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Probiotics For Women's Reproductive Health

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Abstract

A Healthy Vaginal Microbiota Is Required To Regulate A Balanced Vaginal Health Which Depends On Internal And External Factors. Any Alteration In This Homeostatic Mechanism Leads To Dysbiosis. The Composition Of Vaginal Microbiota Can Change At Different Stages Of Women's Life From Infancy, Puberty, Pregnancy, And Menopause. The Other Common Factors That Cause The Temporal Alterations In Human Vaginal Microbiota Are Hormonal Changes, Uncontrolled Usage Of Antibiotics, Menstruation, And Vaginal Douching Etc. Lactobacillus, By Secreting Compounds Such As Lactic Acid, Hydrogen Peroxide And Bacteriocins Helps In Directly Killing The Pathogen. A Probiotic Lactobacillus Species Reinforce The Defense Against Invasion And Colonization By Opportunistic Pathogens That Cause Vaginal Infections. It Provides Several Health Benefits To The Host And Provides Effective Preventive And Therapeutic Strategies To Improve Women's Health.

Key Words: Vaginal Microbiome (Vmb), Lactobacilli, Probiotics, Reproductive Health.

Introduction

A Healthy Vaginal Microbiome (Vmb) Is Defined As A Community Of Commensal, Symbiotic And Pathogenic Microorganisms That Colonize The Vagina That Is Associated With Good Reproductive Health (Pawel Laniewski, Melissa Herbst-Kralovetz, 2018). Skin Commensals And Microbiome Normally Inhabiting The Bowel Are The Original Colonisers Of The Young, Healthy Female Vagina. Aerobic Lactobacilli Persist In The Vagina For Weeks After Birth While The Vaginal Ph Remains Acidic. The Ph Of The Vagina Converts To Neutral During Early Childhood, Remains Until Puberty. A Plethora Of Different Microbial Species Co-Exist In This Vaginal Ecosystem Of Which 70 To 90 Percent Are Lactobacilli. During Puberty And Menarche, Dramatic Hormonal And Physical Changes Occur In The Vaginal Environment Favouring The Colonisation Of Lactobacilli (Birley *Et Al.*, 2002).

The Vmb Changes During Menstruation, Smoking And Intercourse. Hygienic Habits And Practices Have Significant Impact On Tthe Vmb Composition. In Women, At A Healthy Reproductive Age, The Vmb Is Dominated By *Lactobacilli*. These Bacterial Communities Can Vary Considerably Between Individuals Over Time. *Lactobacillus*-Dominant Vmb Are Associated With Vaginal Health. The Disruption Of The Vmb Results In Several Infectious Diseases Like Vaginitis And Sexually Transmitted Infections (Paweł Łaniewski, Melissa Herbst-Kralovetz, 2018).

Vaginal Biome

The Community Of Microorganisms That Lives Interior Or On The Outer Surface Of Human Body Forms Human Microflora/Microbiota And Their Genomic Constitution Is

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Referred To As Human Microbiome. The Human Microbiota Usually Involves Symbionts That Are Benefitting From The Host, But In Turn May Not Affect (Commensalism) Or May Affect Positively (Mutuality) And Negatively (Pathogenic) The Functioning, Immunity And Nourishment Of Host (Martin, 2012). Individual Microbiome Achieved During Birth Changes Throughout The Life, Indicating Microbiome Specificity. In Vagina, The Sharp Co-Operative Relationship Of Microbes With The Host Provides First Line Of Defence Against The Migration Of Opportunistic Pathogens. This Healthy Balance Is Referred To As Eubiosis (Farage & Maibach, 2006).

Diseases Associated With Vaginal Tract

Aerobic Vaginitis (Av)

It Is A Form Of Vaginitis First Described By Donders Et Al. In 2002. It Is Characterized By A More Or Less Severe Disruption Of The Lacto Bacillary Flora, Along With Inflammation, Atrophy, And The Presence Of A Predominantly Aerobic Microflora, Composed Of Enteric Commensals Or Pathogens (Donders *Et Al.,* 2017). Women With Aerobic Vaginitis Usually Present With A Thinned Reddish Vaginal Mucosa, Sometimes With Extensive Erosions Or Ulcerations And Abundant Yellowish Discharge (Without The Fishy Amine Odour, Typical Of Bacterial Vaginosis). The Ph Is Usually High. Symptoms Can Include Burning, Stinging And Dyspareunia. In High Percentage It Is Associated With Other Infections. It Is Very Important To Pay Attention To Presence Of Av As Mixed Infection Or Special Entity When Diagnosing Vaginitis, Especially In Pregnancy (Mahira *Et Al.*, 2013).

Bacterial Vaginitis (Bv)

Bacterial Vaginitis Is The Most Common Type Of Vaginal Infection Among Women Of Reproductive Age And Accounted For At Least One-Third Of All Vaginal Infections (Baruah, *Et Al.,* 2014). The Increased Risk For Genital Infections And Adverse Pregnancy Outcomes Such As Postabortal Pelvic Inflammatory Disease, Preterm Birth, Premature Rupture Of Membranes, Chorioamnionitis And Associated Fetal Loss, As Well As Postpartum And Post-Cesarean Endometritis And Cuff Cellulitis Is Due To Bv. This Disease May Increase The Risk Of Human Immunodeficiency Virus Transmission Also (Cohen *Et Al.*, 1995). In Developing Countries Bacterial Vaginosis Is Common In The General Population, Affecting Approximately Half Of All Women, Including Some With Only One Reported Lifetime Sex Partner (Mary Duff, 2007).

Vulvovaginal Candidiasis (Vvc)

It Is A Local Yeast Infection Typically Caused By *Candida Albicans*. Non-*Albicans* Species Have Also Been Associated With Vvc, Including *C. Glabrata, C. Tropicalis,* And *C. Parapsilosis*. Vvc Is Currently The Second Most Common Type Of Vaginal Infection After Bv And Several Key Factors Are Thought To Play A Role In The Increased Incidence, Including Repeated Courses Of Antibiotics, Use Of Hormonal Contraceptives, Corticosteroids, Genetic Predisposition, Intrauterine Devices, And The Continuing Rise In The Incidence Of Diabetes Mellitus (Makanjuola *Et Al.*, 2018). It Is Estimated That 75% Of Women

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Experience At Least One Episode Of Vvc During Their Child-Bearing Years, And Approximately 40–50% Experience A Second Attack. A Small Subpopulation Of Women Of Undetermined Magnitude, Probably 5–8% Of Adult Females Suffers From Repeated Recurrent Often Intractable Episodes Of *Candida* Vaginitis (Jack, 2017).

The Primary Symptom Of Vvc Is Pruritus Followed By Soreness, Dyspareunia, Burning Exacerbated By Urination Or Vaginal Sexual Activity, Dysuria, And A Thick, Clumpy, "Cottage-Cheese-Like" Discharge. Other Signs Of A Candidal Etiology Include The Presence Of Vulvar Erythema And Excoriations (Mollie Parker Szybala, 2020).

Trichomonas Vaginitis (Tv)

Women With Trichomonas Vaginitis May Have A Green Or Yellow Vaginal Discharge That Is Sometimes Frothy, Profuse, Or Both. It May Smell Fishy And The Genital Area May Itch, Become Red And Tender (Irritated), As A Result, Sexual Intercourse May Be Painful. Urination May Also Be Painful If The Bladder Becomes Infected. Adverse Pregnancy Outcomes Occur Due To Preterm Rupture Of Membranes, Preterm Delivery, Low Birth-Weight Infants, Infertility, And Cervical Cancer (Tine *Et Al.,* 2019). Moreover, Studies Have Shown An Increased Risk Of Hiv Transmission Among Individuals Infected By *T. Vaginalis*.

Probiotics As A Front Line Defense Against Vaginally Acquired Infections

Probiotic Microorganisms Provide Health Benefit To The Host And Prevent Vaginally Acquired Infections. Lactobacillus Species Produce Compounds That Kill Or Inhibit The Growth Of Vaginally Acquired Pathogens. The Idea Of Using Microbes Especially Lactobacilli To Maintain And Re-Establish The Vaginal Health Was First Suggested By Bruce Et Al. (Bruce *Et Al.,* 1973). The Predominant Member Of The Healthy Vaginal Microbiota Is Lactobacilli (Redondo-Lopez *Et Al.,* 1990).

Lactobacillus Utilizes Several Mechanisms To Inhibit The Colonization Of Pathogen In Vaginal Tract. The Mechanisms Includes Direct Killing Of The Pathogen By Secreting Compounds Such As Lactic Acid, Hydrogen Peroxide And Bacteriocins, Coaggregation Between The Pathogen And The Lactobacilli And Competition For Adherence To Host Cell Receptors. Other Mechanisms Include Biosurfactants, Mucin Production, Increased Barrier Function And Changes In Virulence Gene Expression (Spurbeck And Arvidson, 2001).

Two Species Of Lactobacilli Have Frequently Been Found To Colonise The Healthy Vagina, Namely, Lactobacillus Gasseri And Lactobacillus (Bahbot And Lepargneur, 2012). While L. Crispatus And L. Jensenii Have A Better Ability To Adhere To Vaginal Cells (Vallor *Et Al.,* 2001). Several *In- Vitro* Studies Have Reported That Acid And Hydrogen Peroxide Production By *L. Acidophilus* And *L. Casei A*re Able To Inhibit The Growth Of Bv-Associated Microbes Such As *Gardnerella Vaginalis*, *Mobiluncus*, *Bacteroides* And Species Of Anaerobic Cocci, While Decreased Production Of Bacteriocins And Hydrogen-Peroxide By Lactobacilli Enhances The Growth Healthy Bacteria By The Production Of Ammonia, Acetic, Succinic Acids And Amino Acids (Sarrah Cribby *Et Al.,* 2009). *Lactobacillus* Has Been

Recommended As A Marker Of The Imbalance Of The Vaginal Microflora Leading To Bv (Africa, 2014).

Lactobacilli Will Remain The Organisms Of Most Importance To Vaginal Health. Postmenopausal Women Are Also More Susceptible To Urogenital Infections, And Colonization Of The Vagina By Commensal Lactobacilli Serves As A Protection From These Pathogens (Raz *Et Al.,* 2003). The Concept Of Delivering Lactobacilli Orally To Repopulate The Vagina Was First Reported In 2001 (Reid *Et Al.,* 2001). The Organisms Were Delivered In A Milk Base And Shown To Be Recovered From The Rectum (Gardiner *Et Al.,* 2002);

Conclusion

Lactobacilli Are The Most Prevalent Microorganisms In The Indigenous Microbiota Of The Vaginal Tract Of Most Women, And Their Presence Correlates With A Reduced Risk Of Vaginally Acquired Infections. The Use Of Lactobacilli As Probiotics To Treat And/Or Prevent Vaginally Acquired Infections Has Value. Probiotics Are Live Microorganisms That Have A Beneficial Effect On Human Health. India Is Fast Emerging As A Potential Market For Probiotics In Food. There Is A Positive Effect Of Probiotics On Female Fertility. The Effect Of Probiotics On Maintaining The Bacterial Balance In The Vagina, Treatment Of Bacterial Vaginosis, And Subsequent Effect On Amelioration Of Inflammation Is Widely Researched And Understood. Effects Of Probiotics On Assisted Reproductive Technology (Art), Pregnancy Complications And Menopausal Infections Is Also Considerable. The Most Familiar Source Of Probiotics Is Yogurt, Milk And Cheese. India Has A Potential Market For Probiotic Products Because Of The Growing Interest In Health Care And Preventive Medicine.

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