

# Postgraduate Diploma

## Intestinal Microbiota in Pharmacy





## Postgraduate Diploma Intestinal Microbiota in Pharmacy

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Credits: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/pharmacy/postgraduate-diploma/postgraduate-diploma-intestinal-microbiota-pharmacy](http://www.techtute.com/us/pharmacy/postgraduate-diploma/postgraduate-diploma-intestinal-microbiota-pharmacy)

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# 01

# Introduction

Scientific research in the field of Microbiota has been booming in recent decades, aimed both at the study of its characteristics and its impact on our health. In each of the different locations of our body, such as the skin, mucous membranes, respiratory tract, vagina or digestive tract, we can find complex microbial ecosystems adapted to the particularities of each niche. Of all of them, the most complex and numerous is the one associated with the digestive system, as these communities have a symbiotic and mutualistic behavior with human eukaryotic cells and are essential for the proper functioning of our body. Aware of this, TECH professionals have designed this training program to focus on providing pharmacists with the necessary skills to understand the functioning of the intestinal microbiota, offering effective solutions to clients with dysfunctions in this area.



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*The Postgraduate Diploma in Intestinal Microbiota in Pharmacy will give you a sense of confidence in the performance of your profession because it will allow you to guide your clients more effectively”*

Numerous pieces of scientific evidence have implicated the intestinal microbiome and its metabolic potential in various pathological conditions in recent years, giving rise to new therapeutic strategies to control and regulate this ecosystem. The study of this ecosystem is a field that is rapidly advancing scientifically, and it is universally accepted that to achieve an adequate state of health it is also necessary to have a "healthy" Microbiota.

Human Microbiota undergoes changes as a consequence of the influence of multiple factors, diet, lifestyle and pharmacological treatments generating, among others, which alter the bacterial ecosystem and may cause abnormal interaction with the organism, and it is related to certain processes: allergies, acute and chronic intestinal diseases, obesity and metabolic syndrome, neurological diseases, dermatitis and other alterations in the dermis, and even some types of cancer.

This Postgraduate Diploma in Intestinal Microbiota focuses on providing pharmacists with the necessary information on issues related to Intestinal Microbiota, its Eubiosis and Dysbiosis, and related problems.

Likewise, the use of Probiotics and Prebiotics, and the growing market launch of new products with very specific strains for problems and diseases of the intestinal tract, will also be addressed. All this content will make it possible for pharmacy professionals to be prepared to offer effective solutions to patients with this type of pathology, knowing how to guide them so that they can recover and maintain their intestinal microbiota and, consequently, a good state of health.

This **Postgraduate Diploma in Intestinal Microbiota in Pharmacy** comprises the most complete and up-to-date scientific program on the market. The most important features of the program include:

- ♦ Practical cases presented by Intestinal Microbiota experts
- ♦ The graphic, schematic, and eminently practical contents with which they are created provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Latest developments in Intestinal Microbiota
- ♦ It contains practical exercises where the self-evaluation process can be carried out to improve learning
- ♦ Special emphasis on innovative methodologies in Intestinal 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 provides you with the latest knowledge on Intestinal Microbiota so that you can become a successful Pharmacist"*

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*This Postgraduate Diploma is the best investment you can make when selecting a refresher program for two reasons: in addition to updating your knowledge of Intestinal Microbiota, you will obtain a qualification endorsed by TECH Global University”*

The program includes in its teaching staff professionals belonging to the field of Medicine and Pharmacy, who bring to this training the experience of their work, in addition to recognized specialists from prestigious reference societies and 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 training programmed to train 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 Professional will be assisted by an innovative Interactive Video System, developed by renowned and experienced experts in Medicine and Pharmacy

*TECH offers the best knowledge in the market. All of which is designed to enhance your professional and personal growth.*

*This 100% online Postgraduate Diploma will allow you to combine your studies with your professional work while increasing your knowledge in this field.*



# 02

# Objectives

The main objective of the program is the development of theoretical and practical learning, so that the professional can practically and rigorously master the study of Microbiotics in daily professional practice. Consequently, the Postgraduate Diploma in Intestinal Microbiota in Pharmacy responds to the continuous demand by professionals for quality training in this regard, which serves as a vehicle to use microbiotic therapy and probiotics as a means of channeling their clients with intestinal tract problems and thus become more competent professionals.





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*TECH professionals have designed this very complete training with the sole objective of enhancing your growth as a pharmacist”*



## General Objectives

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- ♦ This Postgraduate Diploma fulfills a need in today's society, a quality and updated training program that allows for the use of microbiological therapy as a preventive or therapeutic tool for health maintenance
- ♦ It offers a complete and global picture of the current situation in the area of Intestinal Microbiota, in its broadest sense, and the importance of the balance of this microbiota as a direct effect on our health, including the multiple factors that influence it positively and negatively
- ♦ Arguments based in scientific evidence show how Microbiota and its interaction with many non-digestive pathologies of autoimmune nature, or its relation with the dysregulation of the immune system, its capacity for disease prevention and as a support to other medical treatments, are all currently being given a privileged position
- ♦ The program will 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 Microbiota and how the latter may be influencing it
- ♦ Encourage professional stimulus through continuing education and research





## Specific Objectives

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### Module 1 Microbiota. Microbiome. Metagenomics

- ◆ Know the relationship between Microbiota and Microbiome and their most accurate definitions
- ◆ Gain an in-depth understanding of the concepts of symbiosis, commensalism, mutualism, and parasitism
- ◆ Delve into the different types of Human Microbiota and understand their generalities
- ◆ Delve into the aspects that trigger the balance and imbalance of Microbiota

### Module 2 Intestinal Microbiota I. Intestinal Homeostasis

- ◆ Delve into current studies on intestinal microbiota
- ◆ Understand the composition of intestinal microbiota
- ◆ Delve into the physiology of the digestive tract
- ◆ Become familiar with microbiota composition in the different parts of the digestive tract. Resident flora and transient or colonizing flora
- ◆ Understand the functions of intestinal microbiota at the metabolic, nutritional, and trophic levels

### Module 3 Intestinal Microbiota II. Intestinal Dysbiosis

- ◆ Gain an in-depth understanding of intestinal dysbiosis
- ◆ Analyze the consequences of intestinal dysbiosis
- ◆ Understand the relation between intestinal dysbiosis and other types of immunological, metabolic, neurological and gastric disorders
- ◆ Understand the consequences of altering the intestinal ecosystem and its relation to Functional Digestive Disorders
- ◆ Become familiar with Intestinal Microbiota composition in different life stages
- ◆ Learn to apply quantitative analysis techniques to microorganisms in feces
- ◆ Delve into current studies on intestinal microbiota

# 03

# Course Management

The program's teaching staff includes leading specialists in Human Microbiota and other related areas, who bring their years of work experience to this training program. In addition, other specialists of recognized prestige participate in its design and elaboration, completing the program in an interdisciplinary manner. All of which is carried out with the aim of providing pharmacists with the most complete educational information and contents so that they can practice their profession with greater guarantees of success and treat patients with intestinal problems with a deeper knowledge of the functioning of their microbiota in order to determine the most appropriate drugs for their treatment.



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*Learn from leading professionals the latest advances in the field of Intestinal Microbiotics and its relevance to other pathologies, and increase your skills as a pharmacist”*

## Management



### Mrs. Fernández Montalvo, Maria Ángeles

- ♦ Degree in Biochemistry from the University of Valencia
- ♦ Specialist Degree in Nutrition, Dietetics, and Diet Therapy
- ♦ Specialist Degree in Microbiological Food Analysis
- ♦ Specialist Degree in Nutrition, Food, and Cancer. Prevention and Treatment
- ♦ Specialist Degree in Vegetarian, Clinical, and Sports Nutrition
- ♦ Specialist in food intolerances and the study of the intestinal microbiota
- ♦ Numerous courses on Intestinal Microbiota, methods of analysis, and applications
- ♦ Diploma in Natural and Orthomolecular Medicine
- ♦ Specialist Degree in the current use of Nutricosmetics and Nutraceuticals in general
- ♦ Specialist Degree in point-of-sale management in Pharmacies and Parapharmacies
- ♦ 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)

## Professors

### Dr. Álvarez García, Verónica

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

### Dr. Díaz Martín, Juan José

- ◆ Pediatric gastroenterologist at the Central Hospital of Asturias (HUCA)
- ◆ Member of the Spanish Society of Pediatric Gastroenterology, Hepatology, and Nutrition
- ◆ Associate Professor of Pediatrics at the University of Oviedo

### Dr. Fernández Madera, Juan José

- ◆ Degree in Medicine
- ◆ Specialist in Clinical Allergology and Immunology
- ◆ Specialist in Sports Medicine

### Dr. Gonzalez Rodríguez, Silvia P

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

### Dr. Lombó Burgos, Felipe

- ◆ Doctor in Biology from the University of Oviedo
- ◆ Full professor at the University of Oviedo

### Dr. López López, Aranzazu

- ◆ Ph.D. in Biological Sciences
- ◆ Researcher in oral microbiology at the FISABIO Foundation
- ◆ Public Health Research Center of Valencia

### Dr. Méndez García, Celia

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

### Dr. Solís Sánchez, Gonzalo

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

### Dr. Suárez Rodríguez, Marta

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

# 04

# Structure and Content

The structure of the contents has been designed by a team of professionals from the best hospital centers and universities in the country, who are aware of the relevance of up-to-date training to be able to prevent, detect, and treat pathologies related to alterations in intestinal microbiota, and are committed to quality teaching through new educational technologies. All of which aimed at training pharmacists to be much more competent and prepared to offer treatments that help and favor the intestinal microbiome of patients.







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*TECH has created these contents with the latest educational technology. This way you are ensured to learn aided by the best methodology on the market”*

## Module 1 Microbiota. Microbiome. Metagenomics

- 1.1. Definition and Relationship between Them
- 1.2. Microbiota Composition: Types, Species and Strains
  - 1.2.1. Characteristics and Main Functions
  - 1.2.2. Groups of Microorganisms that Interact with Humans: Bacteria, Fungi, Viruses, and Protozoa
  - 1.2.3. Key Concepts; symbiosis, Commensalism, Mutualism, Parasitism
  - 1.2.4. 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. Intestinal-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 and Latest Advances

## Module 2. Intestinal Microbiota I. Intestinal homeostasis

- 2.1. Intestinal Microbiota Studies
  - 2.1.1. METAHIT, META-BIOME, MyNewGut, HUMAN MICROBIOME PROJECTS
- 2.2. Microbiota Composition:
  - 2.2.1. Protective Microbiota (Lactobacillus, Bifidobacterium, Bacteroides)
  - 2.2.2. Immunomodulation Microbiota (Enterococcus faecalis y 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. Intestinal 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. Defense 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. Intestinal Microbiota II. Intestinal Dysbiosis

- 3.1. What is Intestinal Dysbiosis? Consequences
- 3.2. Intestinal Barrier. Physiology. Function. Intestinal Permeability and Hyperpermeability. Relation between Dysbiosis and Intestinal Permeability and 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 Intestinal 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. Intestinal 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

05

# Methodology

This training provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

This teaching system is used 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 Re-learning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization”*

## At TECH we use the Case Method

In a given clinical situation, what would you do? Throughout the program, you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, resolve the situation. There is abundant scientific evidence on the effectiveness of the method. Pharmacists learn better, more quickly and more sustainably over time.

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



According to Dr. Gervas, 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 potential or because of its uniqueness or rarity. It is essential that the case is based on current professional life, attempting to recreate the actual conditions in a pharmacist's professional 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. Pharmacists who follow this method not only achieve the assimilation of concepts, but also develop their mental capacity through exercises to evaluate real situations and apply their knowledge
2. The learning process has a clear focus on practical skills that allow the student 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



## Re-Learning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Re-learning.

Our 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, which represent a real revolution with respect to simply studying and analyzing cases.

*Pharmacists 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 Re-learning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best Spanish-speaking online university (Columbia University).

With this methodology we have trained more than 115,000 pharmacists with unprecedented success, in all clinical specialties. Our pedagogical methodology is developed in a highly demanding environment, with a university student body with a high socioeconomic profile and an average age of 43.5 years old.

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

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

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



In this TECH Specialist Diploma you will have access to the best educational material, prepared with you in mind:



### Study Material

After a complex production process, we transform the best content into high-quality educational and audiovisual multimedia. We select the best syllabus and make it available to you. Everything you need to acquire in-depth knowledge of a discipline, from A to Z. Lessons written and chosen by specialists in each of the disciplines



### Surgical techniques and clinical procedures on video

We bring you closer to the newest techniques, to the latest scientific advances, and to the forefront of medical news. All this, in first person, with the maximum rigor, explained and detailed for your assimilation and understanding. And best of all, you can watch them as many times as you want



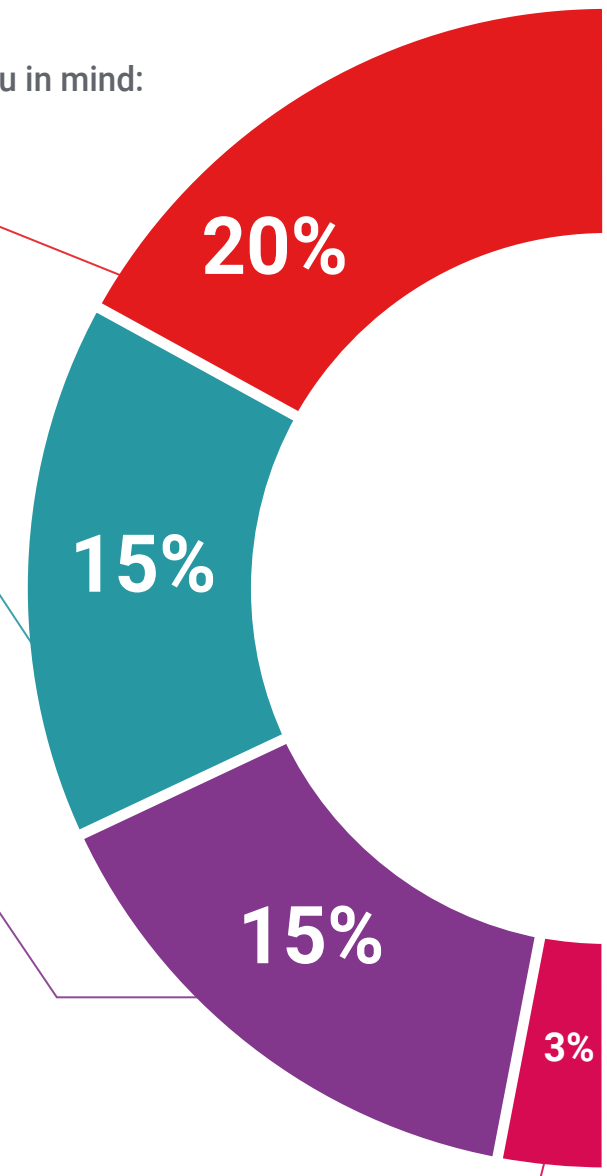
### Interactive Summaries

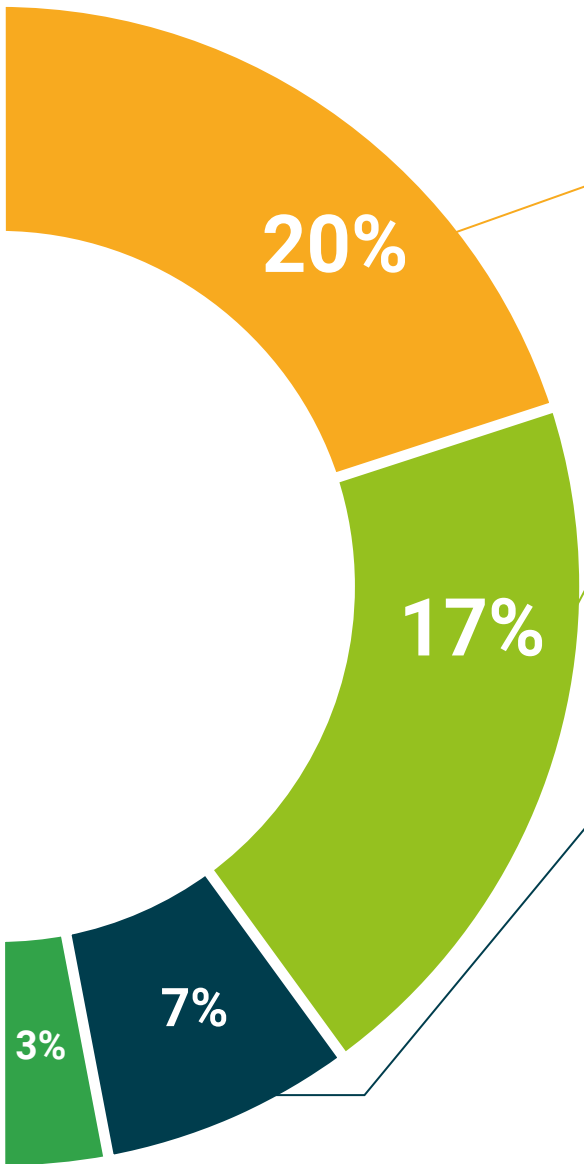
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge. This unique training system for presenting multimedia content was awarded by Microsoft as a "European Success Story"



### Additional Reading

Recent articles, consensus documents, international guides... in our virtual library you will have access to everything you need to complete your training





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

Through the narratives of expert professionals, it is possible to acquire a high degree of understanding of the most frequent problematic situations. The professional's healthcare practice is not alien to the context in which it takes place. If we want to train ourselves to improve our professional practice, this training must be situated within the context in which it takes place



**Testing & Re-testing**

We periodically evaluate and re-evaluate your knowledge throughout this program through activities and evaluative exercises



**Classes**

There is scientific evidence suggesting that observing third-party experts can be useful. Learning from an expert strengthens knowledge and recall, and generates confidence in our future difficult decisions



**Quick Action Guides**

One of the most important functions of our team is to select those contents considered essential and present them in the form of worksheets or quick action guides to facilitate their understanding



06

# Certificate

The Postgraduate Diploma in Intestinal Microbiota in Pharmacy guarantees, in addition to the most rigorous and up-to-date education, access to a diploma issued by TECH Global University.





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

This private qualification will allow you to obtain a **Postgraduate Diploma in Intestinal Microbiota in Pharmacy** 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: **Postgraduate Diploma in Intestinal Microbiota in Pharmacy**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**



future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present quality  
online training  
development languages  
virtual classroom



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