RST Research and Science Today
WWW.RSTJOURNAL.COM
SUPPLEMENT 2/2019
ISSN-E: 2344-0007 / ISSN-L: 2344-0007

Medicine

MICROBIOME - REALITY OR MYTH?

Ramona NEDELCUŢĂ[1]
Călin GIGI[2]
Cristian NEDELCUTA[3]
Dumitru BĂLEANU[4]
Dragoş DAVIŢOIU[5]
Daniel VOICULESCU[6]
Ana Laura MANDA[7]
Bogdan SOCEA[8]
Vlad Denis CONSTANTIN[9]

ABSTRACT:
THE HUMAN MICROBIOME, AS A WHOLE, AND DUE TO THE COMPLEXITY OF THE GENE, IS THE ONE THAT MAKES THE MAJOR DIFFERENCE BETWEEN INDIVIDUALS OF A SPECIES, OUR VARIABILITY, AS REPORTED ONLY ON ITS OWN GENOME, WAS ESTIMATED TO BE 0.1%.
THE STUDY OF THE INFANT GROUP OF PROBIOTICS IN THE CONTEXT OF AN EPISODE OF DIARRHEAL DIARRHEA INDIRECTLY DEMONSTRATES THE IMPORTANCE OF HEALTHY MICROFLORA BY: RAPID NUTRITIONAL RECOVERY, REDUCING THE DURATION OF HOSPITALIZATION, REDUCING THE RISK OF SUBSEQUENT RECURRENCE.
BUCCOPHARYNGEAL RECOLONIZATION WITH SAPROPHYTIC BACTERIA SALIVARIUS STREET HAD A POSITIVE ASPECT IN RELIEVING SYMPTOMS, RESTORING THE NORMAL PHARYNGEAL MACROSCOPIC APPEARANCE, AVOIDING ANTIBIOTIC THERAPY.

KEY WORD: MICROBIOME, VARIABILITY, PROBIOTIC STR. SALIVARIUS.

[1] Department of Pediatrics, University of Medicine and Pharmacy of Craiova, Romania
[2] Department of Pediatrics, University of Medicine and Pharmacy of Craiova, Romania
[3] County Emergency Clinical Hospital from Craiova, Romania
[4] University of Medicine and Pharmacy of Craiova, 2 Petru Rares Str., 200349, Craiova, Romania
[5] University of Medicine and Pharmacy Carol Davila, 8 Eroii Sanitari Str, 050474, Bucharest, Romania
[6] University of Medicine and Pharmacy Carol Davila, 8 Eroii Sanitari Str, 050474, Bucharest, Romania
[7] University Hospital of Bucharest, Surgery Section, Bucharest, Romania
[8] University of Medicine and Pharmacy Carol Davila, 8 Eroii Sanitari Str, 050474, Bucharest, Romania, "Sf. Pantelimon" Emergency Clinical Hospital, General Surgery Department, 340 Sos. Pantelimon, 021659, Bucharest, Romania
[9] University of Medicine and Pharmacy Carol Davila, 8 Eroii Sanitari Str, 050474, Bucharest, Romania, "Sf. Pantelimon" Emergency Clinical Hospital, General Surgery Department, 340 Sos. Pantelimon, 021659, Bucharest, Romania

The notion of microbiome was introduced by one of the pioneers of molecular biology Joshua Lederberg, in 1958 to name the entirety of microbial microorganisms, their genetic elements and their interactions in an environment.

Practically, the human body carries 10 times more microbial cells than its own constitutive cells, and the number of microbial genes is 150 times larger than the genes of the human body. Our symbiosis with our own microbe gives birth to a unique hybrid organism[10].

With the revolution of the new theories, a greater importance was given to epigenetics, considering our inherited genetic baggage is just a cornerstone, interacting with environmental factors, activating gene behavior and modifying our structure and adaptation to the environment[11].

There is an abundance of studies in recent years that demonstrate the early epigenetic intervention in the preconceptional stage and microbial modeling ever since birth. Maternal hygiene, eating habits, preconception pathology, diet or stress during pregnancy, influences the component of its own microflora.

The act of birth is decisive for the "choice" of the initial bacterial baggage. Naturally born children colonize the existing bacteria at the level of the mother's vagina, while the majority flora is represented by different species of lactobacillus (sp and harbor, L. crispatus, L. inners, L. jensenii, L. gasseri) which develops under strict anaerobic conditions[12].

There are racial variations with regard to a certain bacterial preponderance: the white race and the Asians have a higher predominance of lactobacilli than the Hispanic or Blacks. Lactobacillus sp. predominates in Europeans and L. inners in African and Hispanic.

Even the pH varies depending on ethnic differences: 4,7-5 to the Hispanic and black race and 4,2-4,4 to the Asian and the White race.

The appearance of vaginal dismicrosms, vaginosis or vaginitis involves local microbial colonization, with the breakdown of the local defense barrier. By the act of birth the newborn can colonize digestive and tegumentary with specific flora (Gardnerella vaginalis, Sneathia, Eggerthella, Peptoniphilus, Prevotella, Anaerococcus, Atopobium, Mobiluncus, Finegoldia) or even E. coli and Neisseria gonorrhae. Cesarean-born babies colonize with bacteria from the mother's skin. Normal skin is colonized by Propionibacterium (anaerobes in hair follicles), Pitysporium and aerobic coci (Staphylococcus, Micrococus, S. hominis, S. epidermitis, S capitis, S colonies, S haemolyticus, S saprophyticus, A warnerii, Corynebacterium spp. bovis, C minutissimum, C xerosus, C hofmani, Brevibacterium spp, Propionibacterium acnes, P granulosum, P avidum)[13].

There are also racial differences here. S aureus is more common in white children than in blacks.

---

[10] Charbonneau, M.R. et al. A microbial perspective of human developmental biology. Nature 2016;535, 48–55

[11] Tamburini, S. et al.The microbiome in early life: implications for health outcomes. Nat. Med. 2016;22, 713–722

[12] Christian, P. et al. Risk of childhood undernutrition related to small-for-gestational age and preterm birth in low- and middle-income countries. Int. J. Epidemiol. 2013;42, 1340–1355; Koren, O. et al. Host remodeling of the gut microbiome and metabolic changes during pregnancy. Cell 2012;150, 470–480; DiGiulio, D.B. et al. Temporal and spatial variation of the human microbiota during pregnancy. Proc. Natl. Acad. Sci. U. S. A. 2015;112, 11060–11065.

[13] Shiozaki, A. et al. Intestinal microbiota is different in women with preterm birth: results from terminal restriction fragment length polymorphism analysis. PLoS One 9, 2014;e111374; Aagaard, K. et al. The placenta harbors a unique microbiome. Sci. Transl. Med. 2014;6, 237ra65; Gomez de Agüero, M. et al. The maternal microbiota drives early postnatal innate immune development. Science 2016;351, 1296–1302.

ISSN-E: 2344-0007 / ISSN-L: 2344-0007

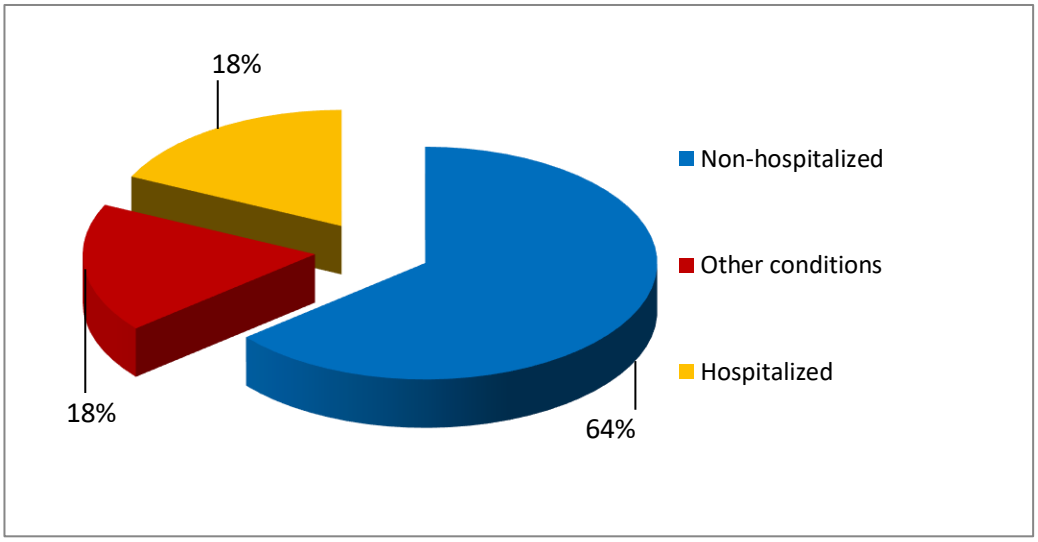
Tegumentary application of antiseptics that inhibits gram positive cocci causes secondary growth of gram negative ones.

Prospective studies have been conducted. One included 50 naturally-fed infants and only probiotics for rotavirus infection. Another, 50 children who were treated for pharyngitis and pharingoamigdalitis have received local treatment based on str Salivarius.

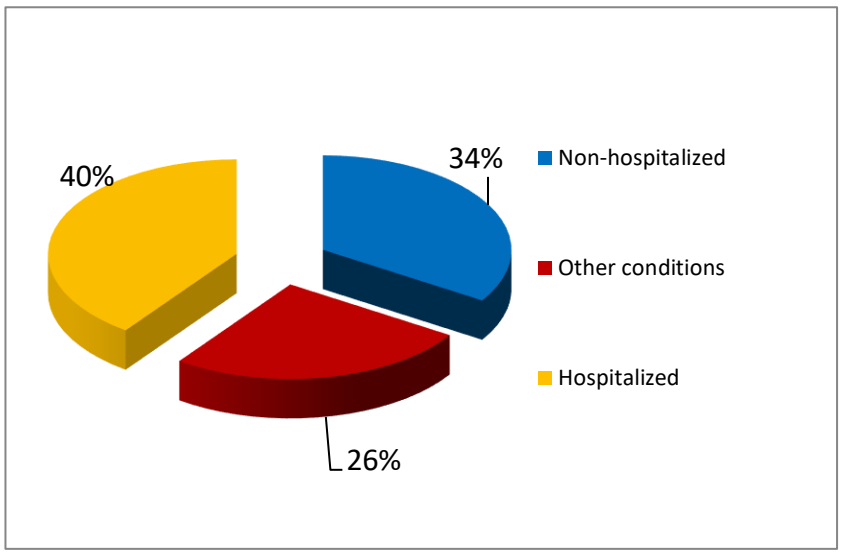
In the first study, the results were reported in a control group of artificially fed infants prior to rotavirus disease, and antibiotic therapy was introduced at the start of treatment throughout hospitalization. The pathophysiology of the rotavirus viral digestive infection is known to cause the fixation to the intestinal cells brush border, with their destruction following the invasion. The lactase that helps to digest lactose is destroyed, causing intolerance (transient) to lactose that explains diarrheal disease.

In naturally-fed infants, the duration of hospitalization was on average 28-34 hours shorter than the control group. Supplementing the diet with probiotics resulted in a quicker nutritional recovery (on average 40-42 hours) than the control group. Antibiotherapy administered prolonged diarrhea duration up to 3-5 days after discharge and weighing or descending weight curve. The median duration of hospitalization was 3 ± 1 days for infants treated with probiotics and 5 ± 2 days for those who received the antibiotic. In the antibiotic-treated group, the return to the milk preparation used before the illness was achieved after 6 ± 2 days after discharge, the children who were naturally fed did not change the dairy preparation during or after the disease.

In a 6-month post-illness period, 64% of babies breast-feeding naturally and treated with probiotics were no longer hospitalized for digestive conditions, 18% had other conditions and 18% had hospitalized digestive episodes.



In the control group, 40% were hospitalized for digestive affections, 26% for other conditions, the remaining 34% were hospitalized.



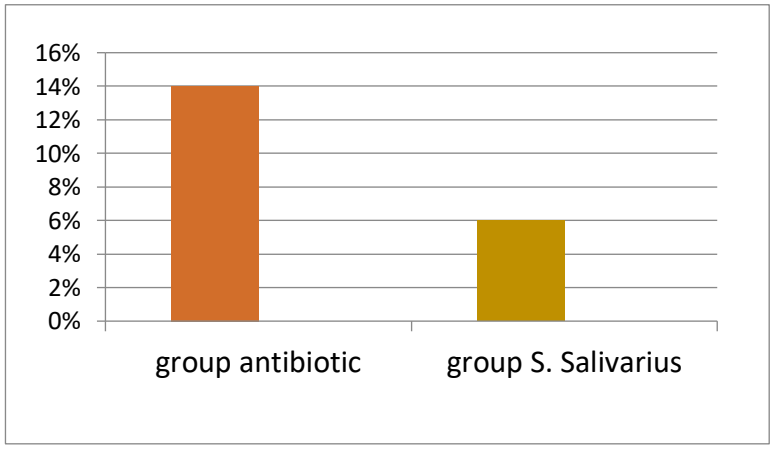
Study 2. Pharyngitis and pharyngitis in str Salivarius treatment - 50 cases versus 50 cases treated with antibiotic (on own initiative or medical indication.) Pharyngeal exudate was negative or found Staph.

The disappearance of symptomatology (dysphagia) occurred after approximately 72 ± 7 hours in the group treated with Salivarius S strains and at 48h ± 7 hours in those treated with antibiotics. It is possible to interfere with the "placebo" effect or psychological impact of "serious" antibiotic therapy at the expense of re-colonization treatment with healthy microflora.

Normalization of the clinical appearance at the pharyngeal inspection did not show any noticeable differences in the two therapies and occurred in about 4th-5th day of treatment.

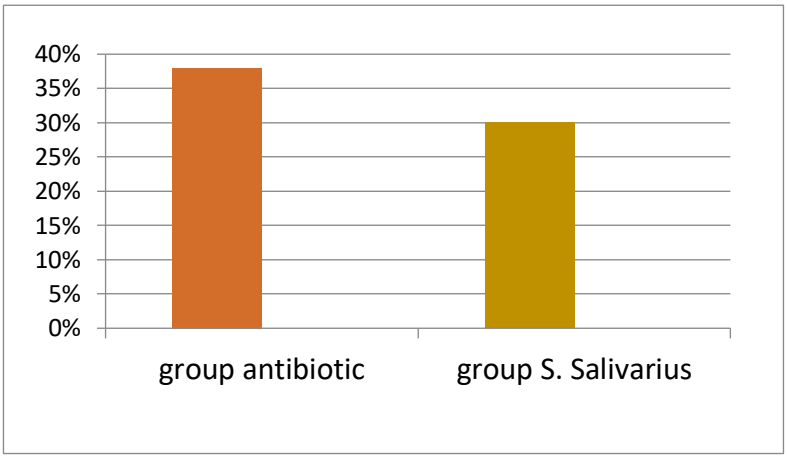
In 26% of patients treated with antibiotic, it was necessary to change the antibiotic after 3 days of initial treatment with the antibiogram.

In those treated with Str salivarius, was added bucopharyngeal antiseptics up to 18%. The percentage of colonization with Candida albicans spores was 14% in patients treated with antibiotics and in the S salivarius treatment group was 6%.



ISSN-E: 2344-0007 / ISSN-L: 2344-0007

Recurrence of pharyngitis at 6 months after antibiotic treatment and 6 months from the first 10-day cure with Str salivarius (were 3 total cures, 10 days / cure) was 38% in the antibiotic treated group and 30% at the group treated with Str salivarius.



DISCUSSIONS

The mechanism of action of probiotics seems to be complex: it occupies competitively the mucosal sites for which pathogenic bacteria or viruses colonize, alter and maintain a local pH unsuitable for disease conditions, compete with pathogens or neutralize toxic compounds produced by them (radicals free cell-cytotoxic effect).

CONCLUSIONS

Both studies suggest that the exogenous intake of "healthy" bacteria potentiates local flora in the mucous membranes (digestive and respiratory) to play antimicrobial defense.

Future therapies tend to become more and more personalized, according to the personal microbe, according to some studies, may have the "weight" of the blood groups, appreciating with some accuracy the potential type of affections that an individual might suffer.

In well-documented situations (viral infections with mucosal tropism viruses), probiotic therapy acts as a shield, preventing bacterial or candid colonization and replacing antibiotic therapy that is unnecessary or even harmful.

Both selected groups of children were fed naturally, providing an equal "start", knowing the protective role (via the "j" secretion synthesized in the galactosporal channels of the mammary gland that binds 2 secreting IgA molecules, of breast milk).

The costs of inappropriate antibiotic treatment far outweigh those of a probiotic treatment, the side effects of the first one being redoubtable - secondary candidiasis, a collateral effect that eventually amplifies the costs of therapy.

Ensuring a normal microflora with mucosal protective function seems to reduce the risk of recurrent infections.

ACKNOWLEDGEMENTS
All authors equally contributed in the research and drafting of this paper.
All authors report no potential conflict of interest.

ISSN-E: 2344-0007 / ISSN-L: 2344-0007

REFERENCES

1. **Charbonneau, M.R. et al.** A microbial perspective of human developmental biology. Nature 2016;535, 48–55
2. **Tamburini, S. et al**. The microbiome in early life: implications for health outcomes. Nat. Med. 2016;22, 713–722
3. **Christian, P. et al.** Risk of childhood undernutrition related to small-for-gestational age and preterm birth in low- and middle-income countries. Int. J. Epidemiol. 2013;42, 1340–1355
4. **Koren, O. et al.** Host remodeling of the gut microbiome and metabolic changes during pregnancy. Cell 2012;150, 470–480
5. **DiGiulio, D.B. et al**. Temporal and spatial variation of the human microbiota during pregnancy. Proc. Natl. Acad. Sci. U. S. A. 2015;112, 11060–11065
6. **Shiozaki, A. et al**. Intestinal microbiota is different in women with preterm birth: results from terminal restriction fragment length polymorphism analysis. PLoS One 9, 2014;e111374
7. **Aagaard, K. et al.** The placenta harbors a unique microbiome. Sci. Transl. Med. 2014;6, 237ra65
8. **Gomez de Agüero, M. et al.** The maternal microbiota drives early postnatal innate immune development. Science 2016;351, 1296–1302