



A Diagnostic and Treatment System Based on the Gut Microbiota Balance



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Abstract

Chronic diseases such as obesity, Diabetes, Inflammatory Bowel Disease, allergies, and others are becoming more frequent according to statistics. Nevertheless, health programs based on traditional strategies are not having the expected results. On the other hand, scientific findings have linked the gut microbiota role with metabolism, immune and hormonal response, as well as the brain-intestine axis finding. All these results had not been used in clinical practice. During last years, there have been collected scientific results from Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco A. C. and Grupo MaBiosis to apply this findings to create a system to evaluate traditional parameters and include gut microbiota parameters to generate a more accurate diagnosis; decide the best treatment, based on this diagnosis, and re-evaluate treatment to prove this treatment is the best for each patient. This system promotes the use of all these avant-garde technology in patients under health protocols with a higher response rate, then it has been developed to enrich clinical practice for health specialist and is able to be adapted to any specialty area in health sciences. It is considered crucial, to use technology a scientific finding to combat current problems.

Keywords: Gut microbiota; Nutrition; Health; Disease

Introduction

In accord to [1], overweight is a public problem health in all life stages. About 1.9 million of adults aged 18 years and older were overweight, and about 650 million were obese. About 41 million children younger than the age of 5 were overweight too in 2016. World Health Organization, Health programs continuous using the same strategies based on exercise and negative calorie balance without results. On the other hand, inflammatory and immunology diseases are more frequent. In accord to the Centers for Disease Control & Prevention reports, in United States, the prevalence of food allergy between 1997 and 2011 had increased in children about 50 percent [2]. (Food Allergy Research & Education) statistics reports show that health program strategies are failed, and it is necessary to look for new strategies, based on science to combat current problems. Different authors have determined that gut microbiota (GM), which is a complex ecosystem that includes a collection of organisms that live in the intestine, could play an important role in metabolism, immune response and endocrinology. Research performed together in Grupo MaBiosis S.A. de C.V. and the center of research Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco, A.C. (CIATEJ) during last seven years, have use this information to create a Diagnostic and Treatment System based on the GM balance that can be used as a tool for any patient to improve treatment response. Different research projects

were focused on to analyze microbial population in different life stage, different pathologic conditions such as Inflammatory Bowel Disease, obesity and overweight, and all this data could determine patters (microorganisms and metabolites) that were linked to patient's clinical information (clinical chemistry, anthropometry, dietetic, clinical evidence, signs and symptoms).

[3] determine that different strains of Bifidobacterium could stimulate systemic and intestinal immunity. [3,4] discover there is a significant impact on initial colonization, in accord to the birth canal, where infants born vaginally had an increased abundance of Bifidobacterium than those born by cesarean section. [4] was founded the field of microbial endocrinology, defined as "the study of the ability of microorganisms to produce and recognize neurochemicals that originate either within the microorganisms themselves or within the host they inhabit". [5] is where the role of short chain fatty acids (SCFA) and other metabolites get crucial for host metabolism. Some authors have reported the role of specific SCFA such as propionic acid in hepatic gluconeogenesis inhibition, increasing lipolysis; butyric acid as the principal substrate of colonocytes, promoting tight junctions' formation and improve membrane permeability; acetic acid that promotes an acid pH to inhibit pathogens proliferation in gut, and other beneficial effects [6,7].

Other studies, [8] determine that GM diversity could be a determining factor due to profiles were reduced in patients with primary sclerosing cholangitis, IBD compared to healthy controls [8]. Nevertheless, until now, there are lots of results where GM plays a crucial paper in health and disease; all these results had not been applied in clinical practice, so health specialists continue using traditional strategies that learned in university.

The system presented in this publication is performed in three stages:

A. Bioanalysis: where different parameters from the patient are evaluated: those that are well recognized and widely used (clinical chemistry, anthropometric, dietetic, etcetera) and an innovative parameter: GM analysis that can be determine by microbiology and other techniques (sequencing, PCR) the presence or absence of microorganism consider as biomarkers or stablish GM profiles. The conjunction of all these parameters will allow a better diagnosis in an integral way. However, other types of measurements can be added, such as specialized cabinet studies (imaging, radiology, more specific determinations such as hormonal), among others.

B. Biological restauration: in accord to results interpretation from Bioanalysis, the health specialist will decide the best treatment for every patient. It could include different strategies

a) Dietary changes: using a specific diet (FODMAP free, Ceto, vegan, etcetera). The best dietetic plan for each patient.

b) The use of probiotics, prebiotics o symbiotics: GM analysis provides enough information to determine a product that could improve patient's health in accord their need. Although there is a disadvantage: just a few products have clinical trial.

c) Pharmacotherapy: is established according to the diagnosis of the patient for the treatment of a present pathology, symptomatology or a metabolic imbalance.

d) Intestinal conditioning: is established according to the intestinal microbiota profile, in the case of presenting significant symptoms (such as inflammation, distension, or lack of response to a specific treatment) due to the presence of yeast and/or a pathogenic agent, is present or not an infection. This therapy is followed by a recolonization therapy, in order to recolonize in a targeted and personalized way.

e) Combination of the previous ones.

C. Re-evaluation: It is important to partially evaluate the results obtained in the second stage of this system in order to monitor this same treatment or adjust the course of treatment.

And if necessary, conduct more specialized studies. Following scientific evidence, patients from different health specialists have followed this system presented with higher response rates to their treatments. Since last year, this system has been used daily by about 20 health specialists in Mexico (nutritionists, infectologists, pediatricians, naturopath doctors, internists, endocrinologists, gastroenterologists) in their clinical practice. Last year, there were required about 500GM analyses for patient follow up with higher response rate to their treatment. Using this system, both, health specialist and patient discover some patients had specific intolerance to some food ingredients, or they discover the diagnosis of inflammatory bowel disease was not correct for some of them, some others could finally lose weight, some others discover they began to gain weight after an antibiotic treatment.

Conclusion

The use of a system that enrich diagnosis, decisions in treatment and re-evaluates, as a tool can improve patients management and hit in the treatment

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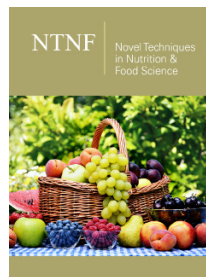
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