

Our Amazing Microbiology

The glycosaminoglycan (GAG) layer of the bladder wall, and how it prevents disease. Is the process similar in the vagina and colon?

The body's innate wisdom and defence system is a marvel, a complete wonder, and to this day is not always well understood by the medical profession. Over recent years, science has been proving what the ancients, medicine men and women, yogis, herbalists, and even our grandmothers have known, intuitively, and by knowledge passed down.

Our body's soldiers fight the good fight on a daily basis. We can either choose to be an ally, by working with and training alongside the body's wisdom and natural defence system, by choosing a lifestyle that supports it, or we can be an antagonist and in complete opposition to our natural defence system that is trying to protect us on a daily basis.

One such defence system is the glycosaminoglycan, or GAG, layer of the bladder wall. This system is almost like a state of the art system that not only protects against pathogens and irritants but has the ability to fight them as well.

This Glycosaminoglycan, or GAG, layer is a mucus layer covering the epithelium and creates a barrier between urine and irritants and the underlying bladder wall. This surface layer is also composed of oligosaccharides.

Women suffering from UTI's is on the increase, and while it is standard treatment to reach for the antibiotics, these are weakening the defence systems further, not only in the bladder but the whole body, and, tragically, the environment, (as they are passed out of the body, down the toilet, and into our water ways).

To understand how this GAG layer prevents disease, we must look at the **whole** picture. We must get back to the practice of keeping healthy and not just 'slapping a band aid' on something that will continue to fester.

This GAG layer or mucus membrane covers the epithelial lining layer. Our 'good guys', beneficial bacteria, form a bio film. They cover the cell wall and feed on the mucus. The preferred food source of the beneficial species is the glycosaminoglycans that are a form of oligosaccharides. The 'good guys', the Lactobacillus species, feed on this layer and they do so without destroying it.

However, if pathogenic bacteria do make their way in, they disrupt the normal microbiota of the urinary tract system, the lactobacillus species start to leave and the pathogenic species just become more powerful and prolific. The pathogenic species however don't just feed on this mucus layer like the lactobacillus, they destroy it, not all of it, but in parts where they set up camp. They secrete a substance that literally burns holes in the layer.

The bladder likes an acidic environment, the lactobacillus like an acidic environment as it is more- friendly. So, the lactobacillus normalizes the GAG layer in the bladder wall. As the lactobacillus grow and feed in this friendly environment they start to crowd out the pathogens and once again create that rich surface layer that protects the bladder wall. It is all about restoring the microbiology to bring the bladder back to health. The port of call for the medical system is antibiotics. This can often help, particularly with a severe infection but it also wipes out the good bacteria as well as the bad bacteria and leaves the woman very vulnerable for future UTI's, as the microbiology has been completely altered and destroyed.

So, if it's about restoring the microbiology that is responsible for the mucus layer in the bladder, (the vagina, bladder and bowel all have similar workings with this microbiota), however, it is in the bladder we have this mucous membrane, we also have it in the gut. If it is also in the vagina and colon, why then, is it not being looked at as a whole?

They have tried instilling probiotics into the bladder but they do not persist, nor do they persist in the vagina. We live in a sea of friendly micro-organisms, collaborating and working in unison to provide a strong and healthy body. Rather than putting in or taking synthetic and pharmaceutical products that do not focus on restoring this system, we can literally give the body, the prebiotics it needs to fully restore equilibrium.

The lactobacillus feed on this GAG layer creating a rich environment not only for the bladder, but also for the vagina and colon. The lactobacillus builds the biofilms that normalize the tissues. The mucus membranes are cultured by these beneficial species, remembering that it is the oligosaccharides that feed the microbiota in the gut which then in turn feed and balance the microbiome of the bladder, vagina and colon. So, we also need to pay attention to our diet. To treat ourselves as a whole, **nothing** is ever separate. Literally it is now coming to light what the sages, wise men and women and naturopaths have known for a long time, 'we are what we eat', and I am going to go a little more and say 'we are also what we think'. As stress plays a big part in diminishing our friendly bacteria environment and inner home.

After a course of antibiotics for an infection, often a woman will then take a course of probiotics to rebuild the microbiology as she is often left with thrush. These however, are not the answer to rebuilding the microbiology of the bladder.

It has been known that glycogen was a food source for lactic acid producing bacteria that colonized the vagina from the outside environment, they knew these migrated to the bladder walls as they fed on glycosaminoglycans. The glycosaminoglycans attract the lactobacilli which form a rich surface layer which protected the bladder wall from pathogens that were capable of compromising and even dissolving the GAG layer.

The doctors of old knew that women suffering from UTI's had specific alterations in their vaginal microbiota, namely a decrease in Lactobacillus. It was known that this microbiology protected against pathogens which create disease in the body, even something as 'simple' as UTI's. In other words, when the natural healthy microbiome is disturbed it makes room for more serious diseases.

We are in the prime position to assist our body in creating more of what we just naturally have. Our wise gut which goes well beyond the 'gut feeling'!!

Our gut bacteria educate our immune cells, we are literally what we eat! When there are shifts in the intestinal population of good bacteria, it makes way for pathogens to move in, making room for everything from allergies, obesity and colon cancer.

When we eat a natural and balanced diet, one that our great grandmothers used to eat, we consume the pesticide free and prebiotics or non-digestible oligosaccharides that produce the fermentation pattern that stimulates the increase of the good guys, lactobacillus and bifidobacterial, we are a more protected and strong human being. We set up our health starting from the mouth then the gut, which then in turn helps to build and sustain the microbiota in the vagina, bladder and colon. The bladder mirrors the vagina and when the vagina is healthy with lactobacillus, the nutrients and healthy microbiome move through the tissues and create health for the bladder also.

We are a unique system that the medical system may never fully understand, either by choice, whereby the dollar dictates studies, or simply because the body is so complex and intricate that maybe it will to a certain extent always be a wonder.