteners are not a good alternative. While these don't actually feed the opportunistic bacteria, some studies have shown that they can negatively affect the gut microbiota. In fact, studies on both animal and human models have found negative changes in the microbiome. One study which looked at rats fed on aspartame had higher levels of Clostridium and Enterobacteriaceae in their intestines, both of which are associated with disease when present in very high numbers.



Anti-biotics

Anti-biotics are invaluable for treating life threatening infections. However, using them for routine problems can deplete our bodies of beneficial bacteria and allow the unfriendly bacteria to proliferate. When anti-biotics are necessary, it is worth considering protecting the microbiota with probiotics supplements. Do discuss this with your doctor or consultant.

Proton Pump Inhibitors

Proton Pump Inhibitors (PPIs) reduce the amount of hydrochloric acid secreted in the stomach and raise the pH of the stomach making it less acidic. Clinically, they are used to reduce the symptoms of hyperacidity (too much stomach acid) and acid-reflux, however by creating a more neutral pH they also enable more bacteria ingested with our food to survive, and create disturbances in the delicate GI microbiota. Recent research published in the British Medical Journal has found that 'PPIs are consistently associated with changes towards a less healthy gut microbiome and that this can lead to an increased risk of infection, such as *Clostridium difficile* and a general over-growth of pathogenic species of bacteria and can potentially explain the increased risk of enteric infections in PPI users'. It is thought that the effects of PPIs on the balance of the microbiome are more prominent than the effects of antibiotics or other commonly used drugs.

Exercise and Stress

Other factors that affect the microbiome balance include exercise and stress. Studies show that people who are active have healthier microbiomes than those who are more sedentary and exercise has been shown to lead to an improvement in the composition and diversity of gut bacteria.



Exposure to stress has been found to lead to changes in composition, diversity and the number of gut microorganisms. The bacterial communities in the intestine become less diverse, and have greater numbers of potentially harmful bacteria. It is thought that stress relieving techniques may be beneficial in protecting the balance of the microbiota.



Types of Probiotic Supplements

Probiotics supplements are usually freeze dried beneficial gut bacteria in capsule form, although some are liquid. There is a baffling array of products on the market. When choosing a probiotics supplement, first discuss its use with your GP or consultant, particularly when immune compromised.

It is important to make sure that the product you are choosing is 'safe' and contains human strains of 'good' bacteria from a company that has an excellent research and safety record. Make sure that the brand that you chose comes with a guaranteed potency to the end of the product's shelf life. Choose a product that is free of unnecessary fillers and ingredients (probiotic yoghurt drinks are often full of sugar or artificial sweeteners, so you are feeding the bad guys as well as replacing the good guys) and choose a product that also contains dietary fibres (inulin or FOS) to help feed the good gut bacteria as well as repopulating. Probiotics supplements have specific uses, so choose the right product for the specific person (i.e. babies, children, adults or the elderly).

So in Summary

- ✓ Eat a diet rich in fruit, vegetables, beans, lentils and wholegrains.
- ✓ Reduce sugar and artificial sweeteners.
- ✓ Reduce refined carbohydrates and hidden sugars.
- ✓ Get the right amount of exercise.
- ✓ Include pre-biotic foods in the diet.
- ✓ Include fermented foods in the diet.
- ✓ Be conservative with anti-biotic use and replace the 'good' bacteria afterwards with a probiotic supplement.