

# 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.techitute.com/pk/physiotherapy/professional-master-degree/master-human-microbiota](http://www.techitute.com/pk/physiotherapy/professional-master-degree/master-human-microbiota)

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# 01

# Introduction

Behind joint inflammations, congestion, headaches or infant colic there is a problem related to the human microbiota, as attested to by a number of scientific investigations addressing this field. Due to the great advances which have been made in this area, physiotherapists must continuously update their knowledge on the latest developments in areas such as tissue regeneration or the improvement of the musculoskeletal system. This 100% online program was created to provide the professional with the most advanced and up-to-date information on eubiosis and dysbiosis, the factors that regulate the microbiota and the latest clinical uses of prebiotics and probiotics. In addition, its innovative content can be accessed at any time of the day.



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*This Professional Master's Degree, will comprehensively guide you through the latest advances in microbiota, and the clinical uses of probiotics and prebiotics in the treatment of multiple conditions”*

Our microbiota undergo changes as a consequence of a number of factors, including diet, lifestyle or pharmacological treatments, all of which generate alterations in this bacterial ecosystem. The body occasionally produces an adverse response which could be related to certain reactions: allergic, acute and chronic intestinal diseases, obesity and metabolic syndrome, neurological diseases, dermatitis and other alterations in the dermis and even some types of cancer. Therefore, it is common that behind certain ailments or conditions there is an imbalance of the human microbiota.

Large laboratories and research centers have carried out research in this field and have created increasingly effective and specific probiotics and prebiotics which are used for the prevention and treatment of certain illnesses. An important step in the study of, and advancement in, the field of human microbiota, a factor of which the physiotherapy professional should be fully aware.

For this very reason, TECH has designed this Professional Master's Degree in order to provide professionals with the up-to-date information they need with the guidance of a specialized teaching team who have extensive experience of the sector. Therefore, using a theoretical and practical approach, students will study, among other aspects, the microbiome and metagenomics and the advances in the clinical uses of probiotics and prebiotics in urology, gynecology and immunology.

In addition, this university program has clinical case studies and detailed videos that will facilitate a much more direct experience for the physiotherapist. This syllabus is also complemented by essential readings, interactive summaries and video summaries.

This is an excellent opportunity for professionals to access a flexible, online university program that is compatible with even the most demanding daily schedules. In order to access the content of this Professional Master's Degree, students only need an electronic device with an Internet connection. Without the added pressure of strict schedules or having to attend classes, students are able to study whenever and wherever they wish.

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

- 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
- 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



*TECH uses all of its technological tools to provide the most attractive multimedia content which is available to you, whenever and wherever you want"*

“*You will get up to date easily with the help of the best team of experts on the scientific advances in the improvement of the musculoskeletal system through the right microbiota*”

The program's teaching staff includes professionals from the sector who contribute their work experience to this 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.

*This 100% online program provides a deeper understanding of the microbiota of the genitourinary tract and the current lines of research in this field.*

*A university program that provides you with the most recent scientific evidence relating to microbiota in digestive disorders and nutrient malabsorption problems.*



# 02 Objectives

This Professional Master's Degree syllabus has been prepared by a team who are specialized in human microbiota, with the main objective of offering students the latest information in this field. As a result, physiotherapists will closely examine the scientific evidence supporting the relationship between correct microbiota and a number of different ailments, as well as the factors that have a positive and negative influence. Students are provided with the most up-to-date content, 24 hours a day, throughout the 12 months of this educational program.







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*Students have access to the multimedia resource library 24 hours a day, allowing them to delve deeper into the implications of glutamine on muscle recovery any time they want”*



## General objectives

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- ♦ Offer a complete vision of the current situation regarding Human Microbiota, the importance of balancing this Microbiota and the direct effect it has on our health, including the multiple factors that can have a positive or a negative effect
- ♦ Argue, with the backing of scientific evidence, how Microbiota interacts with many non-digestive conditions which are of autoimmune in nature or its relationship with the deregulation of the immune system, the prevention of diseases and as a support to other treatments in the daily practice of Physiotherapy
- ♦ 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 humans, 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: SIBO, irritable bowel syndrome (IBS), Crohn's disease, etc., and intestinal dysbiosis
- ♦ Learn how to manage the different intestinal infections caused by viruses, bacteria, parasites and fungi affecting the intestinal microbiota
- ♦ Delve into the bidirectional relationship between microbiota and the neuroimmunological system and study in depth the intestine-microbiota-brain axis and all the conditions that are generated in its imbalance
- ♦ Acquire in-depth knowledge of all the oral and respiratory structures and the ecosystems that live in them, see how any changes in these ecosystems are directly related to many associated conditions
- ♦ Study the mechanisms by which probiotics are considered to prevent the formation of dental caries and periodontal diseases
- ♦ Know how a negative change in our microbiota can result in the appearance of food intolerances and allergies
- ♦ Learn how drugs designed for humans can have a negative impact on the gut microbiota, in addition to the impact made by antibiotics
- ♦ Gain an in depth understanding of the safety guidelines regarding 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**

- ♦ Gain up-to-date knowledge of, 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**

- ♦ Look into intestinal microbiota as the main axis of the human microbiota and its relationship with the rest of the body, methods of study, and its uses in clinical practice to help maintain good health
- ♦ Learn how to manage the different intestinal infections caused by viruses, bacteria, parasites and 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 pediatric patients



### Module 5. Oral Microbiota and Respiratory Tract

- ♦ Study the mechanisms by which probiotics are considered to prevent the formation of dental caries and periodontal diseases
- ♦ Acquire in-depth knowledge of all the oral and respiratory structures 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 The Immune System

- ♦ Delve into the bidirectional relationship between Microbiota and the 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 for approaching 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
- ♦ Take an in-depth look at the role of probiotics in the prevention of the main infections of the genitourinary tract





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

- ◆ 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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*You will get up to date on the latest lines of research addressing the microbiota and its relationship with skin pathologies”*

# 03 Skills

The syllabus for this online program has been designed specifically to enhance the skills of practising physiotherapists. In order to achieve this, innovative educational material has been designed and clinical case studies are presented to provide the latest knowledge in the field of human microbiota, the progress achieved and future lines of research.





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*An academic opportunity specifically designed for professionals who want to combine a quality education with their personal responsibilities”*



## 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





# OTICS



## 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
- ♦ Know what factors can help maintain the balance of this ecosystem to maintain a good state of health
- ♦ Update and expand knowledge with special emphasis and interest on probiotic therapy, prebiotic therapy and the latest advances in this field (such as fecal transplantation), the current situation and future development paths, which are the main tools we have to optimise the functions of the microbiota and its future projection



*Access an educational program that brings you closer to the progress being made in microbiota studies of babies and pregnant women"*

# 04

# Course Management

TECH carefully selects all the teaching staff that form part of its degree programs. For this purpose, in addition to taking into account their high qualifications, we value their extensive professional background in the field. Therefore, physiotherapists who take this online program will have the support of a faculty specialized in Human Microbiota, Pharmacy or Nutrition. Thanks to them, they will be able to keep up to date on advances in Microbiota and resolve any doubts that may arise regarding the content of this program.





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*A multidisciplinary teaching team brings you closer to the clinical applications of probiotics and prebiotics in different pathologies with the greatest scientific accuracy”*

## 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 from Gaspar Casal Foundation
- ♦ PhD in Medicine from the Autonomous University of Madrid
- ♦ Degree in Medicine and Surgery from the Autonomous 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
- ♦ Degree in Biochemistry from the University of Valencia

## Professors

### Dr. Alarcón Cavero, Teresa

- ♦ Specialist in the Microbiology Department at La Princesa University Hospital
- ♦ Head of Group 52 of the Research Institute of 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 Puerto de Hierro University Hospital, Majadahonda
- ♦ Teaching collaborator at the School of Medicine in the subject of Microbiology at the Autonomous University of Madrid
- ♦ PhD in Pharmacy from the Complutense University of Madrid
- ♦ Degree in Pharmacy from the University of Valencia

### Dr. 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

### Dr. Anel Pedroche, Jorge

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

### Dr. 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 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. Bueno García, Eva**

- ♦ Pre-doctoral researcher in the research group of Immunosenescence of the Immunology Service at 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. Verdú López, Patricia**

- ♦ Speciality of Allergology at the Dr. Negrín University Hospital 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

**Dr. Rodríguez Fernández, Carolina**

- ♦ Degree in Biology from the University of Oviedo

**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. Rioseras de Bustos, Beatriz**

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

**Dr. Lombó Burgos, Felipe**

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

**Dr. Alonso Arias, Rebeca**

- ♦ Specialist Immunology Physician at the Central University Hospital of Asturias
- ♦ Head of 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

**Dr. Álvarez García, Verónica**

- ♦ Digestive system specialist at the Central Hospital of Asturias
- ♦ 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
- ♦ PhD in Biology, researcher at Center for Genomic Regulation | CRG - Bioinformatics and Genomics

**Dr. Fernández Madera, Juan**

- ♦ Allergy Specialist
- ♦ Degree in Medicine

**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

**Dr. López Vázquez, Antonio**

- ♦ Specialist in Immunology, Central University Hospital of Asturias

**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. López López, Aranzazu**

- ♦ PhD in Biological Sciences
- ♦ Researcher in oral microbiology at FISABIO foundation

**Dr. Suárez Rodríguez, Marta**

- ♦ Neonatologist of the Central University Hospital of Asturias
- ♦ Researcher and professor of the Professional Master's Degree in Primary Care and the Professional Master's Degree in Critical Care Nursing at the University of Oviedo and other training courses

**Dr. Solís Sánchez, Gonzalo**

- ♦ Neonatologist at the Central University Hospital of Asturias
- ♦ Researcher and Associate Professor of the University of Oviedo







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*Leading professionals in the field have come together to teach you the latest advances in Human Microbiota and help you to excel in your profession”*

# 05

# Structure and Content

TECH uses the latest technology applied to teaching when developing the content of each of its educational programs. A combination of quality and innovation, which give students a dynamic and agile learning experience. Therefore, professionals who take this university course will have access to multimedia content that will allow them to learn more about the microbiota in neonatology and pediatrics, the oral microbiota, as well as the composition of the intestinal microbiota in the different stages of life.





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*Reduce the hours of study and progress more quickly in this program thanks to the Relearning system used by TECH”*

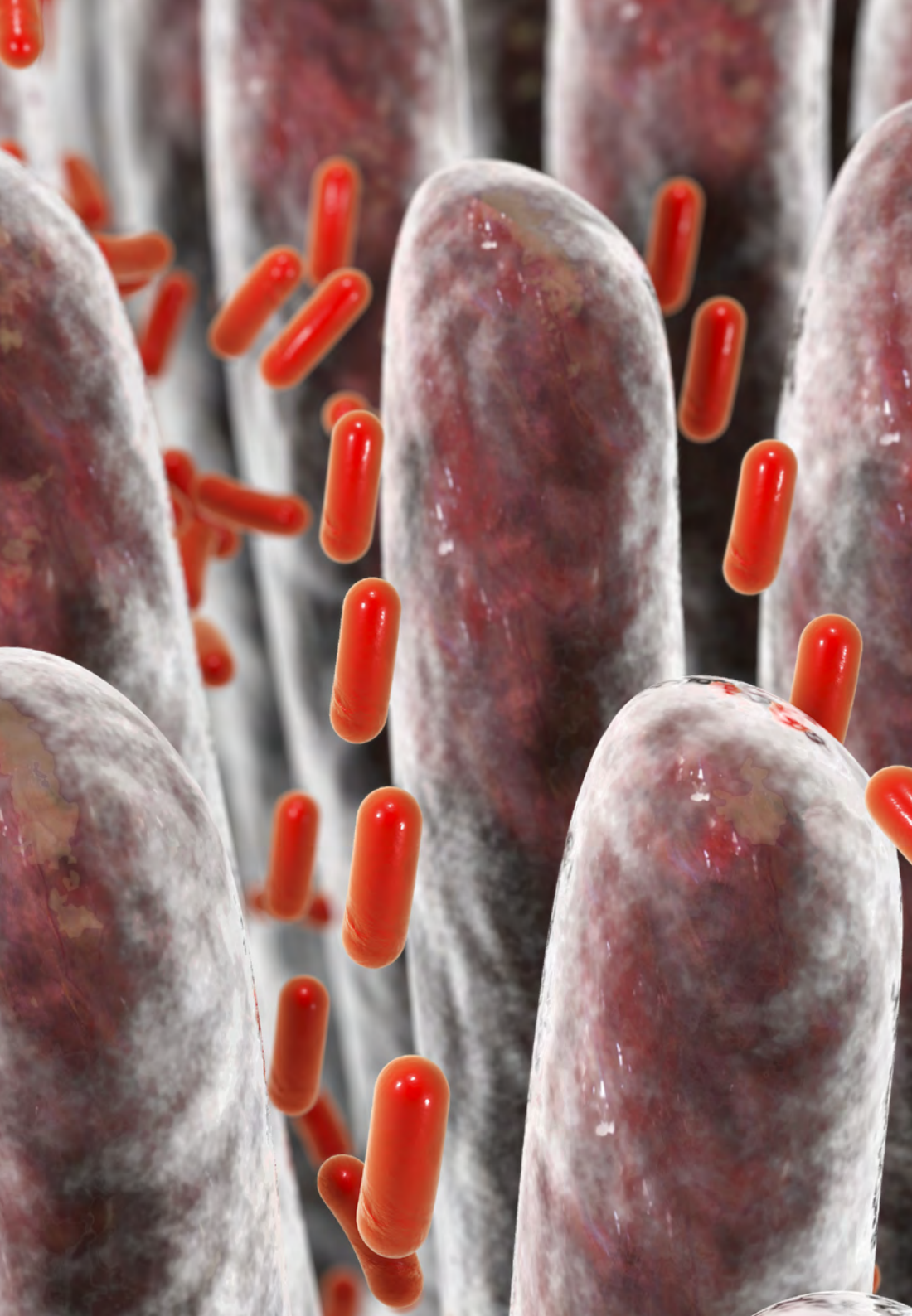
## Module 1. Microbiota. Microbiome. Metagenomics

- 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 Pausnitzii 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 Newborn
- 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 Newborn'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 Lactic 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 Celiacs
- 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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*You are looking at a 100% online program that will provide you with the latest information on the mechanisms of action of probiotics and prebiotics”*

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.





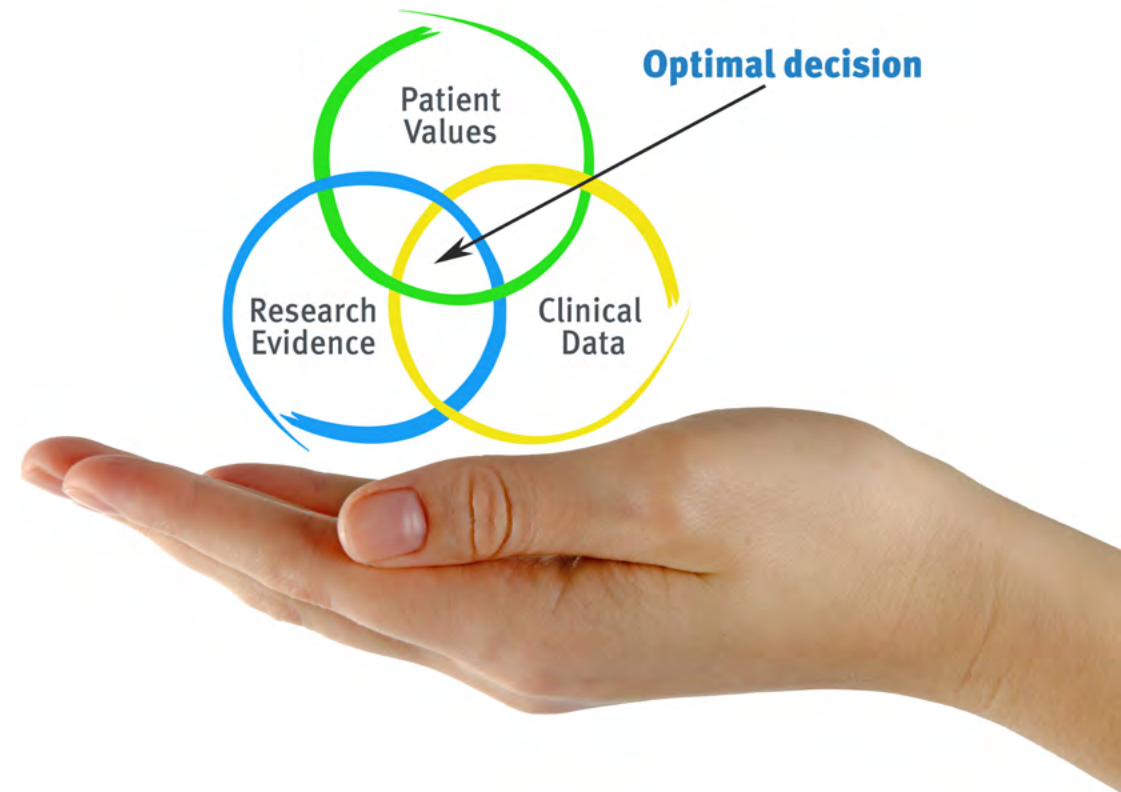
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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

What should a professional do in a given situation? 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. Physiotherapists/kinesiologists learn better, faster, and more sustainably over time.

*With TECH you will 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 physiotherapy practice.

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*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. Physiotherapists/kinesiologists who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the physiotherapist/kinesiologist to better integrate into the real world.
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 physiotherapist/kinesiologist 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 we trained more than 65,000 physiotherapists/kinesiologists with unprecedented success in all clinical specialties, regardless of the workload. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

*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 our 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 really 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.



#### Physiotherapy Techniques and Procedures on Video

TECH brings students closer to the latest techniques, the latest educational advances and to the forefront of current Physiotherapy 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 them as many times as you want.



#### Interactive Summaries

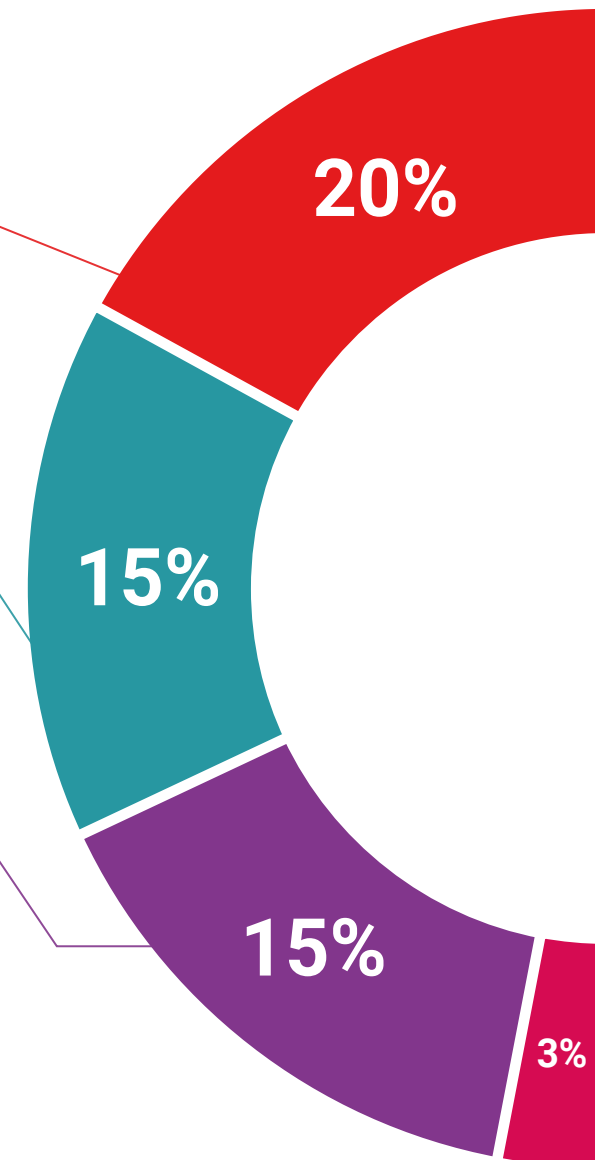
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story".

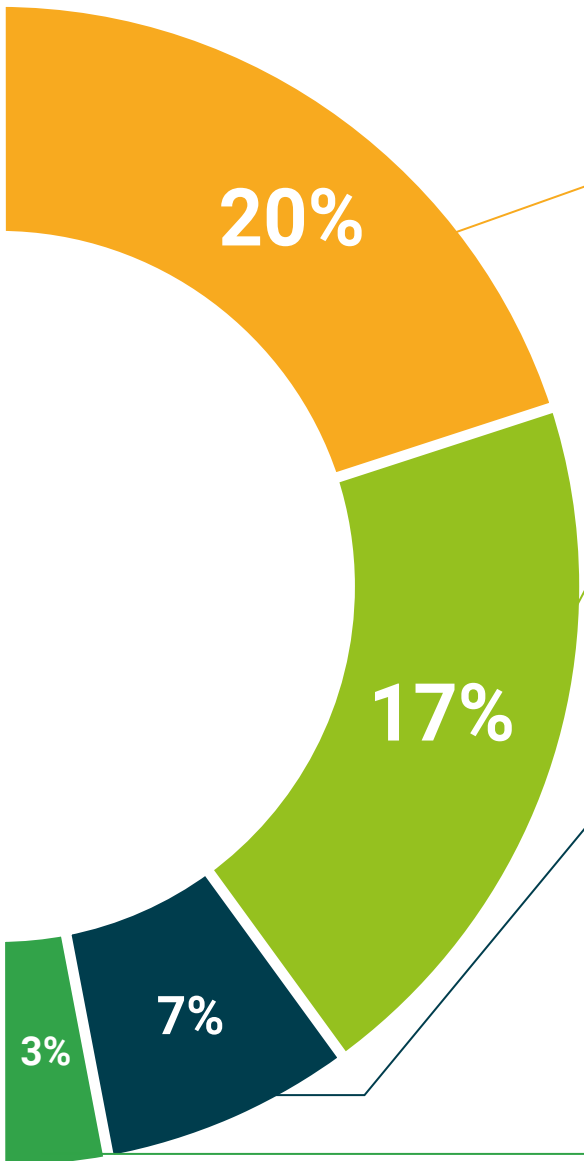


#### Additional Reading

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 on the usefulness of learning by observing experts. The system known as 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”*

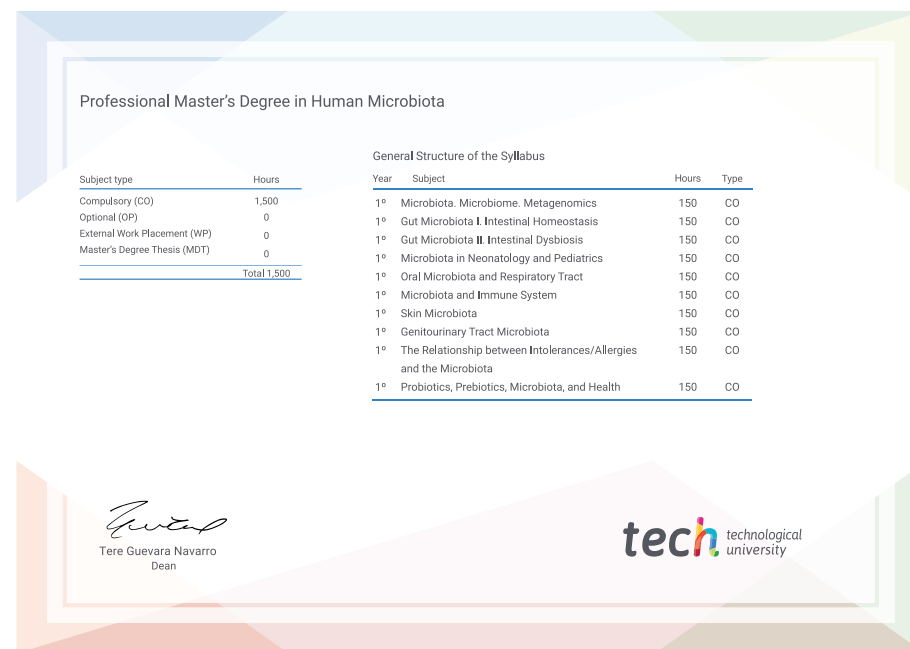
This **Professional Master's Degree in Human Microbiota** contains the most complete and up-to-date scientific program on the market.

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 certificate 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 certificate issued, with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

future  
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education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present quality  
development language  
virtual classroom



## 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

