

Microbiota intestinale e vaginale, amici o nemici?



franco vicariotto

COME CAMBIA LA GINECOLOGIA IN ITALIA

in futuro gli atteggiamenti e le prescrizioni dello specialista ginecologo si declineranno al femminile.

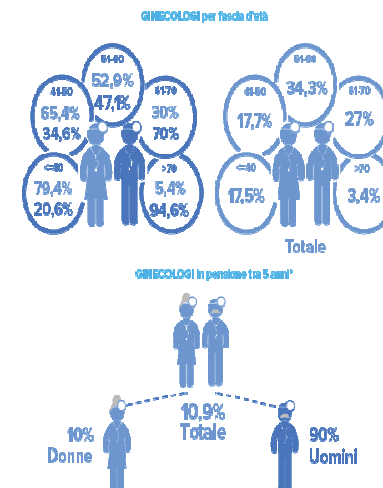
Su 10 ginecologi che andranno in pensione tra cinque anni 9 saranno uomini. già oggi nelle scuole di specialità i le donne sono otto su dieci.

Domani chi sarà accanto alla donna nelle scelte di salute legate alla sfera femminile sarà dunque una donna.

*La ginecologa sara' meno **allopatrica**..*

*la Medicina si sta progressivamente allontanando da una visione separatistica delle funzioni organiche con una interpretazione **naturale\olistica** una Medicina centrata sulla persona che considera la paziente nella sua globalità mente-corpo e nella sua individualità.*

L
SEP



La **medicina olistica** è prima di tutto un Modo, cioè **una metodologia clinica**.
Essa **riguarda il modo di essere del medico, del paziente e della loro relazione**

MICROBIOMA

“The human body is colonized by a vast number of microbes, collectively referred to as the human microbiota.

The link between these microbes and our health is the focus of a growing number of research initiatives, and new insights are emerging rapidly

Il futuro della medicina personalizzata dipenderà dagli studi sul microbioma

da dove partiamo.....

THE NEW ENGLAND JOURNAL of MEDICINE 2016;375:2369-79.

REVIEW ARTICLE

Elizabeth G. Phimister, Ph.D., Editor

The Human Intestinal Microbiome in Health and Disease

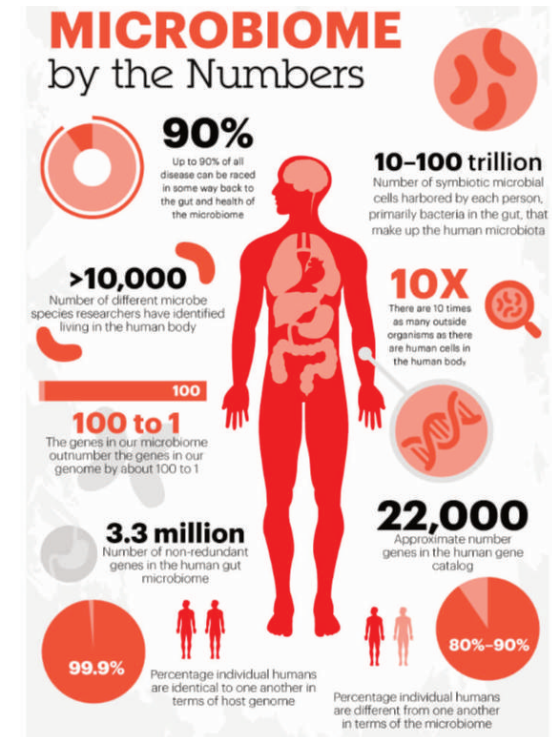
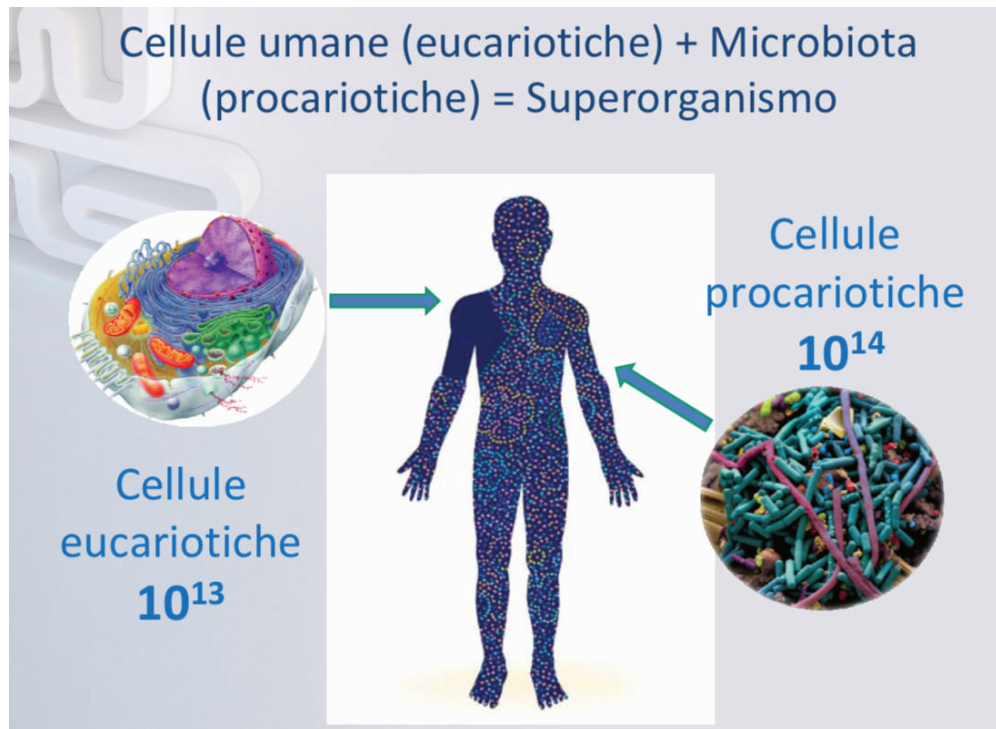
Susan V. Lynch, Ph.D., and Oluf Pedersen, M.D., D.M.Sc.

La “Rivoluzione” del Microbiota Umano

La tradizionale visione antropocentrica del microbiota intestinale come essenzialmente patogeno e minaccia per il sistema immune è stata sostituita dal riconoscimento che esso ha prevalentemente un effetto benefico per la salute umana.

Il concetto di ologenoma dell'evoluzione postula che l' OLOBIONTE (ospite di piu' simbiotici) con il suo OLOGENOMA (genoma ospite piu' microbioma) sia un livello di selezione in evoluzione

Ogni animale e pianta naturale e' un OLOBIONTE costituito dall'ospite e da diversi microbi e virus simbiotici



Disbiosi e' malattia!

L'intestino è il bersaglio privilegiato di numerosi triggers flogogeni che creano un danno tissutale



Stile di Vita

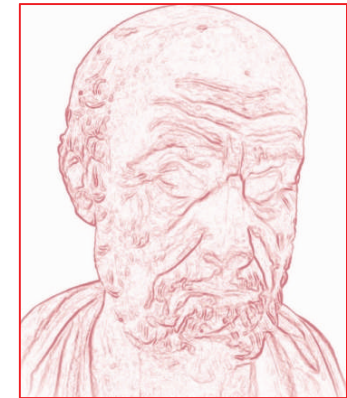
Cibo-Stress-Farmaci-Fumo

Genetica

Pat. Autoimmunitari

CENTRALITA' DELL'INTESTINO

Tutte le malattie hanno origine nell'intestino. Ippocrate



The Relationship Between Intestinal Microbiota and the Central Nervous System in Normal Gastrointestinal Function and Disease



Stephen M. Collins



Premysl Storka

The Farncombe Family Digestive Health Research Institute, Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada

Although many people are aware of the communication that occurs between the gastrointestinal (GI) tract and the central nervous system, fewer know about the ability of the central nervous system to influence the microbiota or of the microbiota's influence on the brain and behavior. Within the GI tract, the microbiota have a mutually beneficial relationship with their host that maintains normal mucosal immune function, epithelial barrier integrity, motility, and nutrient absorption. Disruption of this relationship alters GI function and disease susceptibility. Animal studies suggest that perturbations of behavior, such as stress, can change the composition of the microbiota; these changes are associated with increased vulnerability to inflammatory stimuli in the GI tract. The mechanisms that underlie these alterations are likely to involve stress-induced changes in GI physiology that alter the habitat of enteric bacteria. Furthermore, experimental perturbation of the microbiota can alter behavior, and the behavior of germ-free mice differs from that of colonized mice. Gaining a better understanding of the relationship between behavior and the microbiota could provide insight into the pathogenesis of functional and inflammatory bowel disorders.

The gut-brain axis (GBA) is a bidirectional neurohumoral communication system that integrates brain and gastrointestinal (GI) functions. The GBA has been implicated in the pathophysiology of functional GI disorders, and evidence is emerging for its role in the pathogenesis of

consider the influence of the brain on the microbial content of the gut and, conversely, to examine the evidence showing that the intestinal microbiota influences the brain and behavior. Investigation of the integration of the intestinal microbiota into the GBA could improve the understanding of the pathophysiology of both functional¹ and inflammatory² bowel conditions.

The GBA contributes to homeostasis of several systems, including GI function, appetite, and weight control. Because GI motility and epithelial function are critical determinants of the habitat for the microbiota, changes induced by the central nervous system or the GI tract alter the habitat and perturb the intestinal microbiota.³ The longstanding observation that oral antibiotics and laxatives ameliorate hepatic encephalopathy provides a potent reminder that the intestinal microbiota is capable of influencing behavior, albeit under pathologic conditions.⁴ Taken together, these observations provide a framework for considering the integration of the intestinal microbiota into the bidirectional GBA.

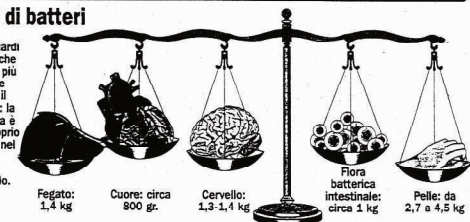
The Intestinal Microbiota

The gut contains a vast and complex microbial ecosystem, comprising mainly bacteria, of which most are strict anaerobes; it also includes fungi and viruses,⁵⁻⁷ but only bacteria are considered in this review. Commensal bacteria instruct the immune and physiologic systems throughout life and are responsible for the presence of inflammatory and immune cells in the healthy gut: so-called "physiologic" or "controlled" inflammation. The term physiologic inflammation refers to the presence of

Pesa più del cuore, è indispensabile. È dentro la pancia eppure è invisibile
L'organo nascosto

Miliardi di batteri

100'000 miliardi di cellule, anche dieci volte di più di tutte quelle che formano il corpo umano: la flora batterica è un vero e proprio organo, che, nel suo insieme, può pesare anche un chilo.



INTESTINO, il grande "HUB" della salute

**LOW-GRADE CHRONIC INFLAMMATION:
MADRE DI TUTTE LA PATOLOGIE**

Ginecologia

VVC –VB-GSM (alterazione microbioma vaginale)

Vulvodinia

Il dolore pelvico cronico

Irritable Bowel Syndrome IBS

IBD Inflammatory Bowel Disease

colite ulcerosa, morbo di Crohn

UTI.....Dolore Vescicale

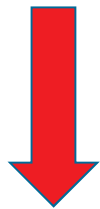
Infertilità '.....

Ostetricia

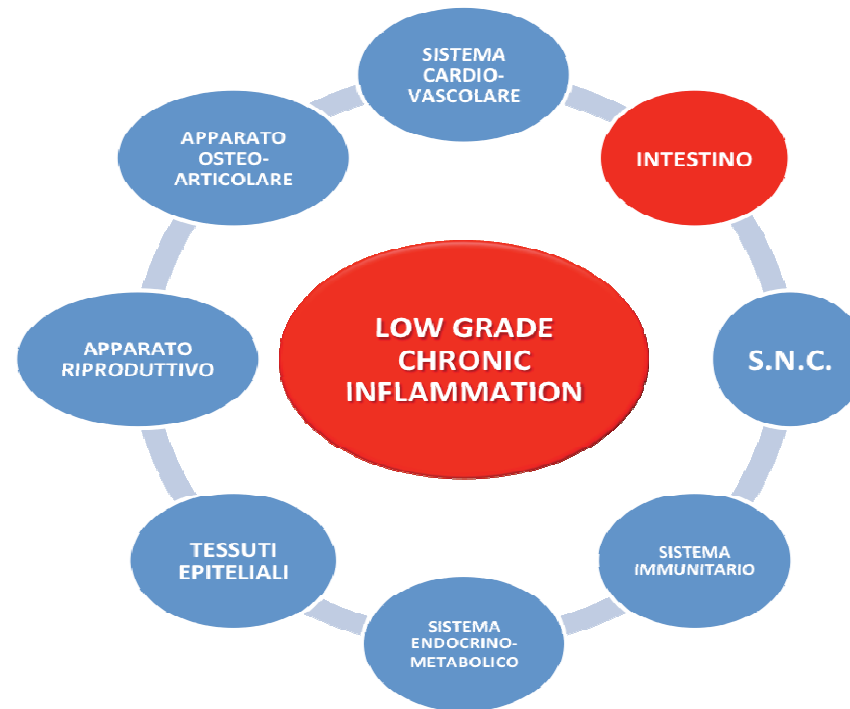


DISBIOSI / MICROBIOMA

La vagina può essere considerata uno dei modelli più completi ed interessanti per lo studio dei rapporti tra ospite e flora microbica residente



VAGINITI E CISTITI



INFIAMMAZIONE madre di tutte le patologie

GUT and UROGENITAL AXIS

GUT and UROGENITAL AXIS

Dysbiosis in the vaginal microbiome

Bacterial Vaginosis (BV)

- 10-29% of the female population
- underlying inflammation increase the risk for preterm labor and the acquisition of STIs

Yeast Vaginitis (Vulvovaginal Candidiasis)

- experienced at least once by 75% of women

Urinary Tract Infections (UTI)

- 25-30% of women between the ages of
- In 85% of cases, the bacteria responsible for a UTI originate in a woman's own intestine or vagina

***grandi numeri
prima causa di visita ginecologica
problema economico, psicologico e sociale***

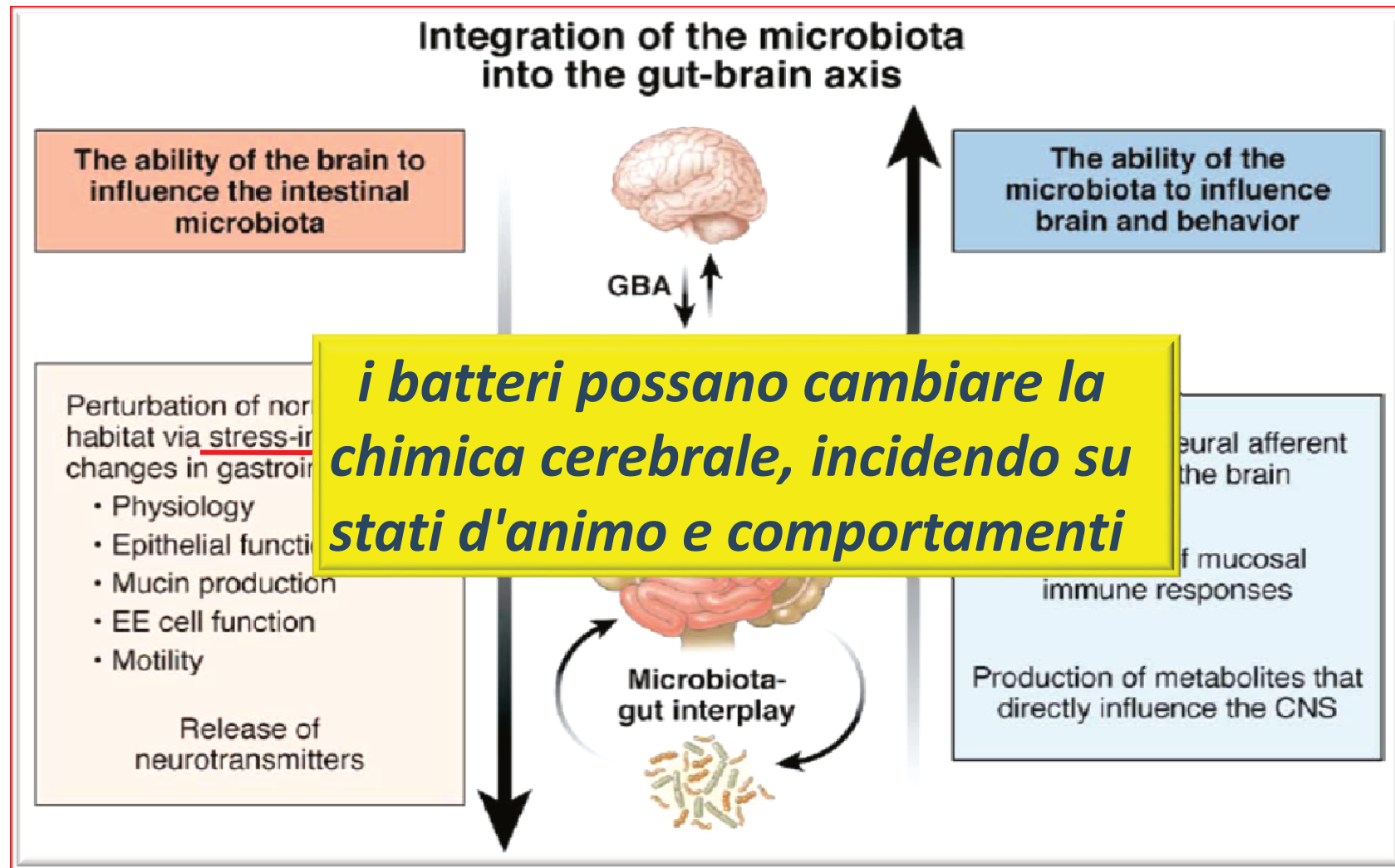
antibiotici o probiotici?

Vaginal flora

Vaginal health involves microbial competition and adaptation. Over time symbiotic relationships were formed that allow beneficial vaginal microbiota to competitively inhibit pathogen growth, adhesion and colonisation via a number of mechanisms, including: pH maintenance, hydrogen peroxide production, enzyme inhibition, immune system interaction and bacteriocin generation.

Lactobacilli produce	Function
Lactic acid	Help to maintain vaginal pH, inhibiting the proliferation of pathogenic bacteria
Hydrogen peroxide	Toxic to anaerobic pathogens, directly destroy pathogenic anaerobic bacteria
Bacteriocins	Proteins that inhibit the growth & reproductive success of competing pathogens
Biosurfactants	Reduce surface tension and have the ability to disrupt and dislodge pathogenic biofilms

GBA AXIS



Collins S M, Bercik P. The Relationship Between Intestinal Microbiota and the Central Nervous System in Normal Gastrointestinal Function and Disease. GASTROENTEROLOGY 2009;136:2003–2014

Microbioma in relation to Women Health



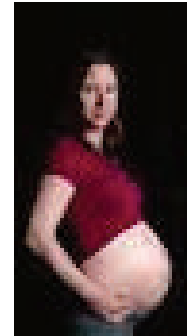
Gynec

STD
Vaginitis
Vaginosis
Metabolic disorders



Fertilization

Pro-inflammatory cytokines
Sperm motility and viability



Pregnancy

Preterm delivery
Eczema-Allergy
Breastfeeding



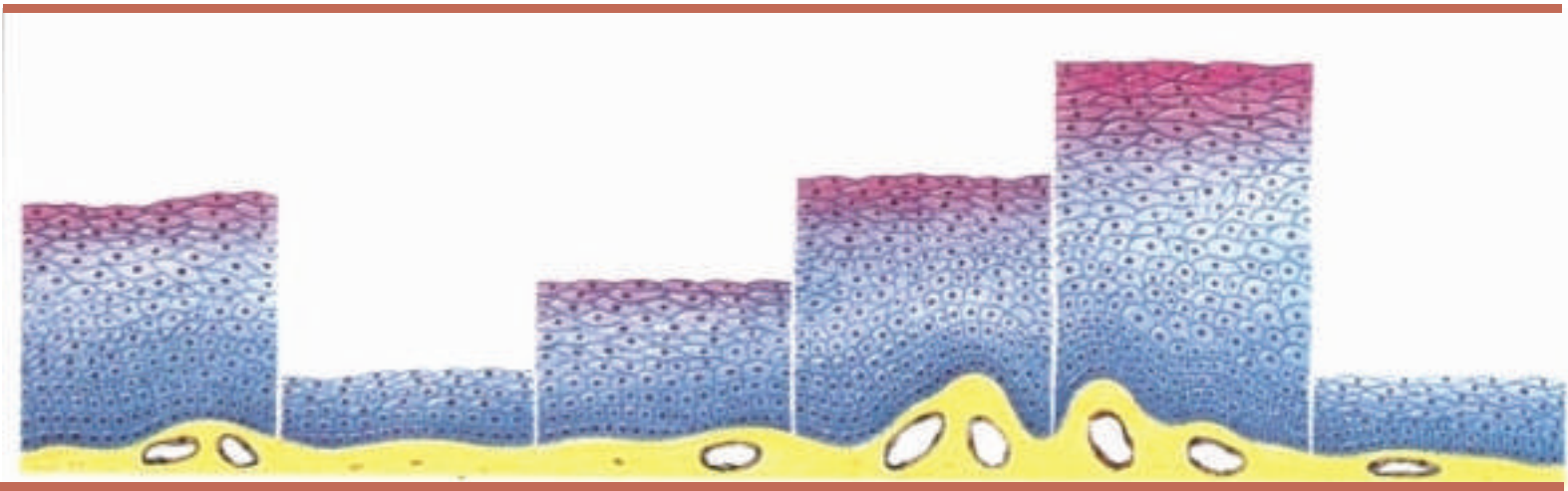
Menopause

UTI
ATROPHY

variazioni cicliche e ormonali

How does the vaginal microbiome
change over a lifespan?



	neonata	1 mese	pubertà	maturità sessuale	gravidanza	dopo la menopausa
estrogeni	++	-	+	++	+++	-
epitelio						
glicogeno	+	-	- → +	+	++	-
pH	4-5	7	7 → 5	4-5	3,5-4,5	6-7
presenza microrgan.	sterile Lattobacilli	scarso	misto	Lattobacilli	Lattobacilli	misto

MICROBIOMA

Controller dell'inflammation

Controller della funzione GBA e GUG AXIS

Siamo Ospiti o ospitati?

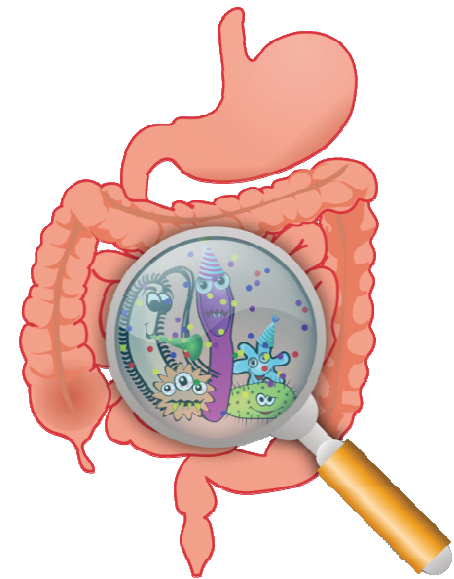
Terapia\prevenzione

Uccidere i batteri?

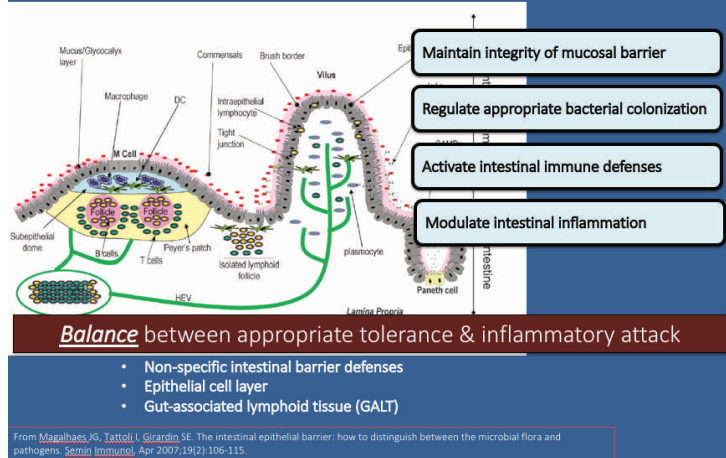
Introdurre batteri?

Selezionare i batteri?

Controllare l'inflammation?



Intestinal Tract: The Largest Immune Organ (70% of the Immune System) & Defense Barrier



Tratto gastroenterico e patologia urogenitale

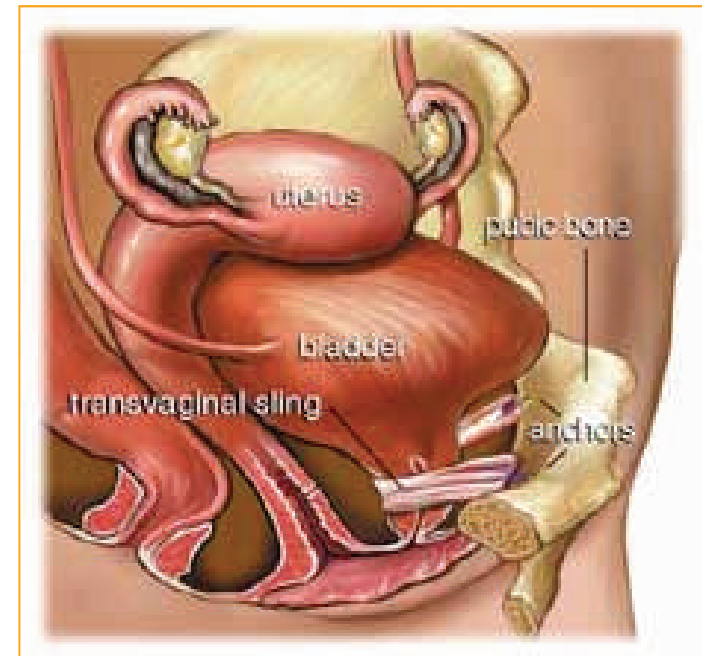
Razionale e teorie eziopatogenetiche

- Traslocazione

Via ematica

Via linfatica

- Migrazione



Concetto chiave:

VB è caratterizzata da un'alterazione numerica, quantitativa e non qualitativa, dei diversi tipi di microrganismi presenti nel microbioma vaginale

The vaginal microbiome: rethinking health and diseases

SINDROME E DISBIOSI

[Bing Ma](#),¹ [Larry J. Forney](#),² and [Jacques Ravel](#)^{1,*}

¹Institute for Genome Sciences, University of Maryland School of Medicine, Baltimore, MD 21201

²Department of Biological Sciences and the Initiative for Bioinformatics and Evolutionary Studies, University of Idaho, Moscow, ID 83844

Bing Ma: bma@som.umaryland.edu; Larry J. Forney: lforney@uidaho.edu; Jacques Ravel: javel@som.umaryland.edu

*Corresponding author. javel@som.umaryland.edu, Institute for Genome Sciences, University of Maryland School of Medicine, BioPark II – room 611, 801 W. Baltimore Street, Baltimore, MD 21201

Is bacterial vaginosis a disease?

Gregor Reid¹

Received: 13 October 2017 / Revised: 15 November 2017 / Accepted: 15 November 2017

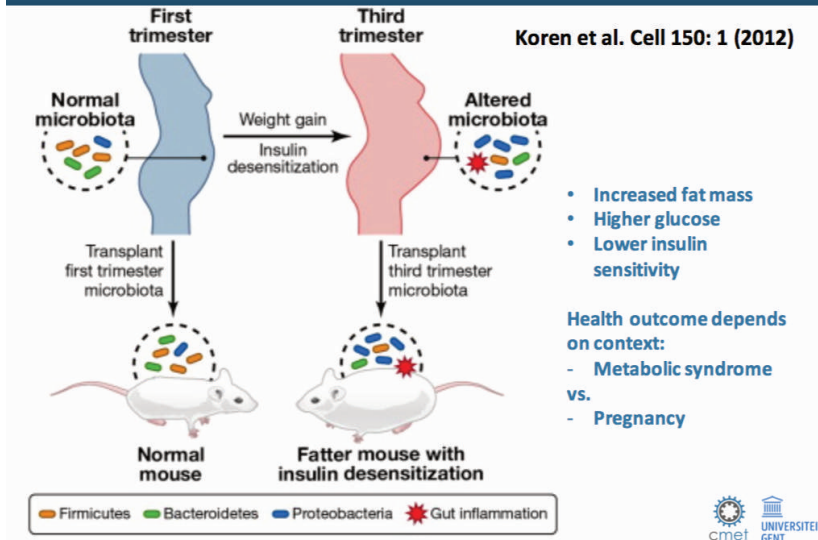
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Abstract

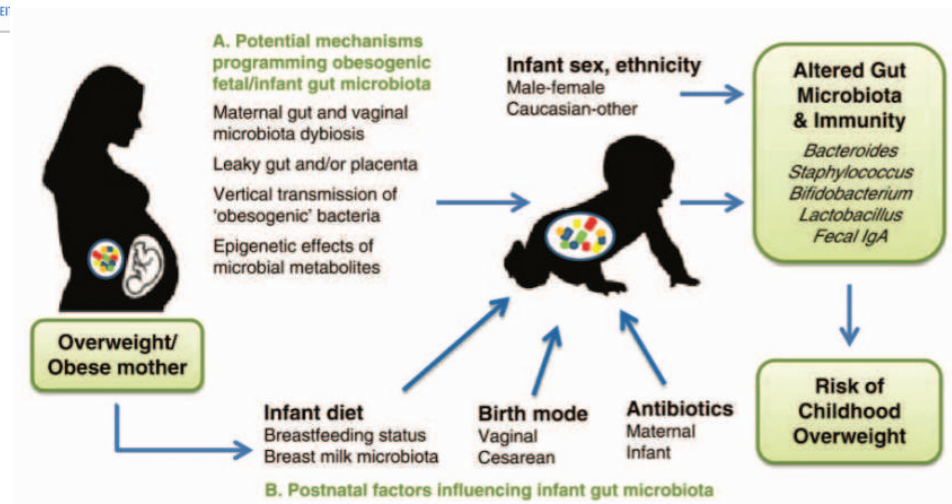
Bacterial vaginosis (BV) has been described as a disease, a disorder, a vaginal inflammation, an infection, a microbial dysbiosis, a condition, and in some women, a normal situation. In order to fit the definition of a disease, BV would have to be a disorder of function that produces specific signs or symptoms or affects the vagina in an aberrant way. Yet, there is little consistency in patients reporting signs and symptoms when BV is diagnosed, nor the appearance of aberrations to the vagina. If BV is not a disease, there are implications for its management and coverage of treatment costs, and for the conclusions drawn in a multitude of previous studies. It is time for BV to be redefined and for the various subsets to be given a separate terminology with specific methods of diagnosis and appropriate treatment and preventive strategies.



Health consequences ?



Il microbioma materno in gravidanza puo' essere responsabile di patologie materno-fetali e neonatali



GRAVIDANZA

***in una gravidanza normale
(ossia senza complicanze e con parto a termine):
la composizione microbiotica, lattobacillo-dominata, si mantiene
inalterata. maggiore abbondanza di L. crispatus, L. gasseri ed L. jensenii***

Why a pregnancy probiotic?



Benefits to Mother

- Immune modulation
- Digestive regulation
- Vaginal flora
- Prevent UTIs & thrush
- Protect against mastitis

Benefits to Baby

- Immune development
- Prevent eczema and allergy
- Healthy bacterial exposure (birth)
- Breast milk quality

***Importance of the maternal
microbiome during
pregnancy, at birth and after
birth***

Before Microbirth

The role of mother's
microbiome during pregnancy



 www.Primal-Baby.com

Maternal-Fetal Microbiome. *STERILE?...*

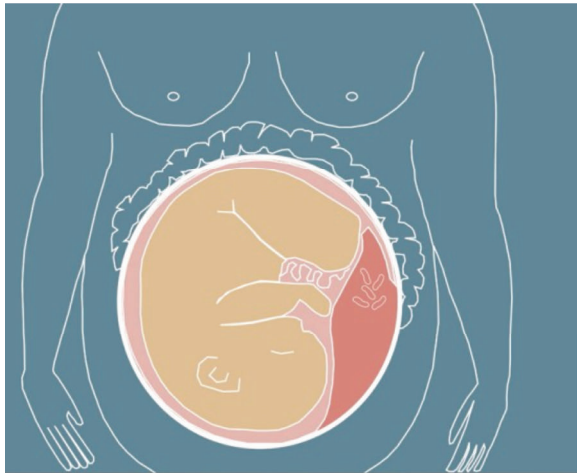
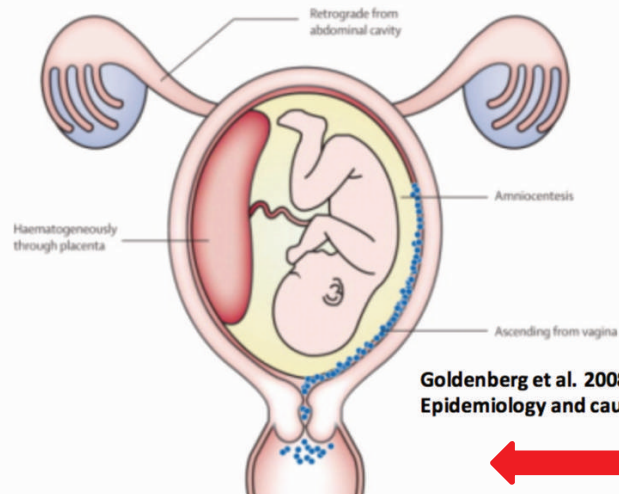


ILLUSTRATION (FROM ANIMATION) © SCIENCE/AAAS

Potential routes of intra-uterine colonization



Goldenberg et al. 2008, Lancet.
Epidemiology and causes of preterm birth

← **VB e GBS**

Recent microbiome studies have challenged the dogma that the Maternal-Fetal unit is sterile.

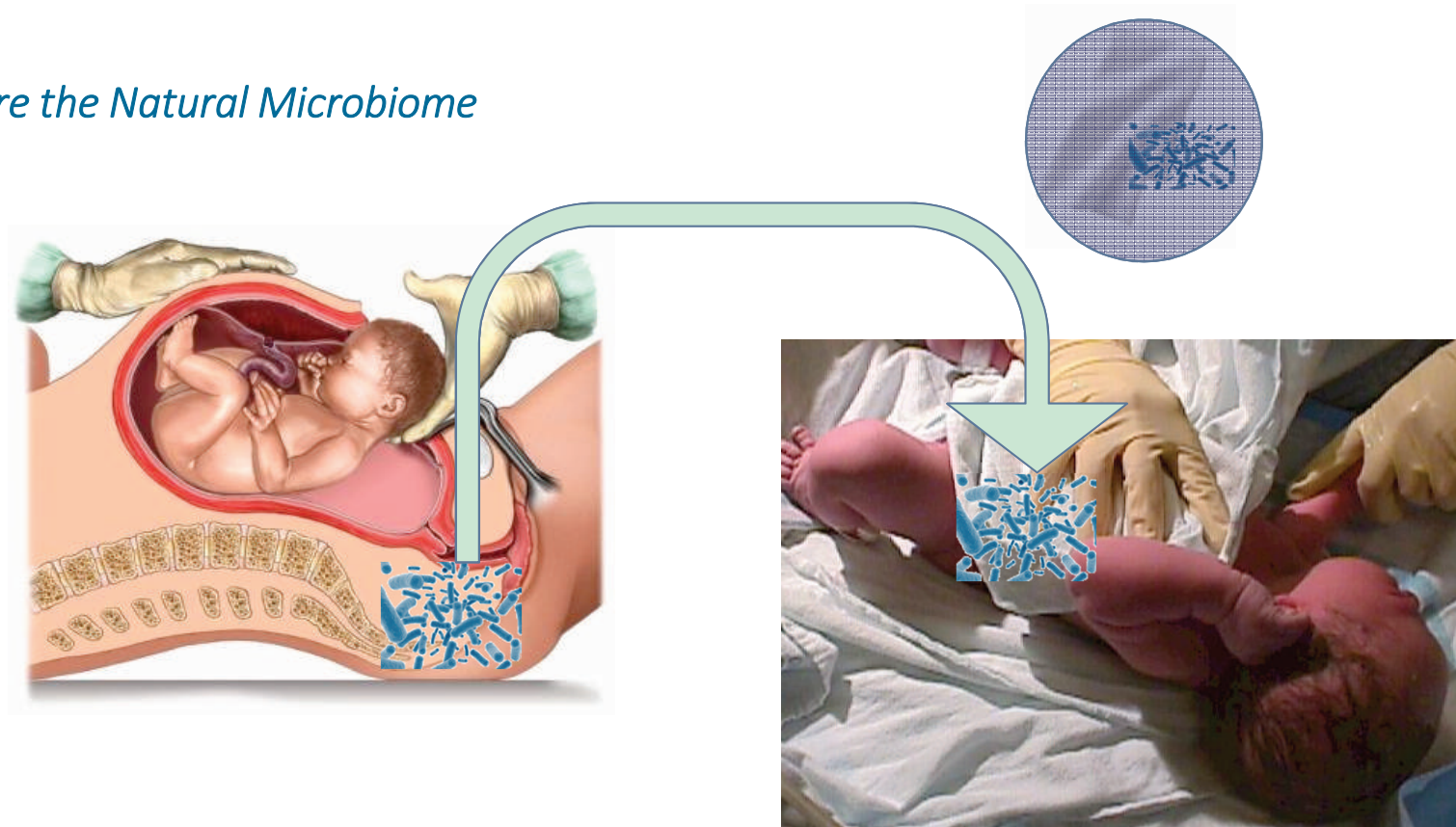
Placenta harbors a unique microbiome
(Aagaard K et al, Sci Transl Med. 2014)

Analysis of the first meconium reveal microorganisms
(Ardissone et al., Plos one 2014)

Analysis of tracheal aspirates after intubation at birth reveal microorganisms
(Lohmann et al., Pediatric Research 2014)

Per ovviare alla mancanza di batteri dei bambini nati con taglio cesareo, uno studio con lo scopo di verificare se una semina artificiale, tramite una garza che viene incubata un'ora prima dell'intervento nel canale vaginale della madre e poi strofinata sulla bocca, sul viso e sul resto del corpo del bambino dopo la nascita, possa contribuire ad una formazione più naturale del microbioma

Restore the Natural Microbiome



www.brooksidepress.org

Dr. Maria Gloria Dominguez-Bello, associate professor in the Human Microbiome Program at the NYU School of Medicine

<http://commonhealth.wbur.org/2014/06/birth-canal-bacteria-c-section>

MICROBIOMA E MENOPAUSA NEL TRATTO UROGENITALE

INCREMENTO DEGLI ANAEROBI INCREMENTO DI E.COLI
RIDUZIONE LATTOBACILLI. SQUILIBRIO IMMUNOLOGICO
ALTERAZIONI TESSUTALI ALTERAZIONE DEL MICROBIOMA

Differences in the vaginal lactobacilli of postmenopausal women and influence of rectal lactobacilli

*L. Petricevic , K. J. Domig * , F. J. Nierscher , M. J. Sandhofer , I. Krondorfer * , W. Kneifel * and H. Kiss*

2° CONGRESSO NAZIONALE
AIGEF
Associazione Italiana Ginecologia Endocrinologia e Fertilità

The influence of estrogen and progesterone on anal function in women may be mediated by changes in collagen levels and/or the number of blood vessels in the submucosa of the anal canal. The decrease of female sex hormones associated with menopause not only induces genitourinary atrophy, it may also influence the normal function of the gastrointestinal tract.

In summary, our data indicate that rectal lactobacilli may affect the intermediate vaginal flora of postmenopausal women, suggesting that atrophic colpitis with depleted numbers of lactobacilli in postmenopausal women may effectively be treated by oral application of probiotics.

MENOPAUSA MICROBIOMA E INFIAMMAZIONE

cessazione della attività ovarica le caratteristiche dei tessuti si modificano.

- l'epitelio si assottiglia a causa della progressiva carenza estrogenica con il caratteristico quadro dell'atrofia**
- l'epitelio è costituito soprattutto dagli strati basale e para-basale, a scapito dello strato superficiale con cellule contenenti glicogeno**
- riduzione dei bacilli di Doderlein e aumento del Ph**

Table 1. A Comparison of Bacterial Vaginosis and Aerobic Vaginitis.

Clinical Characteristics	Bacterial Vaginosis	Aerobic Vaginitis (1)
Lactobacilli	Displaced	Displaced
Pathogen	<i>Gardnerella vaginalis</i> , <i>Atopobium vaginae</i> , <i>Megasphaera</i> species, BVAB2	<i>Escherichia coli</i> , Group B Streptococcus, <i>Staphylococcus aureus</i> , <i>Enterococcus faecalis</i>
Vaginal epithelial inflammation	None	Present
Elevation of pro-inflammatory cytokines (IL-1 β , IL-6, IL-8)	Moderate elevation	High elevation
Immune reaction (cytotoxic leukocyte)	Non-reactive	Reactive
pH [Normal = 3.8 – 4.2]	T= 4.2-4.5 BV $\geq$ 4.5	> 4.5; usually >6
Shed vaginal epithelial cells	Clue cells	Parabasal cells
Vaginal discharge characteristic	White, homogenous	Yellowish
10% KOH Whiff Test (fishy amine odor)	Positive	Negative
Treatment	Metronidazole ^b Clindamycin ^b	Kanamycin ovule. (5) 2% clindamycin topical. (3) Fluoroquinolones are reported to have clinical success. (5) GBS is uniformly sensitive to penicillin, ampicillin, amoxicillin, amoxicillin/ clavulanic acid. (7) <i>E. faecalis</i> is traditionally treated with ampicillin. (8)



VA
Vaginite aerobica

MICROBIOMA VAGINALE E INFERTILITÀ?

*“l’abbondanza relativa di alcune specie di Lactobacilli, quali il L. iners, L. crispatus e L. gasseri distingueva la flora vaginale delle **donne infertili sine causa** dalle **donne infertili con causa nota** e dalle **donne fertili**.*

***Le specie L. iners e L. crispatus erano sottorappresentate nelle donne infertili sine causa**, mentre si osservava una considerevole colonizzazione di L. gasseri.*

*Questo profilo microbico sembra aumentare la suscettibilità all’invasione e colonizzazione di batteri quali Atopobium, Prevotella, Veillonella, Ureaplasma ed Escherichia che **mimano un microambiente simile a quanto osservato nelle donne con vaginosi**, con caratteristiche etio-patogenetiche associate a complicanze durante il periodo del concepimento o del periodo gestionale.*

*La conoscenza approfondita del profilo microbico con tecniche di ultima generazione sembra rappresentare un elemento importante nella **determinazione** della precisa **causa dell’infertilità femminile** senza ricadere nella vaga nozione di “infertilità idiopatica” e apre la strada per interventi terapeutici personalizzati atti al ripristino di un habitat vaginale ottimale.”*

Subclinical alteration of the cervical-vaginal microbiome in women with idiopathic infertility

Authors Giuseppe Ricci Francesco De Seta, Manola Comar. **First published:** 16 February 2017

LA TERAPIA.....ARRIVANO I GINECOLOGI.....

PARTIAMO DALLE LE BASI.... LA COLONIZZAZIONE VAGINALE.

J Clin Gastroenterol. 2004 Jul;38(6 Suppl):S107-10.

Utilization of the intestinal tract as a delivery system for urogenital probiotics.

Morelli L, Zonenenschain D, Del Piano M, Cognein P.

Istituto di Microbiologia, Facoltà di Agraria, U.C.S.C., Piacenza, Italy. Lorenzo.morelli@unicatt.it

Abstract

Orally consumed viable bacteria with proposed beneficial health effects, the so-called probiotics, are increasingly used to treat disorders of the gastrointestinal tract. It has been recently suggested that specifically selected lactobacilli could have a therapeutic role in female urogenital tract infections. It has been also suggested that some of these bacteria could be not intravaginally instilled, but also orally delivered. The authors investigate the ability of lactobacilli isolated from the vagina to survive gastrointestinal tract transit, and establish a link between the rate of intestinal survival and vaginal colonization.

Sono passati 15 anni.....



EARLY ASSEMBLY OF THE MICROBIOME:

The importance of a woman maintaining a healthy microbiome

Author: Professor Franco Vicariotto, MD.

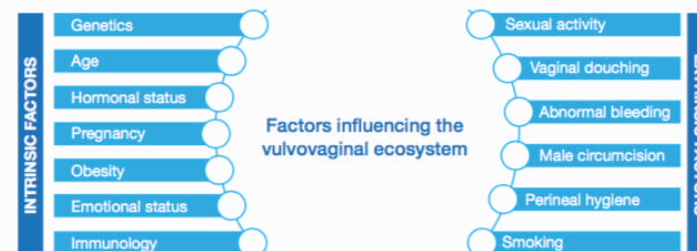
Prof. Vicariotto is Chair of the Life-Space Probiotics Advisory Board.

Prof. Vicariotto is a specialist consultant in Obstetrics and Gynaecology at HUMANITAS-S.PIO X Hospital of Milan and at the Lower Genital Tract Disease Unit, V. Buzzi Hospital – University of Milan. His major interest and experience is in the use and research of oral and vaginal probiotics in obstetrics and gynaecology. He is the founder and on the Board of SIFIOG – Italian Society of Supplements in Obstetrics and Gynaecology.

Human microbiome

The human microbiome is defined as 'the ecological community of commensal, symbiotic, and pathogenic microorganisms that literally share our body space.'¹ The microbiota is composed of microorganisms including bacteria, viruses, fungi and protozoa that reside on and in the human body and contains approximately 38 trillion microbial cells.^{1,2} The microbiome is defined as the community of all microorganisms and their genes.¹

The microbiome is mostly located at entrance points to the body, which are directly exposed to the external environment e.g. skin, gastrointestinal (GI), respiratory and urogenital tracts.³ A healthy microbiota is one that contains a highly diverse variety of different bacteria. A low amount of bacterial diversity has been associated with the development of chronic disease.⁴



362.385.000 euro (2017) +6,3%

Minimising disruptions to the vaginal microbiome with probiotics

Bacterial vaginosis is the most common cause of vaginal infection in women of childbearing age. It is predominantly caused by pathogenic *Gardnerella*. About 50% of women with this condition have no symptoms at all and the prevalence rate in apparently healthy women is around 10%.¹⁸

The dominance of lactobacilli in healthy vaginal microbiota and its depletion in bacterial vaginosis has given rise to the use of probiotic *Lactobacillus* strains as well as *Streptococcus thermophiles* for its treatment and prevention, by lowering intravaginal pH with the production of certain acids and hydrogen peroxide, thus establishing a barrier effect against many pathogens.¹⁸⁻²¹

Original Article

Oral *Lactobacillus rhamnosus* GR-1 and *Lactobacillus reuteri* RC-14 to reduce Group B *Streptococcus* colonization in pregnant women: A randomized controlled trial

Ming Ho^a, Yin-Yi Chang^a, Wei-Chun Chang^a, Hung-Chih Lin^b, Mei-Hung Wang^a, Wu-Chou Lin^a, Tsan-Hung Chiu^{a,*}

^a Department of Obstetrics and Gynecology, China Medical University Hospital, China Medical University, Taichung 40402, Taiwan

^b Department of Pediatrics, China Medical University Hospital, China Medical University, Taichung 40402, Taiwan

PROBIOTICI ORALI (attivi sui biofilms?)

British Journal of Nutrition (2017), 117, 804–813

doi:10.1017/S0007114517000289

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Early pregnancy probiotic supplementation with *Lactobacillus rhamnosus* HN001 may reduce the prevalence of gestational diabetes mellitus: a randomised controlled trial

Kristin L. Wickens^{1*}, Christine A. Barthow¹, Rinki Murphy², Peter R. Abels^{1,3}, Robyn M. Maude⁴, Peter R. Stone², Edwin A. Mitchell², Thorsten V. Stanley^{1,3}, Gordon L. Purdie¹, Janice M. Kang¹, Fiona E. Hood¹, Judy L. Rowden², Phillipa K. Barnes¹, Penny F. Fitzharris⁵ and Julian Crane¹

¹University of Otago, Wellington 6021, New Zealand

²University of Auckland, Auckland 1142, New Zealand

³Capital and Coast DHB, Wellington 6021, New Zealand

⁴Victoria University, Wellington 6021, New Zealand

⁵Auckland Hospital, Auckland 1142, New Zealand

Augmentation of antimicrobial metronidazole therapy of bacterial vaginosis with oral probiotic *Lactobacillus rhamnosus* GR-1 and *Lactobacillus reuteri* RC-14: randomized, double-blind, placebo controlled trial

Anukam K, Osazuwa E, Ahonkhai I, Ngwu M, Osemene G, Bruce AW, Reid G. Microbes and Infection 2006 May; 8 (6): 1450-4.

Studio su 125 donne africane ad elevata incidenza per BV. La terapia è stata: metronidazolo 500 mg bis in die per 7 gg + *Lactobacillus rhamnosus* GR-1 e *Lactobacillus reuteri* RC-14 bis in die per 30 gg.

L'88% delle donne trattate con l'associazione metronidazolo-probiotico ha ottenuto una risoluzione della patologia rispetto al 40% trattato con antibiotico-placebo ($p < 0,001$), il 30% di questo gruppo non ha risolto la patologia e il restante 30% ha sviluppato una situazione intermedia.

Metronidazolo
500 mg bis in die

+

Lactobacillus rhamnosus GR-1
e *Lactobacillus reuteri* RC-14



88%

risoluzione
vaginosi batterica

PROBIOTICI VAGINALI? (attivi sui biofilms)

J Clin Gastroenterol. 2014 Nov-Dec;48 Suppl 1:S102-5. doi: 10.1097/MCG.0000000000000225.

Can *Lactobacillus fermentum* LF10 and *Lactobacillus acidophilus* LA02 in a slow-release vaginal product be useful for prevention of recurrent vulvovaginal candidiasis?: A clinical study.

Murina F¹, Graziottin A, Vicariotto F, De Seta F.

J Clin Gastroenterol. 2014 Nov-Dec;48 Suppl 1:S96-101. doi: 10.1097/MCG.0000000000000224.

Effectiveness of an association of a cranberry dry extract, D-mannose, and the two microorganisms *Lactobacillus plantarum* L P01 and *Lactobacillus paracasei* L PC09 in women

ISSN: 2573-9506

Research Article

International Journal of Women's Health Care

Improvement of Bacterial Vaginosis and Vulvovaginal Candidiasis with a New *Lactobacillus* Strains Association: A Pilot Study

Franco Vicariotto¹ and Filippo Murina²

Gynaecology Unit, Casa di Cura San Pio X Private Clinic, Milan, Italy

Lower Genital Tract Disease Unit, V.Buzzi Hospital, University of Milan, Italy

*Corresponding author

Filippo Murina, Lower Genital Tract Disease Unit, V.Buzzi Hospital, University of Milan, Italy, E-mail: filippomurina@tin.it

Submitted: 23 Jan 2018; Accepted: 29 Jan 2018; Published: 07 Feb 2018

Io ci credevo...addio al medical device....

I dispositivi medici a base di probiotici verranno interdetti dal mercato UE a partire da Maggio 2020



Il nuovo regolamento sui dispositivi medici, **Medical Device Regulation (EU) 2017/745**, abroga le precedenti direttive europee. Il nuovo regolamento sancisce chiaramente che i prodotti contenenti organismi viventi non rientrano più nell'ambito dei dispositivi medici (Art.1, pt. 6).

NUOVE OPPORTUNITÀ PER I PROBIOTICI



Diventare farmaco

Ci sono ancora diverse difficoltà nel dimostrare la relazione dose-risposta.

La ricerca sul microbioma umano sta ottenendo risultati promettenti per superare queste impasse.

Rilanciarne l'uso nell'integrazione

Possibilità di modulare attivamente la composizione del microbiota.

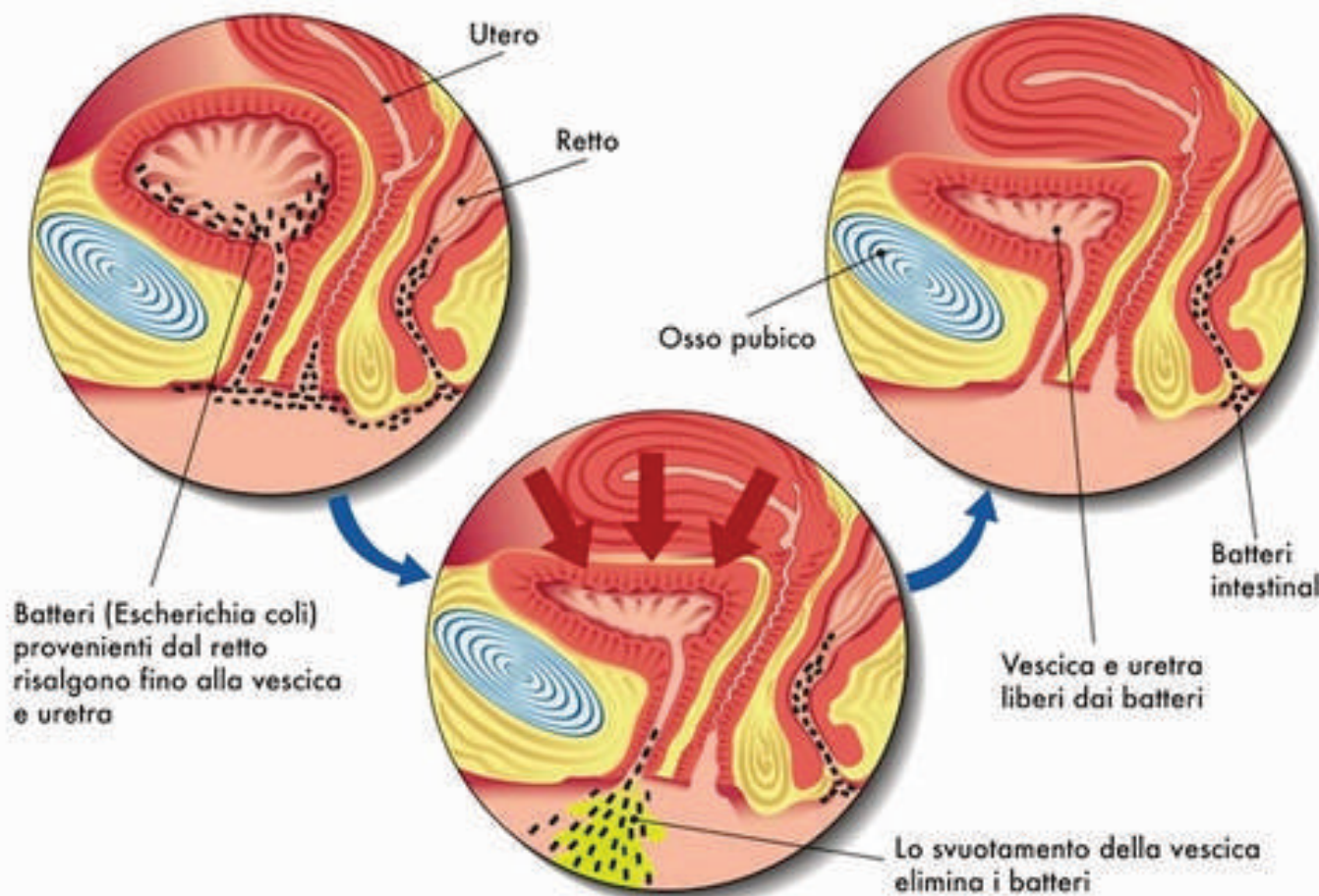
Prime evidenze di efficacia di un integratore a base di probiotici nel ridurre il tasso di infezioni vaginali recidivanti.



LE RECIDIVE....



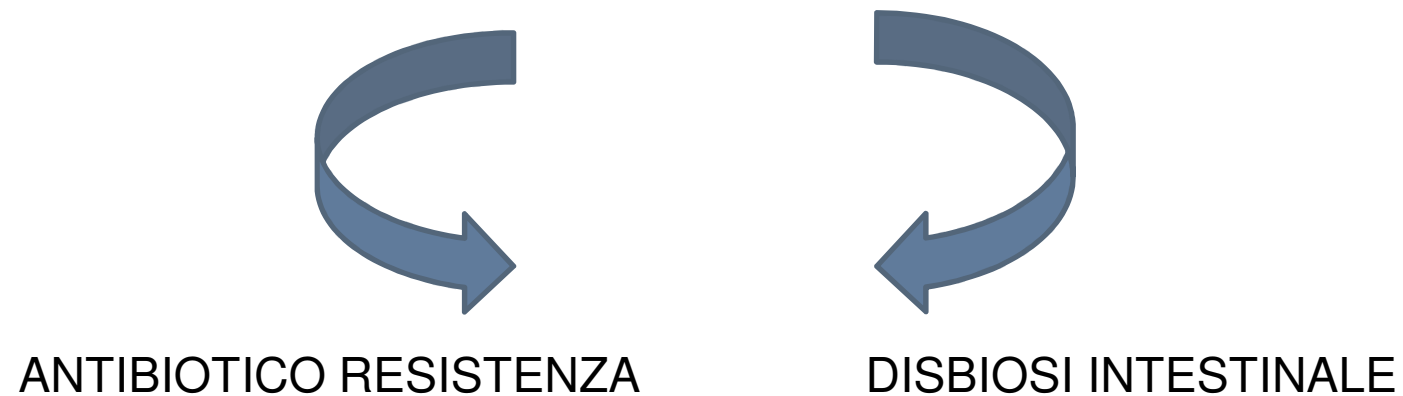
CISTITE



LA TERAPIA

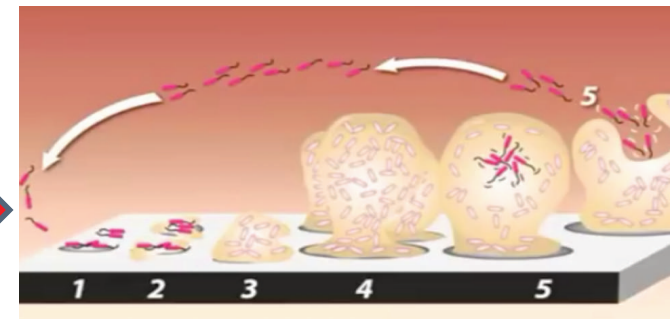
si ricorre al trattamento antibiotico.....

CIRCOLO VIZIOSO



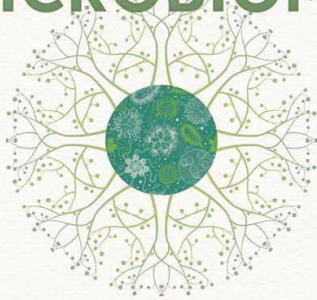
RECIDIVE DI INFEZIONE

BIOFILM



grazie

THE
SECRET LIFE
OF YOUR
MICROBIOME



WHY NATURE *and* BIODIVERSITY
ARE ESSENTIAL TO
HEALTH *and* HAPPINESS

Susan L. Prescott, MD, PhD
Alan C. Logan, ND

**THE
MICROBIOME
EFFECT**

HOW YOUR BABY'S BIRTH
AFFECTS THEIR FUTURE HEALTH



TONI HARMAN &
ALEX WAKEFORD

**ginecologia@
vicariotto.com**