

# Postgraduate Certificate

## Physiological Therapeutic Effects of HBOT

Endorsed by the NBA





## Postgraduate Certificate Physiological Therapeutic Effects of HBOT

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/sports-science/postgraduate-certificate/physiological-therapeutic-effects-hbot-physical-activity-sport](http://www.techtute.com/us/sports-science/postgraduate-certificate/physiological-therapeutic-effects-hbot-physical-activity-sport)

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# 01

# Introduction

The beneficial action of HBOT can be applied to a wide range of ailments and pathologies. In sports medicine it becomes a valuable ally in the treatment and intervention of injuries and other preventive or developmental applications. Knowing the physiological therapeutic effects of HBOT will open new avenues of work and approach of great interest to the physiotherapy professional.





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*Get to know all the therapeutic effects that HBOT offers to sports medicine professionals and start working in this exciting field"*

The detailed knowledge of the physiological therapeutic effects obtained from the generation of hyperoxia will allow the student to develop the critical sense to understand the mechanisms of action in the different proven and potential clinical applications. For this purpose, the Physiological Therapeutic Effects are explained in detail through documents, videos and exercises of applications in different pathologies.

Each individual case will benefit from different biochemical effects that are triggered by the transient increase in reactive oxygen species during the HBOT session.

The first part of the Postgraduate Certificate presents the action of hyperbaric oxygen in mitochondrial reactivation, and reviews the importance of reversing mitochondrial dysfunction in the prevention and treatment of different pathologies. Thus, the most relevant physiological effects described are detailed: vasoconstriction, angiogenesis, collagen synthesis, osteogenesis, neuroprotection, peripheral axonal regeneration, bactericidal effect, anti-inflammatory effect and antioxidant effect. A bibliography is also provided for those who wish to study a particular effect in greater depth, as well as documents prepared to review them.

On the other hand, the concept of relative hyperoxia is presented, an effect achieved with normobaric oxygenation and that it is considered that it could be achieved with hyperbaric oxygenation treatment at low pressures.

The understanding and interpretation of this Postgraduate Certificate is fundamental to be able to evaluate the probable effect achieved in different clinical cases.

This **Postgraduate Certificate in Physiological Therapeutic Effects of HBOT** contains the most complete and up-to-date educational program on the market. The most important features of the program include:

- ♦ Development of practical cases presented by experts in Hyperbaric Medicine.
- ♦ 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.
- ♦ Developments in Hyperbaric Medicine.
- ♦ Practical exercises where self-assessment can be used to improve learning.
- ♦ Special emphasis on innovative methodologies in Hyperbaric Medicine.
- ♦ 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



*Don't miss this opportunity to study in the biggest private online university"*

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*This Postgraduate Certificate is the best investment you can make in the selection of a refresher program for two reasons: in addition to updating your knowledge in Physiological Therapeutic Effects of HBOT, you will obtain a certificate by TECH Technological University"*

It includes in its teaching staff professionals belonging to the field of Hyperbaric Medicine, who pour into this training the experience of their work, in addition to recognized specialists from reference societies and prestigious universities.

Its multimedia content, developed with the latest educational technology, will allow the professional a situated and contextual learning, that is, a simulated environment that will provide an immersive knowledge update programmed to train in real situations.

This program is designed around Problem Based Learning, whereby the specialist must try to solve different professional practice situations that arise during the program. For this purpose, the professional will be assisted by an innovative interactive video system developed by renowned experts with extensive experience in the Physiological Therapeutic Effects of HBOT.

*This specialisation comes with the best didactic material, providing you with a contextual approach that will facilitate your learning.*

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



02

# Objectives

The Postgraduate Certificate in Physiological Therapeutic Effects of HBOT is oriented to train in the fundamentals and applications of hyperbaric oxygenation treatment and to expose the scientific evidence in the different specialties in the health field.





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*Become one of the specialists in the use of HBOT with the knowledge to use it safely and successfully”*



## General Objectives

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- ◆ Promote the usefulness of hyperbaric oxygenation treatment in different medical specialties
- ◆ Train health professionals on the foundations, mechanisms of action, indications, contraindications and applications of hyperbaric oxygen
- ◆ Study the degree of evidence published and the recommendations and indications of the different scientific societies related to Hyperbaric Medicine
- ◆ Recognise the potential applications of hyperbaric oxygen in different clinical cases and the benefits that can be achieved with the treatment, as well as performing the indication and detection of the contraindications





## Specific Objectives

- Training on the effects of hyperoxia on a mitochondrial level and the physiological benefits it triggers
- Describe the importance of mitochondrial reactivation with HBOT and its potential effect on different related pathologies with mitochondrial dysfunction
- Present the physiological effects that are triggered with HBOT and the production of reactive oxygen species
- Relate this physiological effects with different indications of HBOT
- Training in the analysis of different clinical cases which can benefit from the therapeutic effects of HBOT



*Update your knowledge through the Postgraduate Certificate in Physiological Therapeutic Effects of HBOT"*



03

# Course Management

The program includes in its teaching staff reference experts in Hyperbaric Medicine, who pour into this training the experience of their work. In addition, other specialists of recognized prestige participate in its design and development, completing the program in an interdisciplinary way.



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*We have an excellent team of specialists in the field of Hyperbaric Medicine that will help you train in this field"*

## International Guest Director

Dr. Peter Lindholm is an eminence in Hyperbaric Medicine and the approach to Respiratory Disorders. His research has been focused on the Pathophysiology of Lung Diving, exploring topics such as Hypoxia and loss of consciousness.

Specifically, this expert has analyzed in depth the effects of the medical condition known as Lungsqueeze, frequent in divers. Among his most important contributions in this area is a detailed review of how glossopharyngeal breathing can extend lung capacity beyond normal limits. In addition, he described the first case series linking glossopharyngeal insufflation with cerebral gas embolism.

At the same time, he has been a pioneer in proposing the term Tracheal Squeeze as an alternative to pulmonary edema in divers who bleed after deep dives. On the other hand, the specialist has shown that exercise and fasting before diving increase the risk of loss of consciousness, similar to hyperventilation. In this way, he has developed an innovative method to use Magnetic Resonance Imaging in the diagnosis of Pulmonary Embolism. In the same way, he has delved into new techniques for measuring hyperbaric oxygen therapy.

Dr. Lindholm also serves as Director of the Endowed Gurnee Chair of Diving and Hyperbaric Medicine Research in the Department of Emergency Medicine at the University of California, San Diego, United States. Likewise, this renowned expert spent several years at Karolinska University Hospital. In that institution he worked as Director of Thoracic Radiology. He also has vast experience in diagnosis by means of clinical imaging based on radiation, and has even given lectures on the subject at the prestigious Karolinska Institute in Sweden. He is also a regular speaker at international conferences and has numerous scientific publications.



## Dr. Lindholm, Peter

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- Chair of Hyperpathic Medicine and Diving at the University of California, San Diego, United States
- Director of Thoracic Radiology at the Karolinska University Hospital
- Professor of Physiology and Pharmacology at Karolinska Institute in Sweden
- Reviewer for international scientific journals such as American Journal of Physiology and JAMA
- Medical Residency in Radiology at the Karolinska University Hospital
- Doctor of Science and Physiology, Karolinska Institute, Sweden

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

## Management



### Dr. Cannellotto, Mariana

- ♦ President of AAMHEI Biobarica Medical Director
- ♦ Specialist in Hyperbaric Medicine. Medical Clinic



### Dr. Jordá Vargas, Liliana

- ♦ Degree in Clinical Biochemistry
- ♦ Microbiology
- ♦ Scientific Director of AEMHEI and AAMHEI
- ♦ Biobarica Scientific and Clinical Research Director





## Professors

### **Dr. Emilia Fraga, Pilar María**

- ◆ FINES Teacher
- ◆ AAMHEI Pedagogical Assistant

### **Dr. López Jiménez, Elías**

- ◆ Degree in Medicine from the Complutense University of Madrid
- ◆ Specialist in Radiotherapeutic Oncology via RMI, La Princesa Hospital

### **Dr. Navarro Viltre, Bárbara Ivonne**

- ◆ Deputy of the Emergency Department of the General Hospital of Catalonia
- ◆ Specialist in Family and Community Medicine Via MIR
- ◆ Head of Hyperbaric Medicine unit at Catalunya Hospital

### **Dr. Ramallo, Rubén Leonardo**

- ◆ Master's Degree in Psychoimmunoneuroendocrinology.
- ◆ Biobarica Medical Doctor Núñez and Larrea
- ◆ Director of the AAMHEI Medical Clinic Commission

### **Dr. Romero-Feris, María Delfina**

- ◆ President of AEMHEI
- ◆ Biobaric Medical Director Spain

### **Dr. Verdini, Fabrizio**

- ◆ Diploma in Public Health Management
- ◆ Master's Degree in Healthcare Management

04

# Structure and Content

The structure of the contents has been designed by the best professionals in the field of Hyperbaric Medicine, with an extensive experience and recognized prestige in the profession, backed by the volume of cases reviewed, studied and diagnosed, and with extensive knowledge of new technologies applied to hyperbaric medicine.



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*This Postgraduate Certificate in Physiological Therapeutic Effects of HBOT contains the most complete and up-to-date scientific program on the market”*

## Module 1. Physiological Therapeutic Effects of HBOT

- 1.1. Introduction to the Physiological Therapeutic Effects
- 1.2. Vasoconstriction
  - 1.2.1. Robin Hood Effect
  - 1.2.2. Effect of HBOT on Blood Pressure and Heart Rate
- 1.3. Stem Cells and Oxygen
  - 1.3.1. Liberation of Stem Cells with HBOT
  - 1.3.2. Importance of Stem Cells on Wound Healing
  - 1.3.3. Oxygen in the Differentiation of Stem Cells
- 1.4. Oxygen in the Synthesis of Collagen
  - 1.4.1. Synthesis and Types of Collagen
  - 1.4.2. Oxygen in the Synthesis and Maturing of Collagen
  - 1.4.3. HBOT and Collagen in Healing
- 1.5. Angiogenesis and Vasculogenesis
  - 1.5.1. Degenerative Angiogenesis and Hyperbaric Oxygen
- 1.6. Osteogenesis
  - 1.6.1. HBOT and Osteogenesis and Bone Resorption
- 1.7. Mitochondrial Function, Inflammation and Oxidative Stress
  - 1.7.1. Mitochondrial Dysfunction in the Pathogenesis of Different Pathologies
  - 1.7.2. HBOT and Mitochondrial Function
- 1.8. Oxidative Stress and Hyperbaric Oxygen
  - 1.8.1. Oxidative Stress in Different Pathologies
  - 1.8.2. Oxidative Stress in Hyperbaric Oxygen
- 1.9. Anti-inflammatory Effect in Hyperbaric Oxygen
  - 1.9.1. Hyperbaric Oxygen and Inflammation
- 1.10. Antimicrobial Effect in Hyperbaric Oxygen
  - 1.10.1. Bacterial Effect of Oxygen
  - 1.10.2. Hyperbaric Oxygen and Biofilm
  - 1.10.3. Hyperbaric Oxygen and the Immune Response
- 1.11. Oxygen and Neurone Function
  - 1.11.1. Oxygen and Peripheral Axonal Regeneration
  - 1.11.2. Oxygen and Neuroplasticity





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*This training will allow you to advance in your career in a comfortable way, combining your studies with your professional and personal activities”*

# 05 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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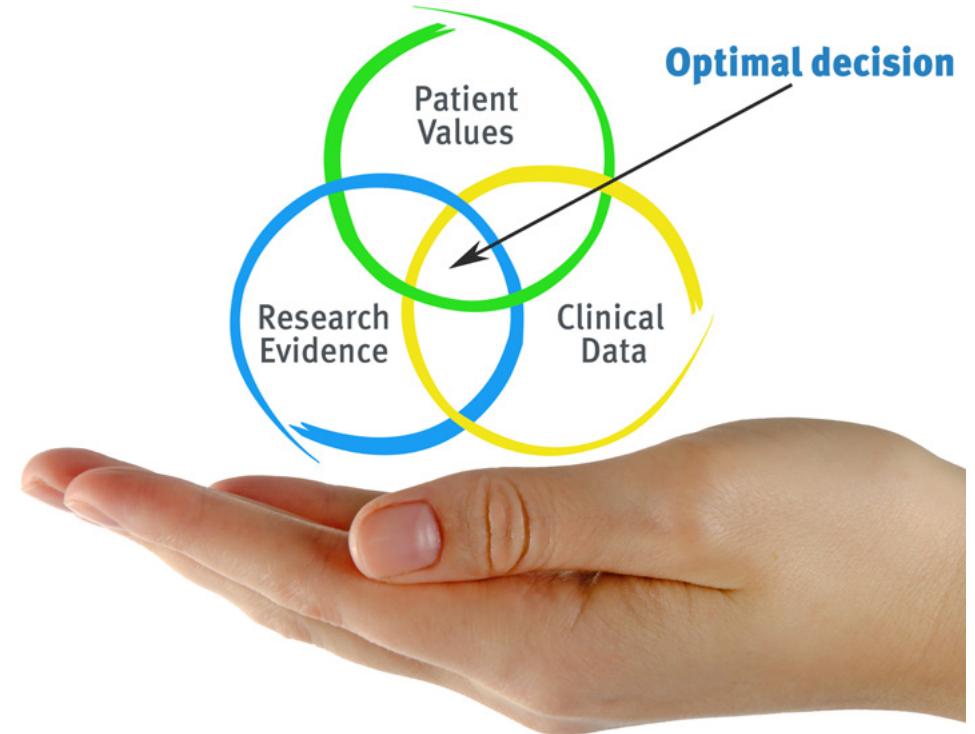
*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

### Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.



*At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"*



*You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.*





*The student will learn to solve complex situations in real business environments through collaborative activities and real cases.*

### A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

“*Our program prepares you to face new challenges in uncertain environments and achieve success in your career”*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question we face in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

## Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

*In 2019, we obtained the best learning results of all online universities in the world.*

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.





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.

With this methodology, we have trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, markets, and financial instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

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

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

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



### Study Material

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

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



### Classes

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

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



### Practising Skills and Abilities

They will carry out activities to develop specific competencies and skills in each thematic area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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.





#### Case Studies

Students will complete a selection of the best case studies chosen specifically for this situation. Cases that are presented, analyzed, and supervised by the best specialists in the world.



#### Interactive Summaries

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

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



#### 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.



# 06 Certificate

The Postgraduate Certificate in Physiological Therapeutic Effects of HBOT guarantees, in addition to the most rigorous and up-to-date training, access to a certificate issued by TECH Technological University.





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

This **Postgraduate Certificate in Physiological Therapeutic Effects of HBOT** 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 **Postgraduate Certificate diploma** issued by **TECH Technological University** via tracked delivery\*.

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

Title: **Postgraduate Certificate in Physiological Therapeutic Effects of HBOT**

Official N° of Hours: **150 h.**

Endorsed by the NBA



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



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



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