



## Population: In the Trillions

This book began as a series on science for surfers. But guys kept saying, "Science is fine, but how do I help my girlfriend have an orgasm?" and women would want to know about "The science of giving my BF a blowjob without having to swallow." So I've been subtle about science, until now.

The health of every woman's vagina depends on a complex world of bacteria and other organisms that's called a microbiome. But few women or men have ever heard of this.

Before you say "Ewww, bacteria in vaginas," a male who weighs 155 lbs. has almost 40 trillion bacteria in his body. And it's not because he smells gross and doesn't bathe. The idea that we should be germ-free has been promoted by companies that sell antibacterial soaps and women's douche products that feature talking vaginas.

Without the bacteria and microorganisms that are so important for vaginal health, a guy would never be allowed near a woman's vagina. And if women understood how important the microorganisms in their vaginas are, they might be more cautious before buying sex lubes and "feminine hygiene" products that could be acting like Agent Orange.

### Acidity

Except for humans, the vaginas of almost all mammals have a pH that's close to 7. This means the pH is neither acidic nor alkaline. But with humans, it's different. The pH is neutral until a girl reaches puberty. Then the pH of her vagina becomes acidic and stays that way until she reaches menopause, when it becomes almost neutral again.

The acidity in a woman's vagina is maintained by an ecosystem of microorganisms called a microbiome. Microbiomes are communities of bacteria and other tiny organisms that live inside of our bodies. They are as important as our chromosomes and blood cells. They produce substances that prevent infections and reduce inflammation. They help digest complex carbohydrates, and when the cells in our bodies are injured, they signal nearby cells to begin reproducing so we can heal more quickly. Our immune systems would be crippled without them.

## Changes in Thinking

Not long ago, physicians believed that the microbiomes in all healthy vaginas were alike—as if there was one universal way every woman’s vagina should be. We now know that there are five distinct communities of microorganisms that can live in a woman’s vagina. While these communities are fairly stable in some women, they can transition frequently in the vaginas of other women. This means that different communities can become more prevalent at different times.

It might seem like there would be more infections in women whose vaginal communities transition frequently, but that does not appear to be the case. Researchers are just beginning to find out about the different ecosystems that are inside of women’s vaginas.

## Lactobacilli

One of the most important residents in the human vagina is a group of bacteria called lactobacilli. Humans are the only animals (including the great apes) who have lactobacilli as the dominant organism in their vaginas. We don’t yet know the answer why.

There are many different species of lactobacilli in the world, such as those that are used to make yogurt, beer and sourdough bread. But the families of lactobacilli that live in the human vagina are unique. The only place they exist on the entire planet is between a woman’s legs.

Lactobacilli in the vagina produce lactic acid and an antimicrobial compound called bacteriocin. These help kill or control undesirable bacteria, and the lactic acid helps to maintain an acidic environment that’s essential for healthy functioning. The lactobacilli also have tiny projections that stick out from their cell bodies. These projections clasp onto the cell walls of the vagina and prevent germs from attaching at these points.

Women who are low in vaginal lactobacillus are more likely to get sexually transmitted infections if they are exposed to them, including HIV. They are at greater risk for having miscarriages, premature babies, and suffer from pelvic inflammatory disease. This is one of the reasons why an important area of research is in how to supplement vaginal lactobacillus when it is low. The solution has proven to be nowhere near as simple as it might seem.

### **When There are Too Few Lactobacilli**

Lactobacilli keeps the pH in the vagina low, which helps keep out unfriendly bacteria that can cause infections. When the population of lactobacilli is disturbed, the stage is set for infections and conditions that can cause itching, burning, odor and discharge.

Let's say a woman starts taking antibiotics for a lung infection. This kills off the unfriendly bacteria in her chest, but it also begins to kill the Lactobacilli in her vagina. As a result, the lactic acid in her vagina will decrease and the alkalinity will increase. The population of the friendly bacteria will begin to collapse.

As the population of the lactobacilli decreases, another of its by-products (hydrogen peroxide) will be in short supply. With less hydrogen peroxide, unfriendly bacteria will have an easier time taking up residence. Also, the Lactobacilli that was protecting the walls of the vagina will weaken. Anaerobic bacteria can more easily invade the cell walls and a woman may get a condition called bacterial vaginosis or BV.

### **Why Yogurt Usually Won't Help**

Lactobacilli is found in yogurt, so you would think that eating a lot of yogurt or plastering it between a woman's legs would help her infection go away. But the kind of yogurt that's in milk is very specific to cow intestines. While yogurt might be good for a woman's calcium intake and maybe for her digestion, the yogurt we eat is unlikely to help with problems in the vagina.

Researchers are hoping to find specific microorganisms called probiotics to treat conditions like bacterial vaginosis. This would provide a much more elegant solution than we currently have. But it is possible that each woman will need a unique combination of probiotics to compliment the mix of bacteria in her vagina.

### **Too Many Lactobacilli**

Another problem can occur when the population of lactobacilli begins to explode and produces too much lactic acid. Natural sugars start being fermented into carbon dioxide, alcohol, formic acid and acetic acid. This fermentation process is not dissimilar to how beer is made. But it causes itching and irritation when it happens inside the vagina.

This can cause the same symptoms as a yeast infection, including itching, burning, painful intercourse and a slight discharge. As a result,

it is often misdiagnosed as a yeast infection. This is why a woman who is having problems needs both a sharp gynecologist and a good knowledge of how her vagina works. Over-the-counter drugs for yeast infections won't touch these kinds of situations.

When a woman really does have a yeast infection, it is commonly referred to as Candida. Another type of infection is caused by a protozoa known as Trich or *Trichomonas vaginalis*. There's also Noninfectious Vaginitis. Instead of being caused by organisms, the source of irritation for Noninfectious Vaginitis can be anything from feminine hygiene spray and body soap to premium toilet paper, laundry detergent, bike-seat irritation, and period gear.

### **Why a Vagina with an Infection Will Sometimes Smell Fishy**

When the levels of lactic acid go down, anerobic bacteria can start to flourish. This kind of bacteria is responsible for the smell of bad breath, smelly feet, and Limburger cheese. A fishy smell is also caused by the cellular death and destruction that's going on in the vagina as part of the body's efforts to make things right again.

### **Fluctuations in pH**

There are times when the pH in a woman's vagina will briefly rise. This can happen when she's having her period, with the pH rising to around 6 which is close to neutral. It will also go up for a few hours after a woman has had intercourse. That's because semen is alkaline and contains buffers that help keep it alkaline, which will cause the pH of the vagina to climb. A woman's own sexual lubrication can make the pH climb.

### **On the Distant Horizon**

Researchers are looking at how a mother passes her vaginal microbiome to her infant daughter during the birth process, and the lifetime significance of this.

Some women have vaginal microbiomes that predispose them to infections, which could also predispose their daughters to vaginal infections. So there might someday be supplemental microbiomes that physicians can give to moms or to baby girls that could result in fewer vaginal infections throughout the girl's entire lifetime.

Products will also be created based on a woman's own unique microbiome that will help prevent her from getting infections and possibly even cancer.

### **Beware the Health Food and Vitamin Industry Probiotic Hype**

The top researchers in the world are just beginning to create probiotics that will be helpful for human vaginas. The going has been slow and success has been illusive. But you wouldn't know that from the health food and vitamin industry hype on their latest and greatest probiotic pills and crotch goop. It sounds pretty good when they say one dose delivers several billion lactobacilli—never mind that these are the wrong lactobacilli.

The health food and vitamin industries can claim anything they want as long as they include a tiny asterisk with the words "This product has not been evaluated by the Food and Drug Administration. It is not intended to diagnose, treat, cure or prevent disease." Nuff said?

### **Are Sex Lubes 'Biome Busters'?**

The billion dollar sex lube industry wants women to put products inside of their vaginas that have never been tested for their impact on the vaginal microbiome or for their longterm safety. Research on this is in its infancy. *For more on this, see Chapter 22: Sex Lubes.*



*Dear Paul,*

*My partner loves me to finger her vagina. But after a few minutes, my fingers start to sting. Do you know what's up with that?*

*Bernie from Vermont*

Dear Bernie,

This is because your partner's vagina is acidic, which is perfectly normal and healthy for a woman who hasn't reached menopause. To help with the stinging, you might try wearing a latex or nitrile glove. Some women prefer being fingered this way, because a gloved finger feels smoother than a finger that isn't gloved.

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