# Master's Degree
## Human Microbiota

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# Master's Degree

## Human Microbiota

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: www.techtitute.com/us/physiotherapy/master-degree/master-human-microbiota

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01

# Introduction

Behind joint inflammations, constipation, headaches or infant colic there is a malfunction or inadequacy of the Human Microbiota, as attested by the numerous scientific researches currently addressing this field. Due to the great advances in this area, physiotherapists must continuously update their knowledge, which will allow them to know the advances in tissue regeneration or improvement of the musculoskeletal system. For this reason, this 100% online program was created to provide the professional with the most advanced and recent information on eubiosis and dysbiosis, the factors that regulate the microbiota and the latest clinical applications of prebiotics and probiotics. All this, in addition, with innovative content that you can access at any time of the day.

*With this Master's Degree, you will know in depth the advances in microbiota, and the clinical use of probiotics and prebiotics in multiple pathologies".*

The human microbiota undergoes changes as a consequence of the influence of multiple factors, including diet, lifestyle or pharmacological treatments, which generate alterations in this bacterial ecosystem. This abnormal interaction that the organism could have with it is related to certain processes: 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. It is, therefore, common that behind certain ailments or pathologies there is an imbalance in the balance of the Human Microbiota.

Large laboratories and research centers have promoted lines of research in this field, as well as the creation of increasingly effective and precise probiotics and prebiotics applied for the prevention and treatment of certain pathologies. A peak moment in the study and advancement of the Human Microbiota, to which the physiotherapy professional cannot be alien.

That is why TECH Global University has designed this Master's Degree, where the professionals will be able to obtain the necessary actualization from the hand of a specialized teaching team with extensive experience in this area. Thus, through a theoretical and practical approach, students will delve into the microbiome and metagenomics, advances in the clinical application of probiotics and prebiotics in urology, gynecology and immunology.

In addition, this university program has clinical case studies and videos in detail that will favor a much more direct and close update by the physiotherapist. Essential readings, interactive summaries and video summaries complement this intensive syllabus.

This is an excellent opportunity for professionals to access a flexible, online university program that is compatible with the most demanding responsibilities. In order to consult the content of this Master's Degree, students only need an electronic device with an Internet connection. Thus, without schedules or attendance, students have the possibility of connecting whenever and wherever they wish.

This **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
- 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

*TECH uses all of its technological tools to provide the most attractive multimedia content. Access it, whenever and wherever you want."*

*You will be able to get up to date easily and with the best team of professionals on scientific advances in the improvement of the musculoskeletal system through an adequate microbiota".*

*This 100% online Master's Degree in the Microbiota of the genitourinary tract and the current lines of research in this field will give you a deeper understanding of the microbiota of the genitourinary tract.*

*A university degree that provides you with the most recent scientific evidence on the involvement of the microbiota in digestive disorders and nutrient malabsorption problems.*

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

Its 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 an immersion education programmed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve the different professional practice situations that are presented throughout the academic course. For this purpose, the student will be assisted by an innovative interactive video system created by renowned experts.

02

# Objectives

The syllabus of this Master's Degree has been prepared by a team specialized in Human Microbiota, whose main objective is to offer the latest information in this field. To this end, students are provided with the most up-to-date content, 24 hours a day, during the 12 months of this educational program.

*The multimedia resource library is available 24 hours a day for you to delve deeper into the implications of glutamine on muscle recovery at your convenience."*

## General Objectives

- 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 relation with the deregulation of the immune system, the prevention of diseases and as support to other treatments in the daily practice of the professional
- 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 continuous learning and research

## Specific Objectives

### 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
- Enhance 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 in 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

*You will get up to date on the role of the latest lines of research addressing the microbiota and its relationship with skin pathologies."*

03

# Skills

The curriculum of this program taught exclusively online has been designed to enhance the competences and skills of the physiotherapy professional. To achieve this, innovative didactic material has been designed and cases of clinical studies are provided to transfer the most recent knowledge in the field of Human Micriobiota, the progress achieved and future lines of research.

*An academic option designed for professionals who want a quality education compatible with their personal responsibilities".*

## General Skills

- 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 field 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 further studying in a largely self-directed or autonomous manner

## Specific Skills

- 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

*Access an educational program that brings you closer to the progress in microbiota studies of the baby and the pregnant woman".*

04

# Course Management

TECH rigorously selects all the teaching staff that form part of its degrees. For this purpose, in addition to taking into account their high qualifications, it values their extensive professional background in the field they are going to teach. Thus, the physiotherapist who takes this online program will have 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.

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

## International Guest Director

Dr. Harry Sokol is internationally recognized in the field of **Gastroenterology** for his research on the **gut microbiota**. With more than 2 decades of experience, he has established himself as a true scientific authority thanks to his numerous studies on the role of **microorganisms in the human body** and their impact on **chronic inflammatory bowel diseases**. In particular, his work has revolutionized medical understanding of this organ, often referred to as the **«second brain.»**

Among Dr. Sokol's contributions, he and his team have opened a new line of advances on the bacterium **Faecalibacterium prausnitzii**. In turn, these studies have led to crucial discoveries about its **anti-inflammatory effects**, opening the door to **revolutionary treatments.**

In addition, the expert is distinguished by his **commitment to the dissemination of knowledge**, whether by teaching academic programs at the Sorbonne University or by publishing works such as the **comic book** The Extraordinary Powers of the Belly. His scientific publications appear continuously in **world-renowned journals** and he is invited to **specialized congresses**. At the same time, he carries out his clinical work at the **Saint-Antoine Hospital** (AP-HP/University Hospital Federation IMPEC/Sorbonne University), one of the most renowned hospitals in Europe.

On the other hand, Dr. Sokol began his **medical studies** at Paris Cité University, showing early on a strong interest in **health research**. A chance meeting with the eminent Professor Philippe Marteau led him to **Gastroenterology** and the enigmas of the **Intestinal Microbiota**. Throughout his career, he also broadened his horizons by training in the United States, at Harvard University, where he shared experiences with **leading scientists**. Upon his return to France, he founded his **own team** where he researches on **Fecal Transplantation**, offering state-of-the-art therapeutic innovations.

## Dr. Sokol, Harry

- Director of Microbiota, Gut and Inflammation at Sorbonne University, Paris, France
- Specialist Physician at the Gastroenterology Department of the Saint-Antoine Hospital (AP-HP), Paris, France
- Group Leader at the Institut Micalis (INRA)
- Coordinator of the Center of Microbiome Medicine of Paris FHU
- Founder of the pharmaceutical company Exeliom Biosciences (Nextbiotix)
- President of the Fecal Microbiota Transplantation Group
- Medical Specialist in different hospitals in Paris
- Doctorate in Microbiology at the Université Paris-Sud
- Postdoctoral Fellowship at the Massachusetts General Hospital, Harvard University Medical School
- Degree in Medicine, Hepatology and Gastroenterology at Université Paris Cité

*Thanks to TECH you will be able to learn with the best professionals in the world"*

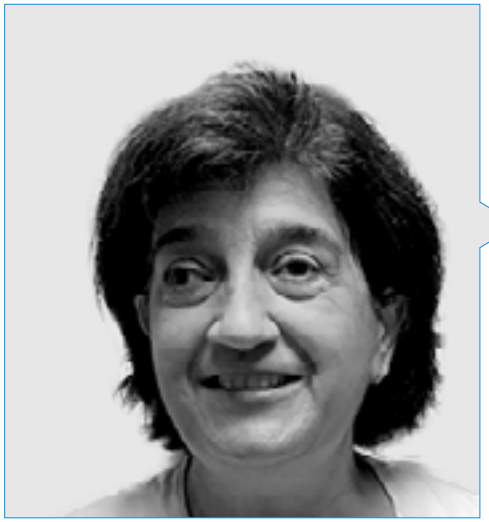
## Guest Directors

### Dr. Sánchez Romero, María Isabel

- Area Specialist in the Microbiology Department of the Puerta de Hierro Majadahonda University Hospital, Madrid
- PhD in Medicine and Surgery from the University of Salamanca
- 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

### Dr. Portero Azorín, MARÍA Francisca

- Acting Head of the Microbiology Service at the Puerta de Hierro Majadahonda University Hospital
- Specialist in Microbiology and Clinical Parasitology at the Puerta de Hierro University Hospital
- Doctorate in Medicine from the Autonomous University Madrid
- Postgraduate in Clinical Management by Gaspar Casal Foundation.
- Research stay at the Presbyterian Hospital of Pittsburg through a FISS scholarship.



### Dr. Alarcón Cavero, Teresa

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

### Dr. Muñoz Algarra, María

- Head of Patient Safety at the Microbiology Department of the Puerta de Hierro Majadahonda University Hospital.
- Area Specialist in the Microbiology Department of the Puerta de Hierro Majadahonda University Hospital, Madrid
- Collaborator Department of Preventive Medicine and Public Health and Microbiology Autonomous University of Madrid
- Doctorate in Pharmacy from the Complutense University of Madrid.

### Dr. López Dosil, Marcos

- Area Specialist in Microbiology and Parasitology at San Carlos Clinical University Hospital.
- 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

### Dr. Anel Pedroche, Jorge

- Facultative Area Specialist. Microbiology Department. Puerta de Hierro University Hospital.
- Degree in Pharmacy from the Complutense University of Madrid.
- Course in Interactive Sessions on Hospital Antibiotherapy by MSD
- Updating course on infection in hematologic patients by Puerta del Hierro Hospital.
- Attendance at the XXII Congress of the Spanish Society of Infectious Diseases and Clinical Microbiology.

## Management

### Ms. Fernández Montalvo, María Ángeles

- Head of Naintmed- Integrative Nutrition and Medicine
- Director of the Master's Degree in Human Microbiota at CEU University.
- Parapharmacy Manager, Nutrition and Natural Medicine professional at Natural Life Parapharmacy.
- Degree in Biochemistry from the University of Valencia
- Diploma in Natural and Orthomolecular Medicine
- Postgraduate in Food, Nutrition and Cancer: prevention and treatment.
- Master's Degree in Integrative Medicine from CEU University
- Specialist Degree in Nutrition, Dietetics and Diet Therapy
- Expert in Vegetarian, Clinical, and Sports Nutrition
- Expert in the current use of Nutricosmetics and Nutraceuticals in general.

## Professors

### Dr. López Martínez, Rocío

- Immunology Physician at the Vall d'Hebron Hospital.
- Internal Biologist in Immunology at Central University Hospital of Asturias.
- Member of the Immunotherapy Unit at the Clinic Hospital of Barcelona.
- PhD in Biomedicine and Molecular Oncology at the University of Oviedo.
- Master in Biostatistics and Bioinformatics, Universidad Oberta of Catalunya.

### Dr. Bueno García, Eva

- Predoctoral researcher in Immunosenescence at the Immunology Service of the Central University Hospital of Asturias (HUCA).
- Degree in Biology from the University of Oviedo
- Master's Degree in Biomedicine and Molecular Oncology from the University of Oviedo
- Molecular biology and immunology courses

**Dr. Uberos, José**

- Head of section in the Neonatology area of the San Cecilio Clinical Hospital of Granada.
- Specialist in Pediatrics and Child Care
- Associate Professor of Pediatrics, 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 Andalucía
- Editor of the Journal of the Pediatric Society of Eastern Andalusia (Bol. SPAO)
- Doctor of Medicine and Surgery.
- Degree in Medicine from the University of Santiago de Compostela
- Member of the Board of the Pediatric Society of Eastern Andalusia.

**Dr. Verdú López, Patricia**

- Medical Specialist in Allergology at the Beata María Ana Hospital of Hermanas Hospitalarias.
- Physician specializing in Allergology at Inmunomet Health and Integral Wellness Center.
- Research physician in Allergology at San Carlos Hospital.
- Specialist in Allergology at the University Hospital Dr. Negrín in Las Palmas of Gran Canaria.
- Degree in Medicine from the University of Oviedo
- Master's Degree in Aesthetics and Antiaging Medicine at Complutense La University of Madrid

**Dr. Rioseras de Bustos, Beatriz**

- Microbiologist and renowned researcher
- Member of the Biotechnology of Nutraceuticals and Bioactive Compounds Research Group (Bionuc) of the University of Oviedo.
- Member of the Microbiology Area of the Department of Functional Biology.
- Collaborator of the Southern Denmark University
- Doctorate in Microbiology from the University of Oviedo.
- Master's Degree in Neuroscience Research 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
- Specialist in Gynecology and Obstetrics at HM Gabinete Velázquez
- Medical Expert at Bypass Comunicación en Salud, SL
- Key Opinion Leader of several international pharmaceutical laboratories
- Doctor in Medicine and Surgery from the University of Alcalá de Henares, specializing in Gynecology.
- Specialist in Mastology by the Autonomous University of Madrid.
- Master's Degree in Sexual Orientation and Therapy from the Sexological Society of Madrid.
- Master's Degree in Climacteric and Menopause from the International Menopause Society.
- Postgraduate Diploma in Epidemiology and New Applied Technologies from the UNED (Spanish Distance Learning University)
- University Diploma in Research Methodology from the Foundation for the Training of the Medical Association and the National School of Health of the Carlos III Health Institute.

**Dr. Rodríguez Fernández, Carolina**

- Biotechnology Researcher at Adknoma Health Research
- Researcher at Adknoma Health Research
- Master in Clinical Trials Monitoring by ESAME Pharmaceutical Business School.
- Master's Degree in Food Biotechnology from the University of Oviedo.
- University Expert in Digital Teaching in Medicine and Health by CEU Cardenal Herrera University.

**Dr. Lombó Burgos, Felipe**

- PhD in Biology and Head of the BIONUC Research Group, University of Oviedo.
- Head of the BIONUC Research Group, University of Oviedo.
- Former Director of the Research Support Area of the AEI Project.
- Member of the Microbiology Area of the University of Oviedo.
- Co-author of the research 'Biocidal nanoporous membranes with inhibitory activity of biofilm formation at critical points in the production process of the dairy industry'.
- Head of the study '100% natural acorn-fed ham against inflammatory intestinal diseases'.
- Speaker III Congress of Industrial Microbiology and Microbial Biotechnology

**Dr. Méndez García, Celia**

- Biomedical Researcher at Novartis Laboratories in Boston, USA.
- Doctorate in Microbiology from the University of Oviedo.
- Member of the North American Society for Microbiology.

**Dr. Alonso Arias, Rebeca**

- Director of the Immunosenescence research group of the HUCA Immunology Service.
- Specialist Immunology Physician at the Central University Hospital of Asturias.
- Numerous publications in international scientific journals
- Research work on the association between the microbiota and the immune system
- 1st National Award for Research in Sports Medicine, 2 occasions.

**Dr. Álvarez García, Verónica**

- Assistant Physician of the Digestive Area at the Río Hortega University Hospital.
- Specialist in Digestive System at the Central Hospital of Asturias
- Speaker at the XLVII Congress SCLECARTO
- Degree in Medicine and Surgery
- Digestive System Specialist

**Dr. Gabaldon Estevani, Toni**

- IRB and BSC senior group leader
- Co-founder and Scientific Advisor (CSO) of Microomics SL
- ICREA Research Professor and Group Leader of the Comparative Genomics Laboratory
- Doctor of Medical Sciences, Radbout University Nijmegen.
- Corresponding Member of the Royal National Academy of Pharmacy of Spain.
- Member of the Spanish Young Academy

**Dr. Narbona López, Eduardo**

- Speciality Neonatal Unit, San Cecilio University Hospital
- Advisor to the Department of Pediatrics, University of Granada.
- Member of: Pediatric Society of Western Andalusia and Extremadura, Andalusian Association of Primary Care Pediatrics.

**Dr. López Vázquez, Antonio**

- Immunology at the Central University Hospital of Asturias
- Area Specialist in Immunology, Central University Hospital of Asturias, Spain.
- Collaborator of the Carlos III Health Institute
- Advisor of Aspen Medical
- Doctor of Medicine, University of Oviedo.

**Dr. Losa Domínguez, Fernando**

- Gynecologist at the Sagrada Familia Clinic of HM Hospitals
- Doctor in private practice in Obstetrics and Gynecology in Barcelona.
- Expert in Gynecoesthetics by the Autonomous University of Barcelona.
- Member of: Spanish Association for the Study of Menopause, Spanish Society of Phytotherapeutic Gynecology, Spanish Society of Obstetrics and Gynecology, Board of the Menopause Section of the Catalan Society of Obstetrics and Gynecology.

**Dr. López López, Aranzazu**

- Specialist in Biological Sciences Researcher
- Researcher at Fisabio Foundation
- Assistant Researcher at the University of the Balearic Islands
- PhD in Biological Sciences from the University of the Balearic Islands.

**Dr. Suárez Rodríguez, Marta**

- Gynecologist specialized in Senology and Breast Pathology
- Researcher and University Professor
- PhD in Medicine and Surgery from the Complutense University of Madrid.
- Degree in Medicine and Surgery from the Complutense University of Madrid
- Master's Degree in Senology and Breast Pathology from the Autonomous University of Barcelona

**Dr. Fernández Madera, Juan Jesus**

- Allergologist at HUCA
- Former Head of the Allergology Unit, Monte Naranco Hospital, Oviedo.
- Allergology Service, Central University Hospital of Asturias.
- Member of: Alergonorte Board of Directors, SEAIC Rhinoconjunctivitis Scientific Committee, Medicinatv.com Advisory Committee.

*Take the step to catch up on the latest developments in Human Microbiota".*

05

# Structure and Content

TECH uses the latest technology applied to teaching in the development of the content of each of its educational programs. A plus of quality and innovation, which give dynamism and agility to the students. Thus, professionals who take this university course will have 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.

*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. Composition of the Microbiota: Types, Species and Strains
  1.2.1. Groups of Microorganisms that Interact with Humans: Bacteria, Fungi, Viruses, and Protozoa
  1.2.2. Key Concepts: Symbiosis, Commensalism, Mutualism, Parasitism
  1.2.3. Autochthonous Microbiota
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. Gut-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”
- 3.6.2. Composition of the Intestinal Microbiota in Adulthood. “Stable Period”
- 3.6.3. 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 Diseases: 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 oral ecosystems
  5.1.2. Key Points
5.2. Main Ecosystems that are Found in the Oral Cavity. Characteristics and Composition of Each of Them. Nostrils, Nasopharynx and Oropharynx
  5.2.1. Anatomical and histological features of the oral cavity
  5.2.2. Nasal Fossa
  5.2.3. Nasopharynx and oropharynx
5.3. Alterations of the Oral Microbial Ecosystem: Oral Dysbiosis. Relationship with Different Oral Disease States
  5.3.1. Characteristics of Oral Microbiota
  5.3.2. Oral diseases
  5.3.3. Recommended measures to reduce dysbiotic processes
5.4. Influence of External Agents in Oral Eubiosis and Dysbiosis. Hygiene
  5.4.1. Influence of External Agents in Oral Eubiosis and Dysbiosis.
  5.4.2. Oral symbiosis and dysbiosis
  5.4.3. Predisposing factors to oral dysbiosis
5.5. Structure of the Respiratory Tract and Composition of the Microbiota and Microbiome
  5.5.1. Upper Respiratory Routes
  5.5.2. Lower Respiratory Routes
5.6. Factors that Regulate the Respiratory Microbiota
  5.6.1. Metagenomics
  5.6.2. Hypothesis of Hygiene
  5.6.3. Viroma
  5.6.4. Microbiome or fungiome
  5.6.5. Probiotics in bronchial asthma
  5.6.6. Diet
  5.6.7. Prebiotics
  5.6.8. Bacterial translocation
5.7. Alteration of the Respiratory Tract Microbiota and its Relationship with Different Respiratory Tract Diseases
  5.7.1. Pathogenesis and clinical manifestations of upper respiratory tract infections
  5.7.2. Pathogenesis and clinical manifestations of upper respiratory tract infections
5.8. Therapeutic Manipulation of the Microbiome of the Oral Cavity in Prevention and Treatment of Diseases Related to it
  5.8.1. Definition of Probiotics, Prebiotics, and Symbiotics
  5.8.2. Application for Oral Cavity Probiotic..
  5.8.3. Probiotic strains used in the mouth
  5.8.4. Action in relation to oral diseases
5.9. Therapeutic Manipulation of the Microbiome of the Respiratory Tract in Prevention and Treatment of Related Diseases
  5.9.1. Efficacy of probiotics for the treatment of respiratory tract disease: GI-Respiratory axis.
  5.9.2. Use of probiotics for the treatment of rhinosinusitis
  5.9.3. Use of probiotics for the treatment of Otitis
  5.9.4. Use of probiotics for the treatment of rhinosinusitis
  5.9.5. Use of probiotics in rhinitis and allergic bronchial asthma
  5.9.6. Probiotics to prevent lower respiratory tract infections
  5.9.7. Studies with lactobacilli
  5.9.8. Studies with bifidobacteria

5.10. Current Lines of Research and Clinical Applications
- 5.10.1. Transfer of fecal material
- 5.10.2. Extraction of Nucleic Acids
- 5.10.3. Sequencing Methods
- 5.10.4. Strategies for Microbiota Characterization.
- 5.10.5. Metataxonomy
- 5.10.6. Metataxonomy of the Active Fraction
- 5.10.7. Metagenomics
- 5.10.8. Metabolomics

## **Module 6.** Microbiota and Immune System

6.1. Immune System Physiology
- 6.1.1. Immune System Components
  - 6.1.1.1. Lymphoid Tissue
  - 6.1.1.2. Immune Cells
  - 6.1.1.3. Chemical Systems
- 6.1.2. Organs Involved in Immunity
  - 6.1.2.1. Primary Organs.
  - 6.1.2.2. Secondary Organs.
- 6.1.3. Innate, Non-Specific, or Natural Immunity
- 6.1.4. Acquired, Adaptive, or Specific Immunity

6.2. Nutrition and Lifestyle

6.3. Functional Foods (Probiotics and Prebiotics), Nutraceuticals, and Immune System
- 6.3.1. Probiotics, Prebiotics, and Symbiotics
- 6.3.2. Nutraceuticals and Functional Foods

6.4. Bidirectional Relationship between Microbiota and Neuroimmunoendocrine System

6.5. Microbiota, Immunity and Nervous System Disorders:

6.6. The Gut-Microbiota-Brain Axis

6.7. Current Lines of Research

## **Module 7.** SkinMicrobiota

7.1. Skin Physiology
- 7.1.1. Structure of the Skin: 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. Epidermis; Essential Element of our Defences
- 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 cutaneous microbiota on the skin immune system: Staphylococcus Epidermidis, Staphylococcus Aureus

7.4. Alteration of the Normal Cutaneous Microbiota (Dysbiosis) and Alteration of the Barrier Function
- 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 TractMicrobiota

8.1. Physiology of the Genitourinary Tract in Men and Women
- 8.1.1. In Men
- 8.1.2. In Women

8.2. Microorganisms Causing Genitourinary Infections
- 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.** Relationship between Intolerances/Allergies and Microbiota

9.1. Microbiota changes in Patients on Food Exclusion Diets
- 9.1.1. Eosinophilic Esophagitis (EoE)

9.2. Changes in the Microbiota in Patients with Food Exclusion Diets: Intolerance to Dairy Products (Lactose, Milk Proteins: Caseins, Albumins, Others)
- 9.2.1. Lactose Intolerance
- 9.2.2. Intolerant to Lactic Proteins: Caseins, Albumins, etc.
- 9.2.3. People Allergic to Milk

9.3. Alteration and Recovery of the Intestinal Microbiota in Patients with Gluten Intolerance and Celiac Disease
- 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 Celiac Patients

9.4. Microbiota and Biogenic Amines

9.5. Current Lines of Research

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

10.1. Probiotics
10.2. Prebiotics
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
10.8. Clinical Applications of Probiotics and Prebiotics in Nutritional Diseases
10.9. Clinical Applications of Probiotics and Prebiotics in Neurological Diseases
10.10. Clinical Applications of Probiotics and Prebiotics in Critically Ill Patients
10.11. Dairy Products as a Natural Source of Probiotics and Prebiotics
10.12. Safety and Legislation in the Use of Probiotics

*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.

*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.

*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:**

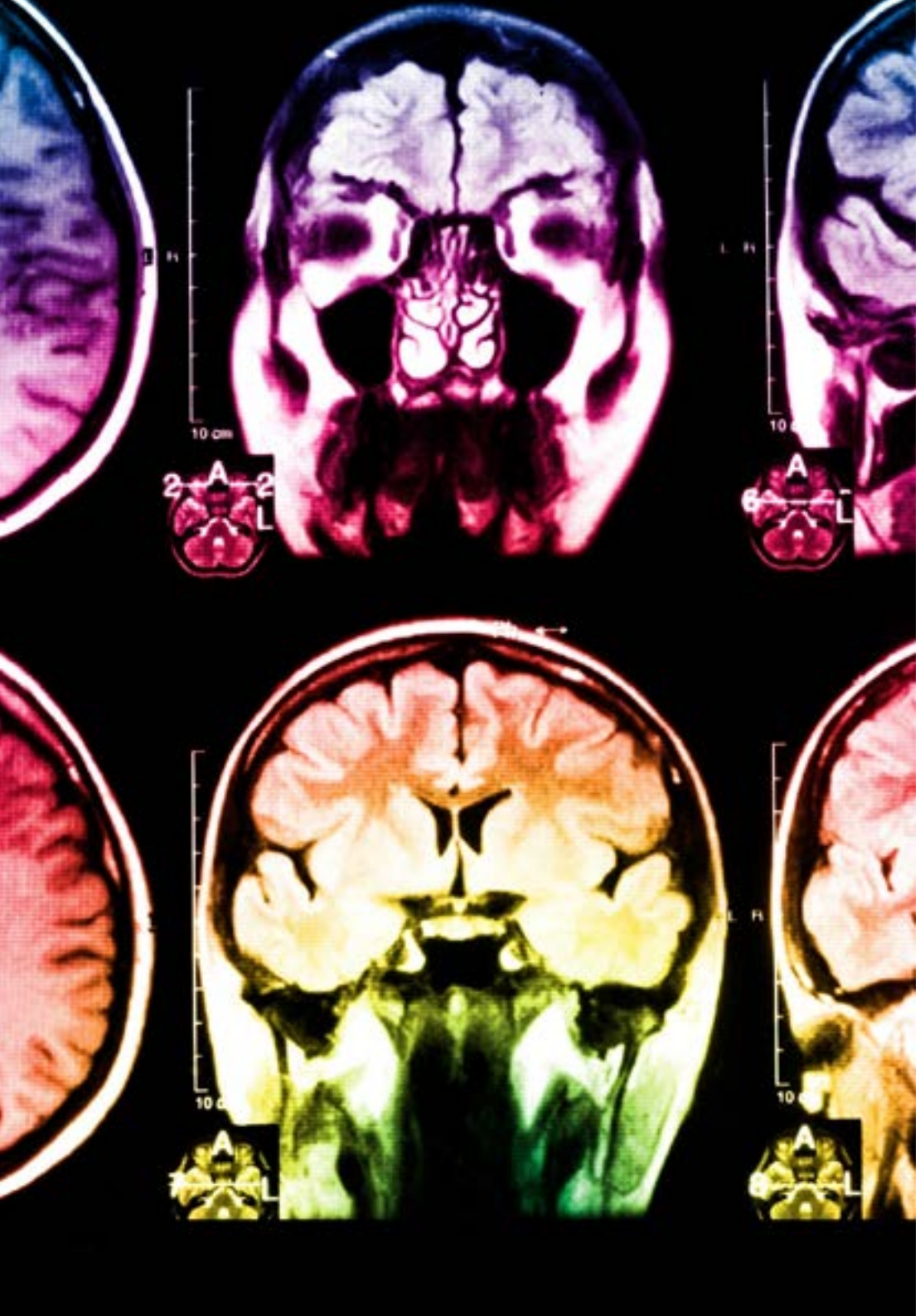
1. Physiotherapists/kinesiologists who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the physiotherapist/kinesiologist to better integrate 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 re-learn). 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.

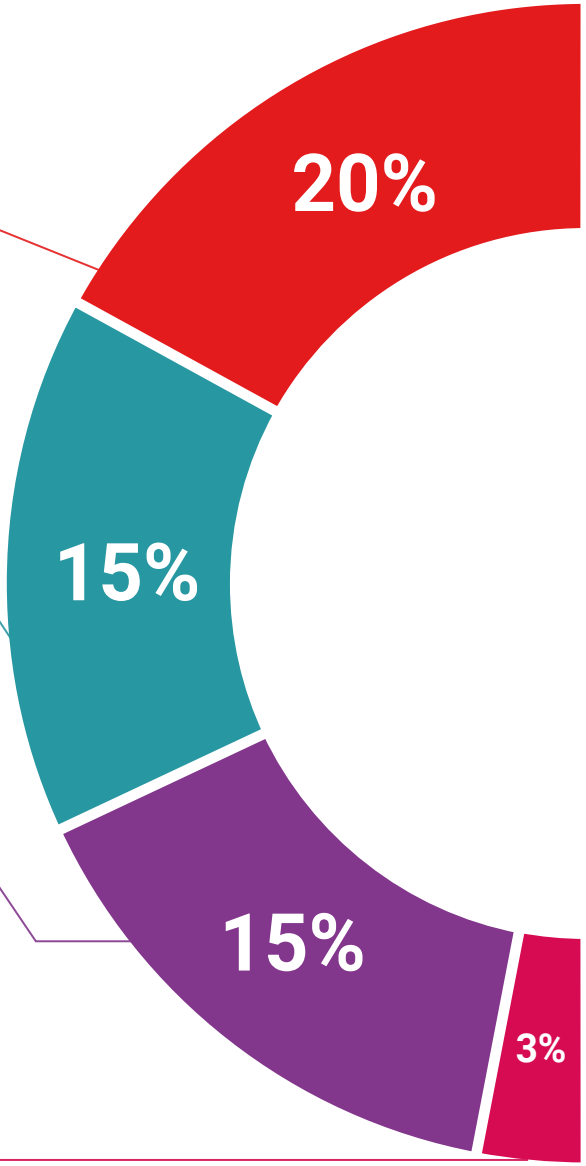
### Interactive Summaries

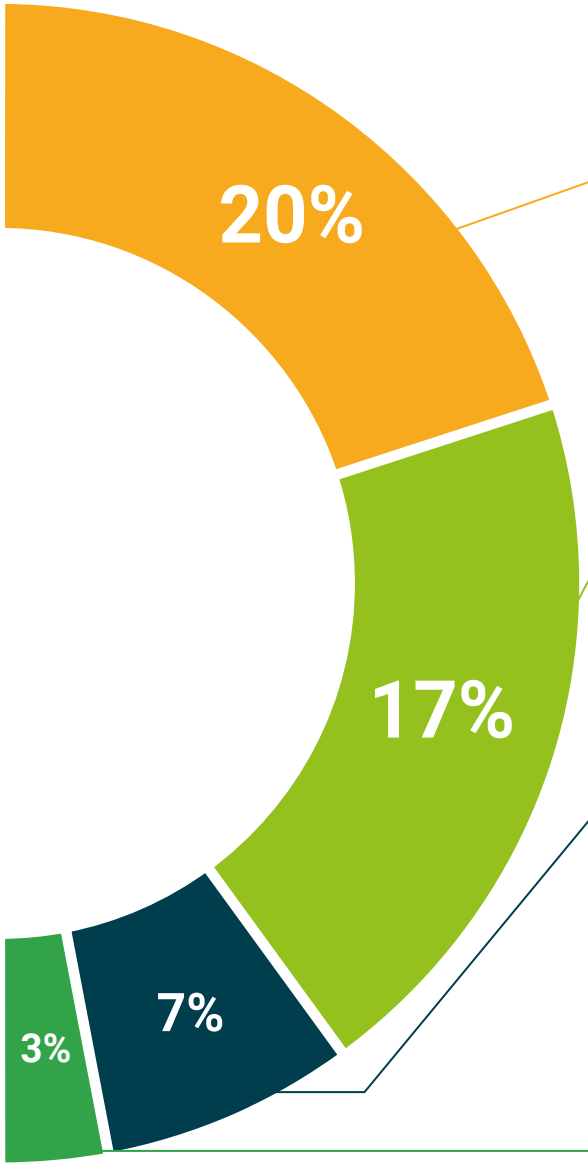
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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

This Master's Degree in Human Microbiota guarantees students, in addition to the most rigorous and up-to-date education, access to a Master's Degree diploma issued by TECH Global University.

*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"*

This private qualification will allow you to obtain a **Master's Degree diploma in Human Microbiota** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra (***official bulletin***). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** private qualification is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

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

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**

tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

**Master's Degree in Human Microbiota**

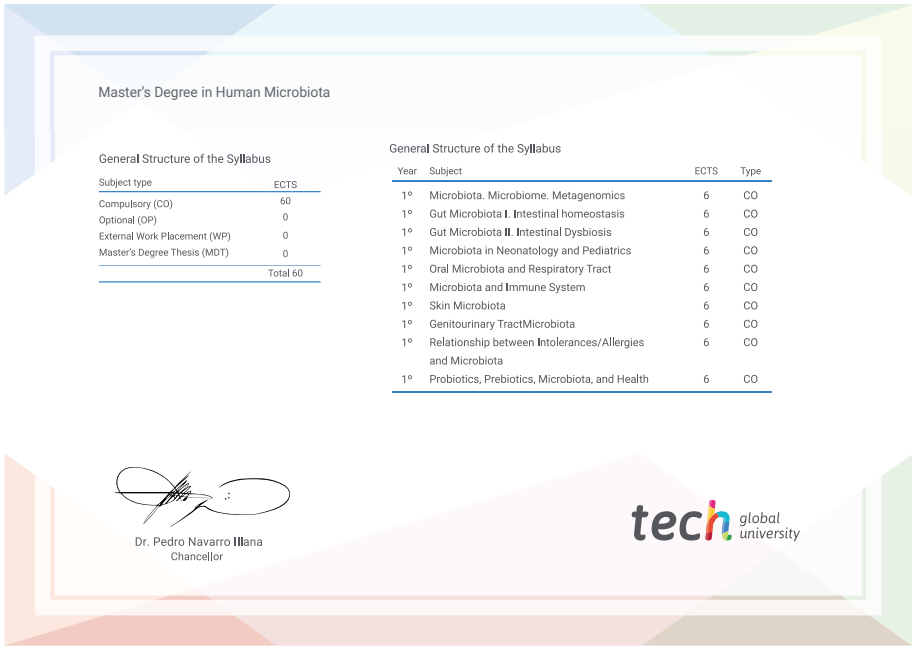
This is a private qualification of 1,800 hours of duration equivalent to 60 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates



Master's Degree in Human Microbiota

General Structure of the Syllabus

| Subject type | ECTS |
|---|---|
| Compulsory (CO) | 60 |
| Optional (OP) | 0 |
| External Work Placement (WP) | 0 |
| Master's Degree Thesis (MDT) | 0 |
| | Total 60 |

General Structure of the Syllabus

| Year | Subject | ECTS | Type |
|---|---|---|---|
| 1º | Microbiota. Microbiome. Metagenomics | 6 | CO |
| 1º | Gut Microbiota I. Intestinal homeostasis | 6 | CO |
| 1º | Gut Microbiota II. Intestinal Dysbiosis | 6 | CO |
| 1º | Microbiota in Neonatology and Pediatrics | 6 | CO |
| 1º | Oral Microbiota and Respiratory Tract | 6 | CO |
| 1º | Microbiota and Immune System | 6 | CO |
| 1º | Skin Microbiota | 6 | CO |
| 1º | Genitourinary TractMicrobiota | 6 | CO |
| 1º | Relationship between Intolerances/Allergies and Microbiota | 6 | CO |
| 1º | Probiotics, Prebiotics, Microbiota, and Health | 6 | CO |

Dr. Pedro Navarro Illana
Chancellor

tech global university

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

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# Master's Degree

## Human Microbiota

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Credits: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

# Master's Degree
## Human Microbiota

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