

# Professional Master's Degree

## Human Microbiota





## Professional Master's Degree

### Human Microbiota

Course Modality: Online

Duration: 12 months

Certificate: TECH Technological University

Official N° of hours: 1,500 h.

Website: [www.techtute.com/us/nutrition/professional-master-degree/master-human-microbiota](http://www.techtute.com/us/nutrition/professional-master-degree/master-human-microbiota)

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# 01

# Introduction

In recent decades, scientific studies have focused on microbiota research, as well as its involvement in the prevention and appearance of certain pathologies and nutritional problems. Laboratories have also advanced in the creation of probiotics and prebiotics with clinical applications in gastroenterology or in patients with obesity. In this sense, it is imperative for nutrition professionals to be up to date with recent scientific evidence in this area and its applications in their daily clinical practice. For this reason, this program was created where, with innovative teaching material, the nutritionist can delve into the nutritional modulation of intestinal dysbiosis and hyperpermeability, eating behavior disorders or the latest scientific postulates on the alteration of the intestinal ecosystem. All this in a 100% online teaching, which allows access to its content at any time from a computer.





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*With this Professional Master's Degree, you will be up to date with the most recent research on the alteration of the microbiota and its relationship with food allergies"*

Obesity has become a pandemic and a global public health concern, due to the negative repercussions on people's health, The role of the nutritionist in this type of patient is crucial. In addition to creating an appropriate diet to address issue, the professional can now go a step further and make an individualized adaptation of the diet itself thanks to the exhaustive knowledge about the functioning and involvement in the health of the human microbiota.

The extensive scientific literature in recent years on clinical applications and diagnostic methods has shed light, facilitating the recovery of people suffering from digestive disorders, nutrient malabsorption problems or infections in the genitourinary tract. Progress that has driven the proliferation of probiotic and prebiotic products applied to multiple diseases or functional disorders. In a booming and continuously advancing field, the nutrition professional needs to update his knowledge in order to maintain an adequate praxis. That is why this Professional Master's Degree brings the nutritionist closer to the most exhaustive and recent information in the field of the Human Microbiota.

Through innovative didactic resources, the student who attends this Professional Master's Degree will obtain the most updated knowledge about intestinal homeostasis, its effects on digestion and nutrition, the stimulation of defences or the composition of the intestinal microbiota in the different stages of life. Likewise, students will be able to delve into the advances achieved in the relationship between the appearance of allergies and an imbalance in the microbiota. Therefore, the professional will have a specialized teaching team that has carefully prepared the content of this degree, in order to offer the most relevant and recent scientific postulates in this field.

In addition, TECH has designed a 100% online program, flexible and convenient, where you can access the most reliable knowledge about the Human Microbiota. Thus, students only need an electronic device to consult or download the syllabus at any time of the day. This educational program does not require attendance or classes with fixed schedules and allows students to distribute its content according to their needs. The professional is, therefore, facing a quality education, which allows him to combine a Professional Master's Degree with the most demanding responsibilities.

This **Professional Master's Degree in Human Microbiota** contains the most complete and up-to-date scientific program on the market. Its most outstanding features are:

- Clinical cases presented by experts in Human Microbiota
- Its graphic, schematic and practical contents, with which they are conceived, gather scientific and assistance information on those disciplines that are essential for professional practice
- New diagnostic-therapeutic developments on assessment, diagnosis, and intervention in problems or disorders related to the Microbiota
- Contains practical exercises, where the process of self-assessment can be carried out to improve learning
- An algorithm-based interactive learning system for decision-making in the clinical situations presented throughout the course
- With special emphasis on evidence-based medicine and research methodologies in Human Microbiota
- All of this will be complemented by theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection



*The clinical case studies in this program will bring you closer to techniques and knowledge about the Human Microbiota, which you can integrate into your daily practice"*

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*This 100% online program will keep you up to date on advances in the Hyperpermeability of glutamine, zinc or vitamins”*

*Make this Professional Master's Degree compatible with your professional responsibilities. TECH adapts to you.*

*With this program you will learn about the current lines of research on the microbiota and celiac disease.*

The program's teaching staff includes professionals from the sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.



# 02 Objectives

The main objective of this program is to provide nutrition professionals with the latest information on Human Microbiota, allowing them to keep abreast of advances in the clinical applications of probiotics and prebiotics in endocrinology, cardiovascular disorders or nutritional diseases. For this purpose, video summaries, detailed videos and specialized readings are available to students 24 hours a day.





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*The multimedia resources will allow you to delve in a more dynamic way into the modulation of the altered intestinal microbiota”*



## General Objectives

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- ♦ Offer a complete and wide vision of the current situation in the area of the Human Microbiota, in its widest sense, the importance of the balance of this Microbiota as a direct effect on our health, with the multiple factors that influence it positively and negatively
- ♦ Argue with scientific evidence how the microbiota and its interaction with many non-digestive pathologies, of autoimmune nature or its relationship with the deregulation of the immune system, the prevention of diseases and as support to other treatments in the daily practice of nursing
- ♦ Promote work strategies based on the integral approach of the patient as a reference model, not only focusing on the symptomatology of the specific pathology, but also looking at its interaction with the microbiota and how it may be influencing it
- ♦ Encourage professional stimulation through continuing education and research
- ♦ Update and clarify general and key terms for a full understanding of the subject such as Microbiome, Metagenomics, Microbiota, Symbiosis, Dysbiosis
- ♦ Study the microbial communities that coexist in symbiosis with the human being, learning more about their structure and functions and how these communities can be altered due to factors such as diet, lifestyle, etc.
- ♦ Delve into the knowledge of the intestinal microbiota as the main axis of the human microbiota and its interrelation with the rest of the body, its study methods and its applications in clinical practice to maintain a good state of health
- ♦ Understand the relationship between intestinal pathologies: Small Intestinal Bacterial Overgrowth (SIBO), Irritable Bowel Syndrome (IBS), Crohn's disease, and intestinal dysbiosis





- Learn how to manage in an updated way the different intestinal infections caused by viruses, bacteria, parasites, fungi by modulating the altered intestinal microbiota
- Delve into the bidirectional relationship between microbiota and neuroimmunological system and to study in depth the intestine-microbiota-brain axis and all the pathologies that are generated in its imbalance
- Acquire an in-depth knowledge of all the oral and respiratory structure and the ecosystems that live in them, seeing how an alteration of these ecosystems has a direct relationship with many associated pathology
- Study the mechanisms by virtue of which probiotics are postulated as preventive in the formation of dental caries and periodontal diseases
- Know how a negative modulation in our microbiota can favor the appearance of food intolerances and allergies
- Delve into how drugs with human targets can have a negative impact on the intestinal microbiota, in addition to the known impact of antibiotics
- Have a thorough understanding of the safety profile of probiotics, since, although their use has spread in recent years thanks to their proven efficacy, both for the treatment and prevention of certain diseases, this does not exempt them from generating adverse effects and potential risks



## Specific Objectives

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### Module 1. Microbiota. Microbiome. Metagenomics

- Update and clarify general and key terms for a full understanding of the subject such as Microbiome, Metagenomics, Microbiota, Symbiosis, Dysbiosis
- Expand knowledge of how drugs designed for humans can have a negative impact on the gut microbiota, in addition to the known impact of antibiotics

### Module 2. Gut Microbiota I. Intestinal homeostasis

- Study the microbial communities that coexist in symbiosis with humans, learning more about their structure and functions and how these communities can be altered due to factors such as diet, lifestyle, etc.
- Understand the relationship between intestinal pathologies: Small intestinal bacterial overgrowth (SIBO), irritable bowel syndrome (IBS), Crohn's disease and intestinal dysbiosis

### Module 3. Gut Microbiota II. Intestinal Dysbiosis

- Delve into the knowledge of the Intestinal Microbiota as the main axis of the Human Microbiota and its interrelation with the rest of the body, its study methods, and its applications in clinical practice to maintain a good state of health
- Learn how to manage the different intestinal infections caused by viruses, bacteria, parasites, fungi affecting the intestinal microbiota

### Module 4. Microbiota in Neonatology and Pediatrics

- Delve into the most influential factors of the intestinal microbiota of the mother, both in childbirth and in the gestation period itself
- Delve into the clinical applications of probiotics and prebiotics in the pediatric patient

### Module 5. Oral Microbiota and Respiratory Tract

- Study the mechanisms by virtue of which Probiotics are postulated as preventive in the formation of dental caries and periodontal diseases
- Acquire an in-depth knowledge of all the oral and respiratory structure and the ecosystems that live in them, seeing how an alteration of these ecosystems has a direct relationship with many associated pathologies

### Module 6. Microbiota and Immune System

- Delve into the bidirectional relationship between Microbiota and Neuroimmunological System and study in depth the intestine-microbiota-brain axis and all the pathologies that are generated in its imbalance
- Analyze the role of nutrition and lifestyle and their interaction with the immune system and Microbiota

### Module 7. Skin Microbiota

- Study the factors that regulate the type of bacterial flora in the skin
- Know the methods of approach to triggered skin diseases

### Module 8. Genitourinary Tract Microbiota

- Analyze the main microorganisms causing urinary infections and their relationship with the alteration of the Microbiota in men and women
- An in-depth look at the role of probiotics in the prevention of the main infections of the genitourinary tract



### **Module 9. Relationship between Intolerances/Allergies and Microbiota**

- ◆ Know how a negative modulation in our Microbiota can favor the appearance of food intolerances and allergies
- ◆ Delve into Microbiota changes in patients with food exclusion diets such as gluten

### **Module 10. Probiotics, Prebiotics, Microbiota, and Health**

- ◆ Know in depth the safety profile of Probiotics, since, although their use has spread in recent years thanks to their proven efficacy, both for the treatment and prevention of certain diseases, this does not exempt them from generating adverse effects and potential risks
- ◆ Analyze the various clinical applications of probiotics and prebiotics in areas such as urology, gynecology, gastroenterology and immunology

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*Access whenever you want, from your computer or tablet, the most up-to-date knowledge on food intolerances and allergies”*

# 03 Skills

Upon completion of this Professional Master's Degree, the nutrition professional will have enhanced their competencies in the proper application of probiotics and prebiotics, as well as their skills to identify and develop the most appropriate nutritional program for patients suffering from obesity, gluten allergy or celiac disease. The clinical case simulations provided by the specialists who teach this program will facilitate the broadening of these competencies and skills.





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*This is a program that will provide you with the latest information on intestinal dysbiosis and its relationship to immune disorders"*



## General Skills

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- Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
- Apply acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study
- Be able to integrate knowledge and face the complexity of making judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments
- Communicate conclusions - and the ultimate knowledge and rationale behind them - to specialized and non-specialized audiences in a clear and unambiguous way
- Acquire the learning skills that will enable them to continue studying in a manner that will be largely self-directed or autonomous

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*This program will introduce you to the latest techniques used in quantitative stool analysis of microorganisms”*







## Specific Skills

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- ♦ Give a global vision of the Human Microbiota, so that the professional has a deeper knowledge of this community of microorganisms that coexist with us and the functions they perform in our body
- ♦ Know the type, importance, and functions of the intestinal microbiota in all patients, but particularly in pediatrics, as well as its relationship with digestive and non-digestive diseases
- ♦ Understand how there are many factors that can alter the balance of this human ecosystem, leading us to a state of illness.
- ♦ Knowing what factors can help maintain the balance of this ecosystem to maintain a good state of health
- ♦ Update and expand knowledge with special education and interest in Probiotic Therapy, Prebiotic Therapy and the latest advances in this field, such as fecal transplantation, the current situation and future development pathways, as the main tools we have to optimize the functions of the Microbiota and its future projection

04

# Course Management

TECH, in its commitment to offer quality education, rigorously selects all the teachers who teach its programs, paying special attention to their high qualifications and professional experience in the subject they will teach. Thus, the nutrition professional who enters this Professional Master's Degree will have at his disposal a specialized teaching team that will show him the latest advances in microbiota and will resolve any doubts that may arise about the syllabus.



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*Microbiota experts with experience in reference clinical centers will provide you with the most up-to-date knowledge on the functioning of the Human Microbiota"*

## Guest Directors



### Dr. Sánchez Romero, María Isabel

- ♦ Area Specialist in the Microbiology Department of the Puerta de Hierro University Hospital, Madrid
- ♦ Medical Specialist in Clinical Microbiology and Parasitology
- ♦ Member of the Spanish Society of Infectious Diseases and Clinical Microbiology
- ♦ Technical Secretary of the Madrid Society of Clinical Microbiology
- ♦ Doctor in Medicine and Surgery from the University of Salamanca (2003) with the qualification of outstanding cum laude
- ♦ Degree in Medicine and Surgery from the University of Salamanca



### Dr. Portero, María Francisca

- ♦ Acting Head of the Microbiology Department of the Puerta de Hierro University Hospital, Madrid
- ♦ Specialist in Clinical Microbiology and Parasitology, Puerta de Hierro University Hospital, Madrid
- ♦ Postgraduate in Clinical Management by Gaspar Casal Foundation
- ♦ Doctorate in Medicine from the Autonomous University Madrid
- ♦ Degree in Medicine and Surgery from the Autonomous University of Madrid



### **Ms. Alarcón Cavero, Teresa**

- ♦ Specialist in the Microbiology Department at the La Princesa University Hospital
- ♦ Head of Group 52 of the Research Institute of the La Princesa Hospital
- ♦ Master's Degree in Medical Microbiology from the Complutense University of Madrid
- ♦ Degree in Biological Sciences with a major in Fundamental Biology from the Complutense University of Madrid



### **Dr. Muñoz Algarra, María**

- ♦ Area Specialist in the Microbiology Department of the Puerta de Hierro Majadahonda University Hospital, Madrid
- ♦ Head of Patient Safety of the Microbiology Service in the H.U. Puerto de Hierro Hospital Majadahonda
- ♦ Teaching collaborator at the School of Medicine in the subject of Microbiology at the Autonomous University of Madrid
- ♦ Doctorate in Pharmacy from the Complutense University of Madrid
- ♦ Degree in Pharmacy from the University of Valencia



### Mr. López Dosil, Marcos

- ◆ Specialist Physician of the Microbiology and Parasitology Department of the Hospital de Móstoles
- ◆ Master's Degree in Infectious Diseases and Antimicrobial Treatment from CEU Cardenal Herrera University
- ◆ Master's Degree in Tropical and Health Medicine from the Autonomous University of Madrid
- ◆ Expert in Tropical Medicine from the Autonomous University Madrid
- ◆ Degree in Medicine from the University of Santiago de Compostela



### Anel Pedroche, Jorge

- ◆ Facultative Area Specialist. Microbiology Department, Puerta de Hierro University Hospital, Majadahonda, Spain
- ◆ Degree in Pharmacy from the Complutense University of Madrid

## Management



### **Ms. Fernández Montalvo, María Ángeles**

- ♦ Parapharmacy Manager, Nutrition and Natural Medicine Professor
- ♦ Specialist in Food Intolerances and the Study of Intestinal Microbiota
- ♦ Member of the Spanish Society of Probiotics and Prebiotics (SEPyP)
- ♦ Member of the Spanish Society of Dietetics (SEDCA)
- ♦ Member of the Spanish Society of Nutrition (SEÑ)
- ♦ Specialist Degree in Nutrition, Dietetics and Diet Therapy
- ♦ Expert in Microbiological Food Analysis
- ♦ Expert in Nutrition, Food, and Cancer. Prevention and Treatment
- ♦ Expert in Vegetarian, Clinical, and Sports Nutrition
- ♦ Expert in the current use of Nutricosmetics and Nutraceuticals in general
- ♦ Expert in point-of-sale management in Pharmacies and Parapharmacies
- ♦ Diploma in Natural and Orthomolecular Medicine
- ♦ Member of the Spanish Society of Probiotics and Prebiotics (SEPyP)
- ♦ Member of the Spanish Society of Dietetics (SEDCA)
- ♦ Member of the Spanish Society of Nutrition (SEÑ)
- ♦ Degree in Biochemistry from the University of Valencia

## Professors

### Dr. Alonso Arias, Rebeca

- ♦ Specialist Immunology Physician at the Central University Hospital of Asturias.
- ♦ Heads the Immunosenescence research group of the Central University Hospital of Asturias Immunology Service
- ♦ 1st National Award for Research in Sports Medicine
- ♦ Degree in Biology from the University of Oviedo
- ♦ Doctorate in Biological Sciences from the Complutense University of Madrid

### Ms. Álvarez García, Verónica

- ♦ Digestive system specialist at the Central Hospital of Asturias (HUCA)
- ♦ Degree in Medicine

### Ms. Bueno García, Eva

- ♦ Pre-doctoral researcher in the research group of Immunosenescence of the Immunology Service of the Central University Hospital of Asturias (HUCA)
- ♦ Master's Degree in Biomedicine and Molecular Oncology from the University of Oviedo
- ♦ Degree in Biology from the University of Oviedo

### Dr. Fernández Madera, Juan

- ♦ Allergy Specialist
- ♦ Degree in Medicine

### Dr. Gabaldon Estevani, Toni

- ♦ Co-Founder and Scientific Advisor (CSO) Microomics SL
- ♦ ICREA Research Professor and Group Leader of the Comparative Genomics Laboratory
- ♦ Dr. in Biology, researcher at Centre for Genomic Regulation | CRG - Bioinformatics and Genomics

### Dr. Gonzalez Rodríguez, Silvia Pilar

- ♦ Medical Subdirector, Research Coordinator and Clinical Chief of the Menopause and Osteoporosis Unit at the Velázquez Medical Cabinet (Madrid)
- ♦ PhD in Medicine and Surgery from the University of Alcalá de Henares. Gynecology Specialist

### Dr. Lombó Burgos, Felipe

- ♦ Associate Professor at University of Oviedo
- ♦ PhD in Biology and head Professor from the University of Oviedo

### Mr. Uberos, José

- ♦ Neonatal Intensive Care Unit Clinical Assistant, San Cecilio Clinical Hospital
- ♦ Associate Professor of Pediatrics, University of Granada
- ♦ Associate Professor at the Faculty of Medicine at the University of Granada
- ♦ Vocal Bioethics Research Committee of the Province of Granada (Spain)
- ♦ Coeditor of the Signs and Symptoms Journal
- ♦ Professor Antonio Galdo Award. Society of Pediatrics of Eastern Andalusia. For the article entitled: Analysis of nutritional intake in very low birth weight infants and its impact on the severity of bronchopulmonary dysplasia and other comorbidities
- ♦ Editor of the Journal of the Pediatric Society of Eastern Andalusia (Bol. SPAO)
- ♦ Member of the Organizing Committee of the XIV Congress of the Spanish Society of Adolescent Medicine

### Dr. López López, Aranzazu

- ♦ Ph.D. in Biological Sciences
- ♦ Researcher in oral microbiology at FISABIO foundation



**Ms. López Martínez, Rocío**

- ♦ Resident Internal Biologist of Clinical Immunology at the Central University Hospital of Asturias
- ♦ Degree in Biochemistry from the University of Murcia
- ♦ Professional Master's Degree in Bioinformatics and Biostatistics from the Catalan Open University (UOC) and the University of Barcelona

**Dr. López Vázquez, Antonio**

- ♦ Specialist in Immunology, Central University Hospital of Asturias (HUCA)

**Dr. Losa Domínguez, Fernando**

- ♦ Obstetrician-Gynecologist and Maternologist
- ♦ Expert in Menopause certified by the AEEM (Spanish Association for the Study of Menopause)
- ♦ Expert in Gynecoesthetics from the University of Barcelona

**Dr. Méndez García, Celia**

- ♦ Doctorate in Microbiology from the University of Oviedo
- ♦ Research at Novartis Laboratories (Boston)

**Dr. Narbona López, Eduardo**

- ♦ Professor of Pediatrics, University of Granada, Spain
- ♦ Speciality Neonatal Unit, San Cecilio University Hospital

**Ms. Rodríguez Fernández, Carolina**

- ♦ Degree in Biology from the University of Oviedo

**Dr. Rioseras de Bustos, Beatriz**

- ♦ Immunology Resident at HUCA
- ♦ Bachelor's Degree in Biology. University of Oviedo
- ♦ Master's Degree in Neuroscience Research, University of Oviedo
- ♦ Doctorate from the University of Oviedo. "Streptomyces development: regulation and industrial applications"

**Dr. Solís Sánchez, Gonzalo**

- ♦ Neonatologist at the Hospital Universitario Central de Asturias (HUCA)
- ♦ Researcher, Associate Professor of the University of Oviedo

**Ms. Suárez Rodríguez, Marta**

- ♦ Neonatologist of the Central University Hospital of Asturias (HUCA)
- ♦ Researcher and Professor of the Professional Master's Degree in Early Care and the Professional Master's Degree in Critical Care Nursing at the University of Oviedo and other training courses

**Ms. Verdú López, Patricia**

- ♦ Specialty of Allergology at the University Hospital Dr. Negrín in Las Palmas of Gran Canaria
- ♦ Professional Master's Degree in Aesthetic and Antiaging Medicine at the Complutense University of Madrid
- ♦ Degree in Medicine from the University of Oviedo

# 05

## Structure and Content

This Professional Master's Degree has been designed to offer the most exhaustive and updated information. For this purpose, a study plan has been developed that will take the students, over 12 months, to be up to date with the advances that have occurred in the changes of the microbiota in patients with food exclusion diet, the mechanisms of action of probiotics and prebiotics or the main factors that influence the balance and imbalance of the microbiota. Likewise, the Relearning system, based on the reiteration of content, will facilitate the progression of students in the program, reducing even the long hours of study.





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*A Professional Master's Degree that will keep you up to date with the latest studies on eubiosis and intestinal dysbiosis."*

## Module 1. Microbiota. Microbiome. Metagenomics

- 1.1. Definition and Relationship Between Them
- 1.2. Microbiota Composition: Genera, Species and Strains
- 1.3. Different Human Microbiota. General Overview of Eubiosis and Dysbiosis
  - 1.3.1. Gastrointestinal Microbiota
  - 1.3.2. Oral Microbiota
  - 1.3.3. Skin Microbiota
  - 1.3.4. Respiratory Tract Microbiota
  - 1.3.5. Urinary Tract Microbiota
  - 1.3.6. Reproductive System Microbiota
- 1.4. Factors that Influence Microbiota Balance and Imbalance
  - 1.4.1. Diet and Lifestyle. Intestine-Brain Axis
  - 1.4.2. Antibiotic Therapy
  - 1.4.3. Epigenetic-Microbiota Interaction. Endocrine Disruptors
  - 1.4.4. Probiotics, Prebiotics, Symbiotics. Concepts and Overviews
  - 1.4.5. Fecal Transplant, Latest Advances

## Module 2. Gut Microbiota I. Intestinal Homeostasis

- 2.1. Gut Microbiota Studies
  - 2.1.1. Projects MetaHIT, Meta-Biomed, MyNewGut, Human Microbiome Project
- 2.2. Microbiota Composition
  - 2.2.1. Protective Microbiota (Lactobacillus, Bifidobacterium, Bacteroides)
  - 2.2.2. Immunomodulatory Microbiota (Enterococcus faecalis and Escherichia coli)
  - 2.2.3. Mucoprotective or Muconutritive Microbiota (Faecalibacterium prausnitzii and Akkermansia muciniphila)
  - 2.2.4. Microbiota with Proteolytic or Proinflammatory Activities (E. coli Biovare, Clostridium, Proteus, Pseudomonas, Enterobacter, Citrobacter, Klebsiella, Desulfovibrio, Bilophila)
  - 2.2.5. Fungal Microbiota (Candida, Geotrichum)
- 2.3. Digestive System Physiology. Composition of the Microbiota in the Different Parts of the Digestive Tract. Resident Flora and Transient or Colonizing Flora. Sterile Areas in the Digestive Tract
  - 2.3.1. Esophageal Microbiota
    - 2.3.1.1. Healthy Individuals
    - 2.3.1.2. Patients (Gastric Reflux, Barrett's Esophagus, etc.)





- 2.3.2. Gastric Microbiota
  - 2.3.2.1. Healthy Individuals
  - 2.3.2.2. Patients (Gastric Ulcer, Gastric Cancer, MALT, etc)
- 2.3.3. Gallbladder Microbiota
  - 2.3.3.1. Healthy Individuals
  - 2.3.3.2. Patients (Cholecystitis, Cholelithiasis, etc.)
- 2.3.4. Small Intestine Microbiota
  - 2.3.4.1. Healthy Individuals
  - 2.3.4.2. Patients (Inflammatory Bowel Disease, Irritable Bowel Syndrome, etc.)
- 2.3.5. Colon Microbiota
  - 2.3.5.1. Healthy Individuals. Enterotypes
  - 2.3.5.2. Patients (Inflammatory Bowel Disease, Crohn's Disease, Colon Carcinoma, Appendicitis, etc..)
- 2.4. Gut Microbiota Functions: Metabolic. Nutritional and Trophic. Protective and Barrier. Immunological
  - 2.4.1. Interrelationships Between the Intestinal Microbiota and Distant Organs (Brain, Lung, Heart, Liver, Pancreas, etc.)
- 2.5. Intestinal Mucosa and Mucosal Immune System
  - 2.5.1. Anatomy, Characteristics, and Functions (MALT, GALT, and BALT System)
- 2.6. What is Intestinal Homeostasis? Role of Bacteria in Intestinal Homeostasis
  - 2.6.1. Effects on Digestion and Nutrition
  - 2.6.2. Defence Stimulation, Hindering Colonization by Pathogenic Microorganisms
  - 2.6.3. Production of Vitamin B and K
  - 2.6.4. Production of Short Chain Fatty Acids (Butyric, Propionic, Acetic, etc.)
  - 2.6.5. Production of Gases (Methane, Carbon Dioxide, Molecular Hydrogen). Properties and Functions
  - 2.6.6. Lactic Acid

### Module 3. Gut Microbiota II. Intestinal Dysbiosis

- 3.1. What is Intestinal Dysbiosis? Consequences
- 3.2. Intestinal Barrier. Physiology. Function. Intestinal Permeability and Hyperpermeability. Relationship between Intestinal Dysbiosis and Intestinal Hyperpermeability
- 3.3. Relationship of Intestinal Dysbiosis and Other Types of Disorders: Immunological, Metabolic, Neurological and Gastric (*Helicobacter Pylori*)
- 3.4. Consequences of the Alteration of the Intestinal Ecosystem and its Relationship to Functional Digestive Disorders
  - 3.4.1. Inflammatory Bowel Disease IBD
  - 3.4.2. Chronic Inflammatory Bowel Diseases: Crohn's Disease. Ulcerative Colitis
  - 3.4.3. Irritable Bowel Syndrome (IBS) and Diverticulitis
  - 3.4.4. Intestinal Motility Disorders. Diarrhea. Diarrhea Caused by *Clostridium Difficile*. Constipation
  - 3.4.5. Digestive Disorders and Nutrient Malabsorption Problems: Carbohydrates, Proteins and Fats
  - 3.4.6. Markers of Intestinal Inflammation: Calprotectin. Eosinophil Cationic Protein (ECP). Lactoferrin. Lysozyme
  - 3.4.7. Leaky Gut Syndrome. Permeability Markers: Alpha-1 Antitrypsin. Zonulin. Tight Junctions and their Main Function
- 3.5. Alteration of the Intestinal Ecosystem and its Relationship with Intestinal Infections
  - 3.5.1. Viral Intestinal Infections
  - 3.5.2. Bacterial Intestinal Infections
  - 3.5.3. Intestinal Infections due to Parasites
  - 3.5.4. Fungal Intestinal Infections. Intestinal Candidiasis
- 3.6. Composition of the Intestinal Microbiota in the Different Stages of Life
  - 3.6.1. Variation in Gut Microbiota Composition from the Neonatal-Early Childhood Stage to Adolescence. "Unstable Period"
    - 3.6.1.1. Composition of the Intestinal Microbiota in Adulthood. "Stable Period"
    - 3.6.1.2. Gut Microbiota Composition in the Elderly "Unstable Stage". Aging and Microbiota
- 3.7. Nutritional Modulation of Intestinal Dysbiosis and Hyperpermeability: Glutamine, Zinc, Vitamins, Probiotics, Prebiotics
- 3.8. Techniques for Quantitative Analysis of Microorganisms in Feces
- 3.9. Current Lines of Research

### Module 4. Microbiota in Neonatology and Pediatrics

- 4.1. Mother-Child Symbiosis
- 4.2. Influencing Factors on the Gut Microbiota of the Mother during Pregnancy and during Birth. Influence of the Type of Delivery on the Microbiota of the New-born
- 4.3. Type and Duration of Breastfeeding, Influence on the Infant's Microbiota
  - 4.3.1. Breast Milk: Composition of the Breast Milk Microbiota. Importance of Breastfeeding in the New-born's Microbiota
  - 4.3.2. Artificial Breastfeeding. Use of Probiotics and Prebiotics in Infant Milk Formulas
- 4.4. Clinical Applications of Probiotics and Prebiotics in Pediatric Patients
  - 4.4.1. Digestive Pathologies: Functional Digestive Disorders, Diarrhea, Necrotizing Enterocolitis. Intolerances
  - 4.4.2. Non-digestive Pathologies: Respiratory and ENT, Atopic Diseases, Metabolic Diseases. Allergies
- 4.5. Influence of Antibiotic and other Psychotropic Treatment on the Microbiota of the Infant
- 4.6. Current Lines of Research

### Module 5. Oral Microbiota and Respiratory Tract

- 5.1. Structure and Oral Ecosystems
  - 5.1.1. Main Ecosystems that are Differentiated in the Oral Cavity
  - 5.1.2. Characteristics and Composition of Each of Them. Nostrils, Nasopharynx and Oropharynx
- 5.2. Alterations of the Oral Microbial Ecosystem: Oral Dysbiosis. Relationship with Different Oral Disease States
  - 5.2.1. Cavities
  - 5.2.2. Halitosis
  - 5.2.3. Periodontal and Gingival Diseases
  - 5.2.4. Peri-Implant Diseases
  - 5.2.5. Other Infectious Diseases: *Candida Albicans*
- 5.3. Influence of External Agents in Oral Eubiosis and Dysbiosis. Hygiene
- 5.4. Structure of the Respiratory Tract and Composition of the Microbiota and Microbiome
  - 5.4.1. Upper Respiratory Tract (Nasopharynx, Middle Ear, Sinuses, and Tonsils)
  - 5.4.2. Lower Respiratory Tract (Trachea, Lungs, Bronchi, Bronchioles and Alveoli)
- 5.5. Factors that Regulate the Respiratory Microbiota
  - 5.5.1. Microbial Immigration
  - 5.5.2. Elimination of Microbes and the Reproduction Rates of its Members

- 5.6. Alteration of the Respiratory Tract Microbiota and its Relationship with Different Respiratory Tract Diseases
- 5.7. Therapeutic Manipulation of the Microbiome of the Oral Cavity in Prevention and Treatment of Diseases Related to it
- 5.8. Therapeutic Manipulation of the Microbiome of the Respiratory Tract in Prevention and Treatment of Related Diseases
- 5.9. Current Lines of Research and Clinical Applications

## Module 6. Microbiota and Immune System

- 6.1. Immune System Physiology. What is Immunity?
  - 6.1.1. Immune System Components
    - 6.1.1.1. Lymphoid Tissue
    - 6.1.1.2. Immune Cells
    - 6.1.1.3. Chemical Systems
- 6.2. Organs Involved in Immunity
  - 6.2.1. Primary Organs
  - 6.2.2. Secondary Organs
- 6.3. Innate, Non-Specific, or Natural Immunity
- 6.4. Acquired, Adaptive, or Specific Immunity
- 6.5. Nutrition and Lifestyle: Interaction with the Immune System and the Microbiota
- 6.6. Functional Foods and their Effect on the Immune System
  - 6.6.1. Probiotics, Prebiotics, and Symbiotics
  - 6.6.2. Nutraceuticals and Functional Foods
- 6.7. Bidirectional Relationship between Microbiota and Neuroimmunoendocrine System
- 6.8. Microbiota, Immunity and Nervous System Disorders: Anxiety, Depression, Autism, Schizophrenia, or Alzheimer's Disease
- 6.9. The Gut-Microbiota-Brain Axis
- 6.10. Current Lines of Research

## Module 7. Skin Microbiota

- 7.1. Skin Physiology
  - 7.1.1. Skin Structure Epidermis, Dermis and Hypodermis
  - 7.1.2. Functions of the Skin
  - 7.1.3. Microbial Composition of the Skin
- 7.2. Factors that Regulate the Type of Bacterial Flora in the Skin
  - 7.2.1. Sweat Glands, Sebaceous Glands, Desquamation
  - 7.2.2. Factors that Alter the Ecology of the Skin and its Microbiota
- 7.3. Skin Immune System
  - 7.3.1. Epidermis; Essential Element of our Defences
  - 7.3.2. Elements of the Cutaneous Immune System: Cytosines, Keratinocytes, Dendritic Cells, Lymphocytes, Antimicrobial Peptides
  - 7.3.3. Influence of the Skin Microbiota on the Skin Immune System. Staphylococcus Epidermidis, Staphylococcus Aureus
- 7.4. Alteration of the Normal Skin Microbiota (Dysbiosis)
  - 7.4.1. Impaired Barrier Function
- 7.5. Triggered Skin Diseases
  - 7.5.1. Psoriasis (Streptococcus Pyogenes)
  - 7.5.2. Acne Vulgaris
  - 7.5.3. Atopic Dermatitis
  - 7.5.4. Rosacea
- 7.6. Influence of the use of Probiotics in the Prevention and Treatment of Different Skin Diseases
- 7.7. Current Lines of Research

## Module 8. Genitourinary Tract Microbiota

- 8.1. Genitourinary Tract Physiology and Microbial Composition
  - 8.1.1. In Men
  - 8.1.2. In Women
- 8.2. Microorganisms Causing Urinary Tract Infections: Uropathogens. Relationship with the Alteration of the Microbiota in Men and Women
  - 8.2.1. Enteric Bacteria, Generally Gram-Negative Aerobic Bacteria: E. Coli, Enterobacteria. Klebsiella or Proteus Mirabilis or Pseudomonas Aeruginosa
  - 8.2.2. Gram-Positive Bacteria: Staphylococcus Saprophyticus, etc.
- 8.3. Vaginal Microbiota and its Modification with Age
  - 8.3.1. Infant Age
  - 8.3.2. Fertile Age
  - 8.3.3. Adult Age (Menopause)
- 8.4. Alteration of the Vaginal Homeostasis and its Relationship with Infectious Pathologies
  - 8.4.1. Vaginitis
    - 8.4.1.1. Chlamydia
    - 8.4.1.2. Bacterial Vaginosis
    - 8.4.1.3. Vaginal Candidiasis
    - 8.4.1.4. Vaginitis Trichomoniasis
    - 8.4.1.5. Viral Vaginitis
  - 8.4.2. Non-Infectious Vaginitis
- 8.5. Probiotics in the Prevention of the Main Genitourinary Tract Infections: UTI (Cystitis/Urethritis), Prostatitis, Pyelonephritis, Vaginal infections, and infertility
- 8.6. Current Lines of Research

## Module 9. The Relationship between Intolerances/Allergies and the Microbiota

- 9.1. Microbiota changes in Patients on Food Exclusion Diets
  - 9.1.1. Eosinophilic Esophagitis (EoE)
- 9.2. Microbiota Changes in Patients on Food Exclusion Diets: Dairy Intolerance
  - 9.2.1. Lactose Intolerance
  - 9.2.2. Intolerant to Dairy Proteins: Caseins, Albumins, etc.
  - 9.2.3. People Allergic to Milk
- 9.3. Microbiota Changes in Patients on Food Exclusion Diets: Gluten
  - 9.3.1. Alteration of the Intestinal Microbiota in Patients with Gluten Intolerance
  - 9.3.2. Alteration of the Intestinal Microbiota in Celiac Patients
  - 9.3.3. Role of Probiotics and Prebiotics in the Recovery of the Microbiota in Gluten Intolerant and Coeliacs
- 9.4. Microbiota and Biogenic Amines
- 9.5. Current Lines of Research

## Module 10. Probiotics, Prebiotics, Microbiota, and Health

- 10.1. Probiotics: Definition, History, Mechanisms of Action
- 10.2. Prebiotics: Definition, Types of Prebiotics (Starch, Inulin, FOS Oligosaccharides), Mechanisms of Action
- 10.3. Clinical Applications of Probiotics and Prebiotics in Gastroenterology
- 10.4. Clinical Applications of Endocrinology and Cardiovascular Disorders
- 10.5. Clinical Applications of Probiotics and Prebiotics in Urology
- 10.6. Clinical Applications of Probiotics and Prebiotics in Gynecology
- 10.7. Clinical Applications of Probiotics and Prebiotics in Immunology: Autoimmunity, Pneumology, Dermatology, Vaccinology, Vaccines
- 10.8. Clinical Applications of Probiotics and Prebiotics in Nutritional Diseases. Obesity and Eating Disorders. Metabolism, Malnutrition, and Malabsorption of Nutrients
- 10.9. Clinical Applications of Probiotics and Prebiotics in Neurological Diseases. Mental Health. Old Age
- 10.10. Clinical Applications of Probiotics and Prebiotics in Critically Ill Cancer Patients
- 10.11. Dairy Products as a Natural Source of Probiotics and Prebiotics. Fermented Milk
- 10.12. Safety and Legislation in the Use of Probiotics





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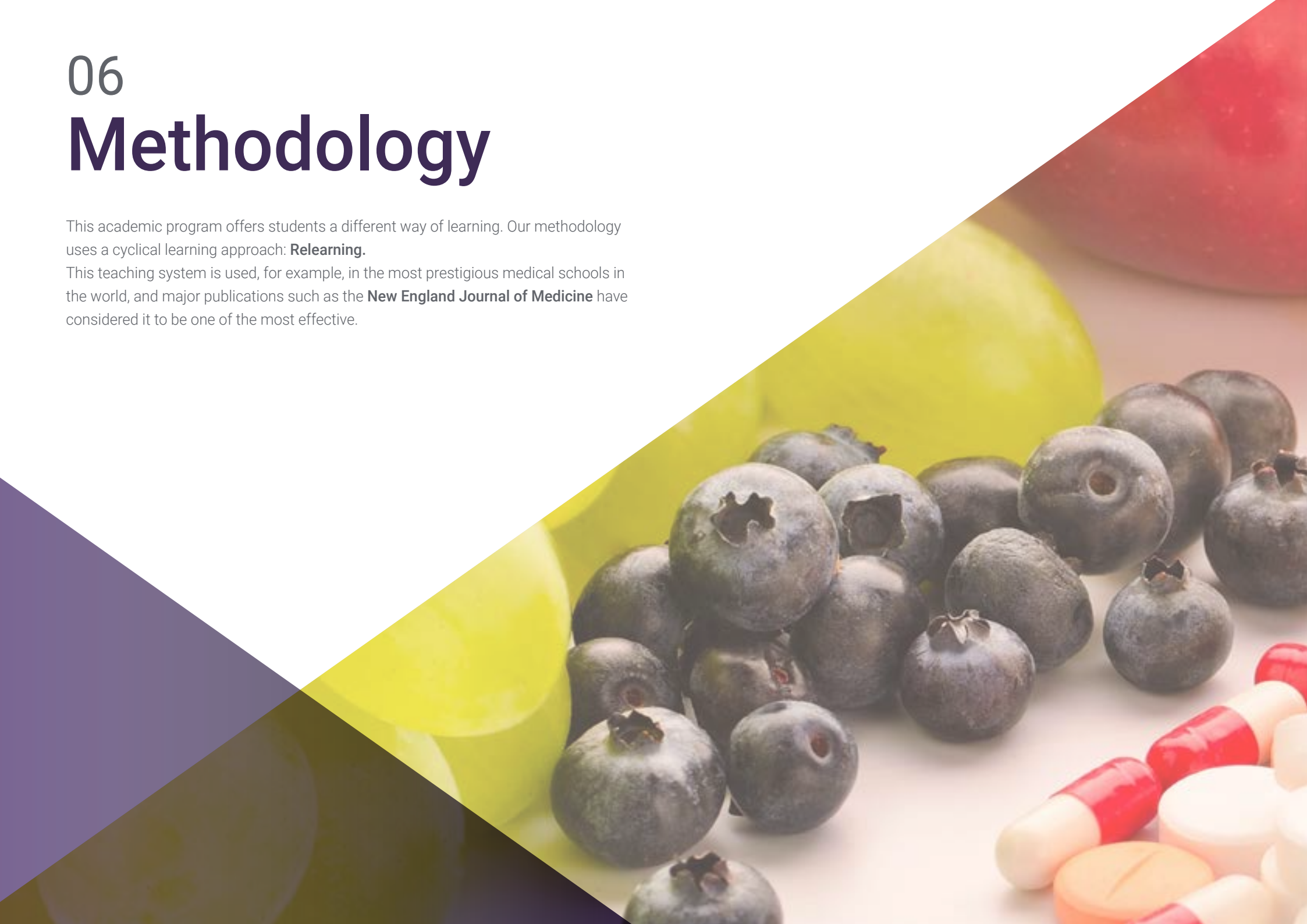
*A 100% online program that will bring you up to date with scientific advances on the proper application of probiotics and prebiotics in patients with obesity.”*


06

# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

In a given situation, what should a professional do? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH, nutritionists can experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions of professional nutritional practice.

“

*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Nutritionists who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity through exercises to evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the nutritionist to better integrate knowledge into clinical practice.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

*The nutritionist will learn through real cases and by solving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 45,000 nutritionists have been trained with unprecedented success in all clinical specialties regardless of the surgical load. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

*Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and relearn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Nutrition Techniques and Procedures on Video

TECH brings students closer to the latest techniques, the latest educational advances and to the forefront of current nutritional counselling techniques and procedures. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

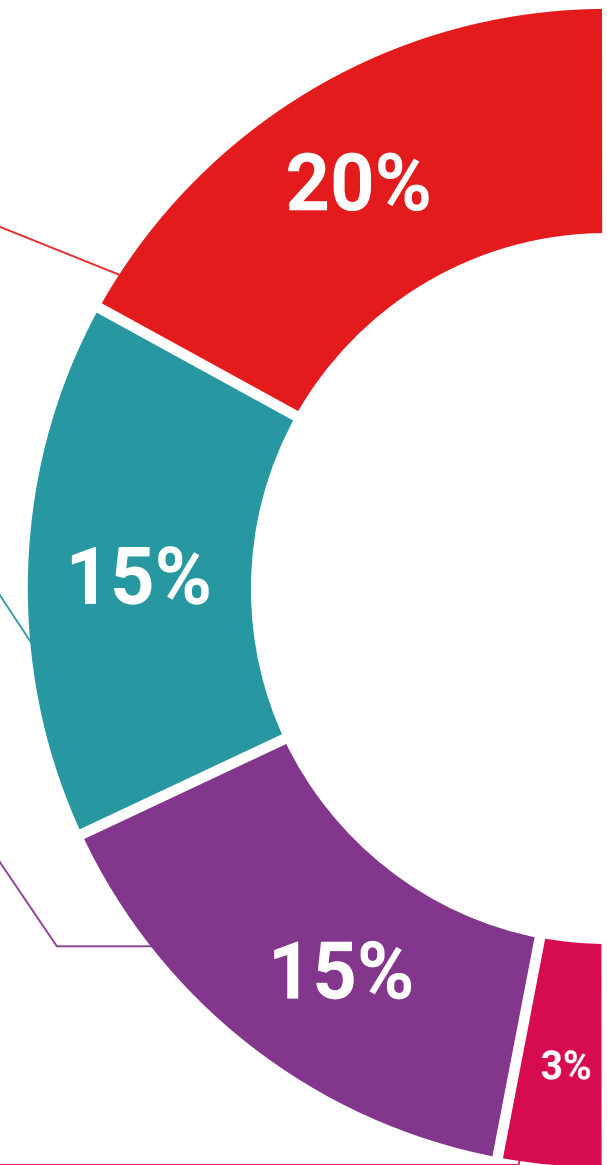
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

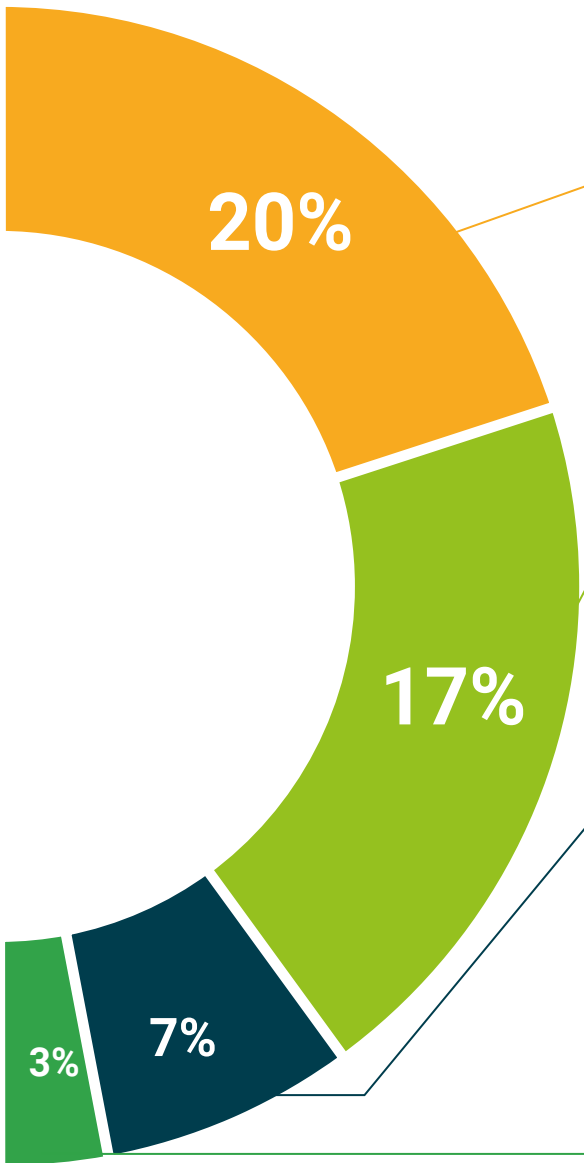


#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.







**Expert-Led Case Studies and Case Analysis**

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



**Testing & Retesting**

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



**Classes**

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



**Quick Action Guides**

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



# 07 Certificate

The Professional Master's Degree in Human Microbiota guarantees you, in addition to the most rigorous and updated training, access to a Professional Master's Degree issued by TECH Technological University.



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*Successfully complete this program  
and receive your university degree  
without travel or laborious paperwork”*

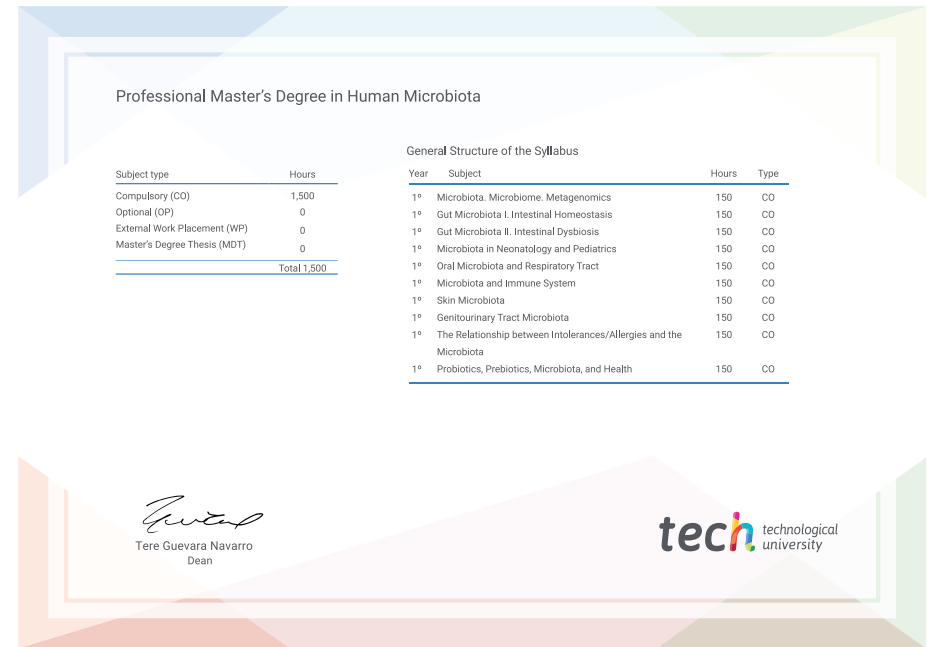
This **Professional Master's Degree in Human Microbiota** contains the most complete and up-to-dated scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery\*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Human Microbiota**

Official N° of hours: **1,500 h.**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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community commitment

personalized service innovation

knowledge present quality

online training

development languages

virtual classroom

**tech** technological  
university

**Professional Master's  
Degree**

Human Microbiota

Course Modality: Online

Duration: 12 months

Certificate: TECH Technological University

Official N° of hours: 1,500 h.

# Professional Master's Degree

## Human Microbiota

