



Vaginal Microbiome Report

Suite 1020 Calgary Place Tower 1
330- 5th Avenue SW, Calgary, AB

3151 27 St NE Calgary, AB, T1Y 7J8

Tel: 403.250.2221

Email: Info@bioaro.com

www.bioaro.com

Patient Information:

Name:	Sunita Sharma	Sample Type:	Vaginal swab
Gender:	Female	Collection Date:	13 March, 2024
Date of Birth:	31 Jul, 1989	Report Date:	20 March, 2024
ID:	P3529	Patient's Address:	32, Oak Steet

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What is the vaginal microbiome, and why is it important for your health?

The complex ecosystem of bacteria, fungi, and other microorganisms that reside inside the vagina is referred to as the vaginal microbiome (also known as the vaginal microbiota or vaginal flora). The vaginal microbiome is fundamental for women's health. The vaginal microbiome greatly impacts the reproductive system and general health.

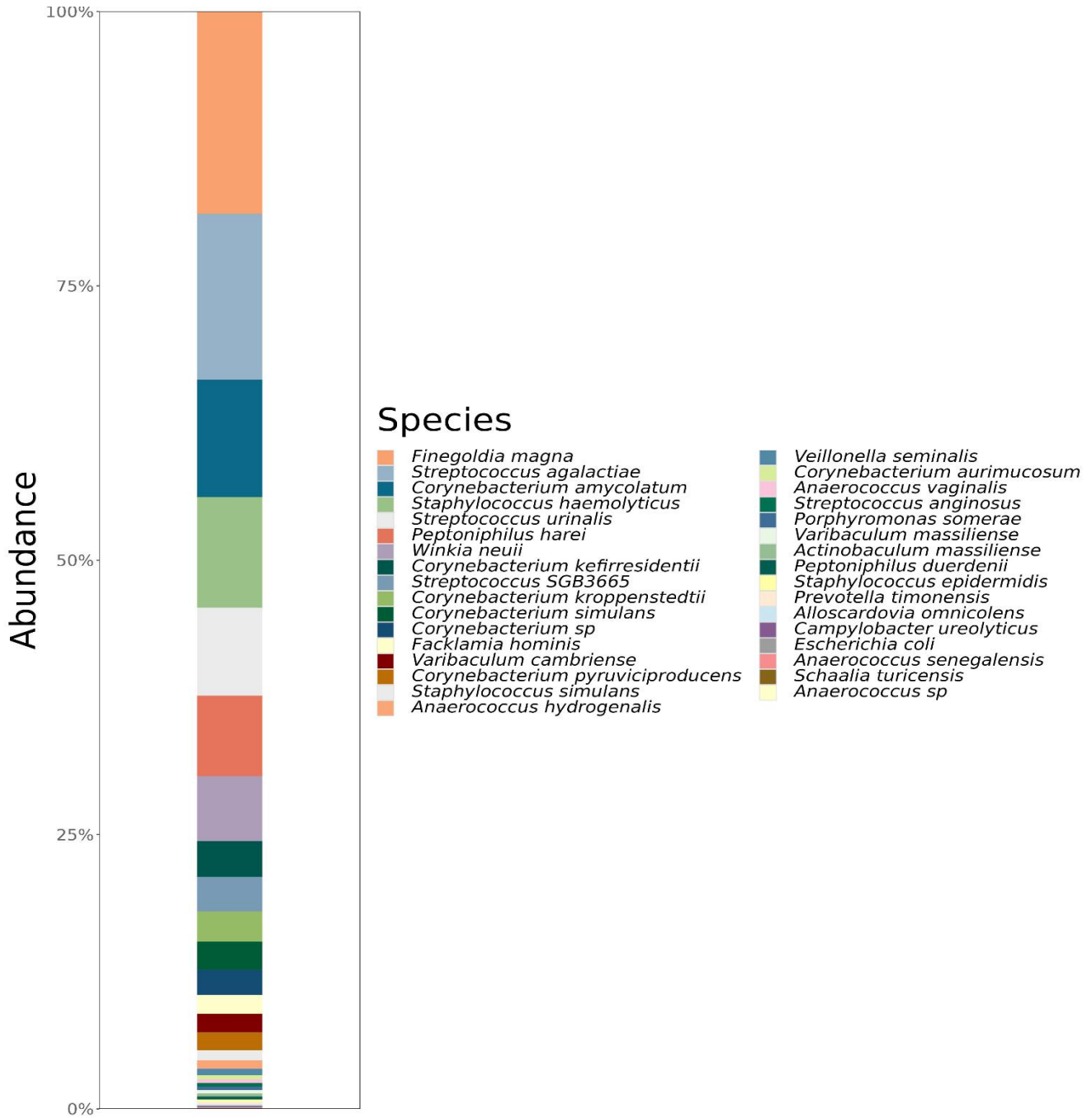
Over 90% of cases of vaginal discomfort, which are the main reason women seek medical attention, can be traced back to imbalances in the vaginal microbiome. Yeast infections, bacterial vaginosis (BV), cytolytic vaginosis (CV), aerobic vaginitis (AV), and other conditions can be signs of imbalances in the vaginal microbiome. However, the effects of vaginal microbiome extend far beyond vaginal health. Additionally, it is linked to infertility, pregnancy complications, STIs, and potentially even cancer is an unbalanced vaginal microbiome.

This comprehensive examination generates a detailed report outlining microbial composition. Beyond identification, this analysis detects genes related to antibiotic resistance, aiding healthcare professionals in determining effective antibiotic treatments for infections.

The report lists the types of microbes and provides detailed information about potentially harmful ones. It gives insights into their identity and genetic traits, helping us understand more about the microbes living in the vagina.

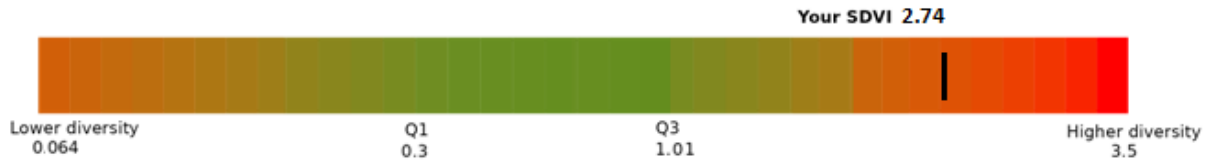
For Important Terms and More Information, please refer to the Appendix.

What is the composition of your microbiome?



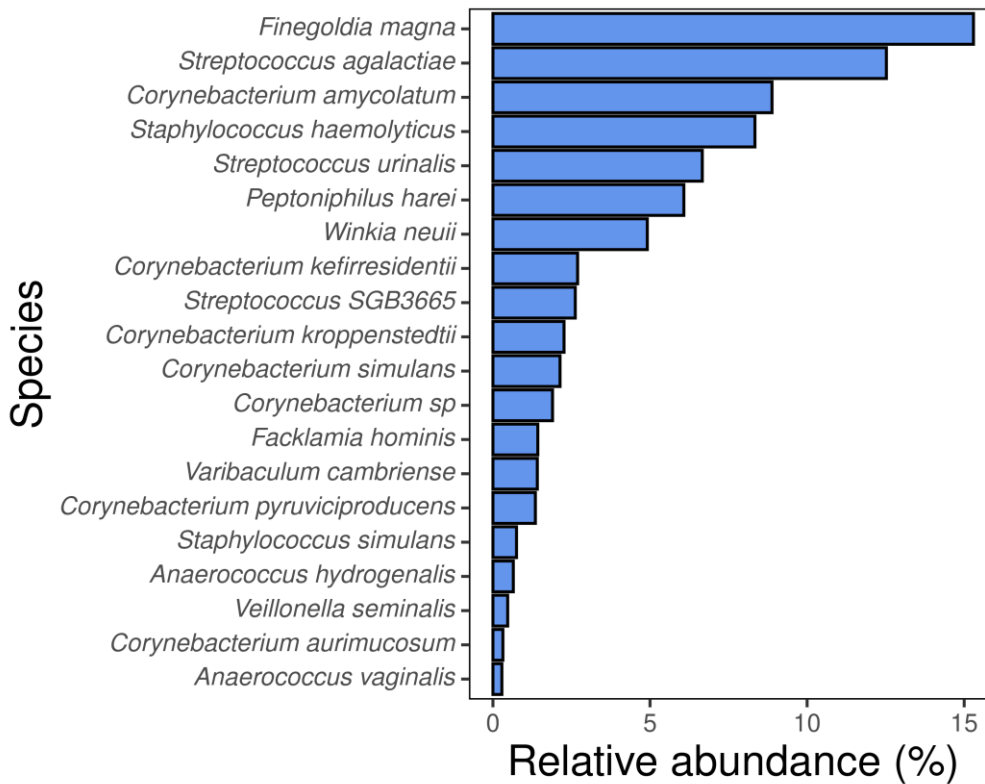
Note: Text in bold indicates keystone species

What is the diversity value of your gut microbiome and why is that important?



Vaginal microbiome diversity is crucial for women’s health. A healthy vaginal microbiome is dominated by *Lactobacillus* spp. and low diversity. High diversity of vaginal microbiome profile is correlated with either dysbiosis or peri/ postmenopausal vulvovaginal symptoms, especially due to the decreased amounts of hormones, particularly estrogen and progesterone. The **Shannon Diversity Index Value (SDIV)** is a metric used to evaluate this diversity, typically within a healthy range. This microbial balance in the vagina is essential for preventing infections. The SDIV for a healthy vaginal microbiome reference cohort is in the range of **0.2 to 1.01**. Your gut microbiome has an SDVI of **2.74**, which is indicative of a healthy microbiome diversity.

Which are the most abundant members of my vaginal microbiome?



This table provides important details about the **top 10** organisms in your vagina, including their roles, impact on health, and suggestions for lifestyle changes.

Scientific Name	Abundance (%)	Reference Range (%)	Significance
<i>Fingoldia magna</i>	15.29%	0.00% -0.20%	Gram-positive anaerobic cocci <i>F. magna</i> is found mainly in the mucosa and is suspected of bacterial vaginosis and soft tissue infections (Urushiyama et al., 2021).
<i>Streptococcus agalactiae</i>	12.52%	ND	<i>Streptococcus agalactiae</i> are commonly found on the skin and female genital tract. These bacteria can cause infections such as trichomonas, candidiasis, and bacterial vaginosis (Savini et al., 2013).
<i>Corynebacterium amycolatum</i>	8.88%	ND	<i>Corynebacterium spp.</i> Commonly found on skin and mucous membranes in humans. Endocarditis, bacteremia, sepsis, wounds, vaginitis, and respiratory and urinary tract infections have all been linked to <i>C. amycolatum</i> (Chen et al., 2015).
<i>Staphylococcus haemolyticus</i>	8.33%	ND	This bacterium is seen in the areas of perineum, axillae, and inguinal areas and is responsible for systemic or local infection (Alwaily et al., 2022).
<i>Streptococcus urinalis</i>	6.66%	ND	<i>S. urinalis</i> belongs to the streptococcus group B. The increased prevalence of this organism is responsible for the localized inflammation of soft tissues and skin. These bacteria release toxic metabolites that cause pus and abscesses (Diop et al., 2020).
<i>Peptoniphilus harei</i>	6.07%	ND	Peptoniphilus sp. is associated with polymicrobial infections. It is genetically closely associated with <i>P. vaginalis</i> (Wang et al., 2022).
<i>Winkia neuii (Actinomyces neuii)</i>	4.91%	ND	This bacterium is generally found in the urogenital tract in females (Könönen et al., 2015).
<i>Corynebacterium kefirresidentii</i>	2.69%	ND	It is a lipophilic bacteria seen in the sweaty regions of the body (Salamzade et al., 2023).
<i>Streptococcus SGB3665</i>	2.62%	ND	The function of this unclassified streptococcus in the vagina is unknown.
<i>Corynebacterium kroppenstedtii</i>	2.26%	ND	<i>Corynebacterium kroppenstedtii</i> is recently discovered bacterium. The function this bacterium in vagina is still unknown (Wong et al., 2018)

Note: A healthy microbiome in the vagina enriched with *Lactobacillus spp.* and low microbial diversity.

Condition-specific microbial markers

What is a biomarker?

The Food and Drug Administration defines a biomarker as a measurable characteristic to tell how the body is doing and overall health. It is a measurable indicator or characteristic that can be objectively assessed and used as a signpost for biological processes, conditions, or diseases in the body. In the context of the vaginal microbiome analysis, biomarkers are specific molecules, genes, or organisms found in the microbiome that can signal various aspects of vaginal health, disease risk, or treatment response.

Biomarkers in the vaginal microbiome analysis can serve several purposes:

- **Health Assessment:** Indicates the overall vaginal health status. For instance, the presence or absence of certain bacteria or microbial metabolites can be indicative of a healthy or diseased vaginal environment.
- **Disease Identification:** Specific biomarkers might be linked to certain diseases or conditions. Changes in the abundance or diversity of certain microbial species could signal conditions like bacterial vaginosis, thrush, STDs such as gonorrhea, or metabolic changes.
- **Treatment Efficacy:** Can be used to assess how the vaginal microbiome responds to treatments or interventions.
- **Predictive Indicators:** Serve as predictive markers, indicating an individual’s susceptibility to certain diseases or response to treatments based on their unique microbial profile.

Identifying and understanding these biomarkers can provide valuable insights into women’s health, disease mechanisms, and personalized approaches for improving vaginal conditions.

Microbial markers for bacterial vaginosis

Reduced abundance in *Lactobacillus* spp. and higher levels in other microbial markers in the table are associated with bacterial vaginosis.

Microbial marker	Relative abundance (%)	Reference Range (%)
<i>Lactobacillus</i> spp.	ND	35.37% - 80.51%
<i>Veillonella montpellierensis</i>	ND	ND
<i>Veillonella atypica</i>	ND	ND
<i>Fannyhessea vaginae</i>	ND	ND
<i>Gardnerella vaginalis</i>	ND	0.36% - 13.44%

Microbial markers for sexually transmitted diseases

Reduced abundance in *Lactobacillus* spp. and higher levels in other microbial markers in the table are associated with sexually transmitted diseases.

Microbial marker	Relative abundance (%)	Reference Range (%)
<i>Lactobacillus</i> spp.	ND	35.37% - 80.51%
<i>Chlamydia</i> spp.	ND	ND
<i>Neisseria gonorrhoeae</i>	ND	ND
<i>Treponema pallidum</i>	ND	ND
<i>Human Immunodeficiency Virus</i>	ND	ND
<i>Herpes simplex virus</i>	ND	ND
<i>Human papillomavirus</i>	ND	ND
<i>Hepatitis B virus</i>	ND	ND
<i>Cytomegalovirus</i>	ND	ND
<i>Trichomonas vaginalis</i>	ND	ND

Microbial markers for miscarriage

Reduced abundance in *Lactobacillus* spp. and higher levels in other microbial markers in the table are associated with miscarriage.

Microbial marker	Relative abundance (%)	Reference Range (%)
<i>Lactobacillus</i> spp.	ND	33.00% - 77.98%
<i>Gardnerella vaginalis</i>	ND	0.36% - 13.44%
<i>Atopobium vaginae</i>	ND	ND
<i>Chlamydia trachomatis</i>	ND	ND
<i>Ureaplasma</i> spp.	ND	0.00% - 0.71%
<i>Prevotella</i> spp.	0.18%	0.00% - 0.20%
<i>Megastrobila</i> spp.	ND	ND
<i>Cyclospora</i> spp.	ND	ND

Microbial markers for stillbirth

Reduced abundance in *Lactobacillus spp.* and higher levels in other microbial markers in the table are associated with stillbirth.

<i>Microbial marker</i>	<i>Relative abundance (%)</i>	<i>Reference Range (%)</i>
<i>Lactobacillus spp.</i>	ND	35.37% - 80.51%
<i>Escherichia coli</i>	0.05%	0.00% - 0.31%
<i>Shigella spp.</i>	ND	ND
<i>Staphylococcus spp.</i>	9.28%	ND
<i>Gardnerella spp.</i>	ND	0.36% - 13.44%
<i>Listeria spp.</i>	ND	ND
<i>Bacteroides spp.</i>	ND	ND

Microbial markers for preterm birth

Reduced abundance of these microbial markers is associated with preterm birth.

<i>Microbial marker</i>	<i>Relative abundance (%)</i>	<i>Reference Range (%)</i>
<i>Lactobacillus gasseri</i>	ND	0.00% - 5.56%
<i>Lactobacillus crispatus</i>	ND	33.00% - 77.98%
<i>Lactobacillus iners</i>	ND	9.11% - 59.74%
<i>Lactobacillus jensenii</i>	ND	3.24% - 21.93%

Microbial markers for infertility

Reduced abundance in *Lactobacillus spp.* and higher levels in other microbial markers in the table are associated with infertility.

<i>Microbial marker</i>	<i>Relative abundance (%)</i>	<i>Reference Range (%)</i>
<i>Lactobacillus spp.</i>	ND	35.37% - 80.51%
<i>Atopobium spp.</i>	ND	ND
<i>Aerococcus spp.</i>	ND	ND
<i>Bifidobacterium spp.</i>	ND	0.00% - 6.99%

Antimicrobial resistance genes and virulence factors in vaginal microbiome

Organisms in your vagina were found to carry antimicrobial resistance genes (ARGs) such as methyltransferases (MLS), Cationic antimicrobial peptides, beta lactams, drug and biocide resistance and phenolic compound resistance (for the relevant coverage and depth). Some antibiotic resistance genes are also found in healthy profiles.

We also found very few pathogenic proteins in your vagina out of which the prominent was from *Streptococcus agalactiae*. It is important to note that certain pathogens and the proteins associated with them are found in normal vaginal microbiome and therefore, can function as opportunistic pathogen.

Overall lifestyle recommendations

Taking care of vagina involves fostering an environment where beneficial bacteria thrive while keeping harmful ones in check. Making small but impactful lifestyle changes can significantly enhance the diversity and health of vaginal microbiome. Here are some recommendations along with practical tips to help improve vaginal health.

Lifestyle Recommendations:

- **Hygiene:** It is important to clean the vulvovaginal region by using pH-balanced feminine washes. Do not douche vagina.
- **Clothing:** Use clean cotton underwear daily for better hygiene.
- **Panty liners:** Use pantyliners to absorb vaginal discharge to stay clean and dry.
- **Stay Hydrated:** Drink plenty of water throughout the day to support overall vagina function as it helps in flushing out toxins. Avoid drinks containing plenty of sugars, as they can interfere with the vaginal microbiome.
- **Safe sex:** Practice safe sex to maintain the health of the vagina and its microbiome.
- **Tampon/Sanitary pads:** Change your sanitary product every 6-8 hours during menses. Use odor-free products.
- **Menstrual cups:** During periods, menstrual cups should be emptied and washed twice. They should also be sterilized and stored according to the manufacturer's instructions.
- **Limit Antibiotics Use:** Only take antibiotics as prescribed by a healthcare professional to avoid disturbing the balance of vaginal bacteria.
- **Avoid Smoking and Excessive Alcohol:** Minimize or avoid smoking and excessive alcohol consumption to protect and nurture your vaginal microbiome.

By embracing these simple yet effective lifestyle adjustments, you can cultivate an environment in your vagina that encourages the growth of beneficial bacteria, ultimately supporting a healthier vagina and overall well-being.

Note: The analysis is based on the results generated by Metaphlan4 (Metagenomic Phylogenetic Analysis) and PFI (Pathogen Fast Identifier) software. It is not suitable for diagnostic use or STD screening. Kindly consult with a physician or gynecologist for interpretation. To arrive at meaningful conclusions, all results and inferences should be clinically correlated with the signs and symptoms. Additionally, pathogenic bacteria or other organisms not detected or tested in this analysis might be present as part of the microbiome. Please consult your family physician if you experience symptoms and require medical care.

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