Master: NEUROMETABOLISM AND CELL BIOLOGY FOR CLINICIANS

Holistic training in neurometabolism and cell biology for a new generation of talented clinicians

GENERAL INFORMATION

What you will learn

- *Original and innovative clinical practice* aimed at connecting the basic mechanisms of disease to clinical symptoms
- *Biomarkers and treatments* of neurometabolic and neurodegenerative diseases
- The *biochemical and cell biology bases of neurological symptoms*

Novel paradigm

This international master aims to lay the ground for the much-needed novel paradigm in clinical neurology. While the classic approach is mainly based on clinical symptoms, here we aim to integrate different levels of complexity in agreement with the intricate operational network of the nervous system.

The neurological manifestations will be linked to genetic, molecular and biochemical markers, cellular pathways, and brain circuitries in a comprehensive manner as a necessary and new approach.

Most of all, we will provide educational tools to integrate the "pathophysiological thinking" in the clinical practice of both neurology and inborn errors of metabolism in line with the fact that >80% of diseases have neurological involvement. All of these aim towards the current development of new therapies.

Who is it intended for?

This master's degree is mainly aimed at neurologists (pediatric or adult) and doctors dedicated to inborn errors of metabolism. It is also aimed at professionals in any area of biomedicine.

- Graduate/Doctor of Medicine
- Graduate/Doctor of biomedicine sciences

Certificate: Lifelong learning master's degree certificate	
Edition: 3º Edition	Length: 2 academic years
Modality: Hybrid	Places: 40
Credits: 90 ECT	Fees: 4.275 € / year
Start date: October, 2026	Teaching Language: English
Finish date: September, 2028	Location: Hospital Sant Joan de Déu Passeig de Sant Joan de Déu, 2 08950 Esplugues de Llobregat, Barcelona, Spain

Director:

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Head Neurometabolic Unit Sant Joan de Déu (SJD), Barcelona

Coordinators:

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Advisory Board:

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TEACHING STAFF

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TEACHING STRUCTURE

The teaching program includes **6 theoretical modules** that cover almost all neurometabolism disorders.

HYBRID FORMAT

The master's program is delivered in a **hybrid format**:

Classes are conducted on a weekly basis. **Each week, access is granted to the corresponding class via the virtual campus and is available to students,** allowing them the freedom to access it as many times as they deem necessary. One or two lectures are scheduled per week.

A **real-time online tutoring session** takes place **every Thursday from 17:00 to 18:00hrs (local time in Spain-CET). This tutoring session provides** an opportunity for interaction and clarification of doubts with the teacher who conducted the class that week.

The face-to-face period takes place during one week per year at the "Summer School" in Barcelona. It will take place at the end of each academic year: **the first week of July 2027 and the first week of July 2028.**

ASSESSMENT CRITERIA

Quiz: At the end of each tutoring session there will be a small exam regarding the conference of the week.

Master's Final Project (MFP):

There are several options for the Master's Final Project. It may be a clinical case that contributes to something different to what it is already known, for being a new presentation, introducing a new biomarker, a new disease, a bibliography review, etc. It can also be the description of a series of patients in an "article format". Finally, combined clinical and laboratory works are also acceptable if the students are working on some translational research topic that they would like to present as a final project.

The project is prepared in a group of 3-5 students with the same interest topic under the supervision of one or two advisors, and should enable the participants to display the knowledge, skills and competences acquired during the master's degree in an integrated way.

ADMISSION

APPLY FOR ADMISSION

The interested participants should send documents to:

neurometab.bio.master@gmail.com

- Curriculum vitae
- Motivation Letter stating why you believe it is important to do the master and the country in which you live and work
- University diploma of the completed Bachelor's degree and of the Master's degrees that have been taken (compulsory or not)
- Identity document (Passport or national document)
- Financial Aid of the AMN program (consult regulation)

The **deadline** for sending these two documents is **July 27th, 2026 12PM (Barcelona time-CET)**

Selection criteria

- Geographical origin, a representativeness of the maximum number of countries is attempted
- Motivation letter
- Curriculum vitae
- Previous experience in inborn error of metabolism and/or neurology

NOTICE OF ADMISSION

The admission resolution will be sent to the e-mail address you specify when you send your application. In any case, whether you are selected or not, you will receive a message from our side. **The program management will announce the admissions on July 31th**.

In this e-mail the selected participants will receive the link for the enrollment as well as the list of documents required for the enrollment.

The enrollment will start September 7th and will finish on September 24th, 2026.

ENROLLMENT

Enrollment dates: From September-07-2026 to September-24-2026

Enrollment process: The entire registration process will be done virtually through the registration portal of the UAO CEU, through the link sent in July, when the admission confirmation.

Documents required at the time of enrollment:

To certify the validity of the studies carried out abroad, it is necessary to carry out specific procedures that allow verifying the existence of both the institution that issues them and the studies that have been completed and the titles and grades obtained.

The documents are:

1. **The university degree certificate** with the certificate made by a registered notary in the Spanish State or by the diplomatic or consular representations of the Spanish State in the country that issued the title.

2. The **translated diploma** is made by a sworn translator (if the diploma is NOT in Catalan, Spanish, English, Italian, French or Portuguese). **If the candidate uploads the translation, it should be certified** by a registered notary in the Spanish State or by the diplomatic or consular representations of the Spanish State. If the candidate uploads the **original translation, it does not need to be certified by the Spanish authorities.**

You can find the Spanish sworn translator in the link:

Official translation of academic documents

Types of valid translations. A. Official translation carried out by a sworn translator/interpreter legally registered in Spain: For the official translation to be valid, the translator/interpreter must be part of the "Updated List of Sworn Translators-Interpreters" published by the Ministry of Foreign Affairs and Cooperation (MAEC).

https://www.ciencia.gob.es/Universidades/validate/traducciones.html

3. Copy of DNI, passport or corresponding **identity document**

4. **Responsible declaration** stating that you are in possession of the title provided, that the data entered are true and authorizing, where appropriate, its verification. The document will be provided by the University. The commitment document will be delivered attached at the time of confirmation of admission.

Important:

1: Students who do not have the certified and apostilled documents will be able to enroll only under the signed commitment to have this regularized documentation before December 15th, 2026. if they haven't been sent by then, students could submit the original documents in July, during the Summer School. After then, If the student has not been able to regularize the documents, the University will cancel your enrollment without the option of claiming a refund of the amounts paid.

2: If the diploma is NOT in **Catalan, Spanish, English, Italian, French or Portuguese** it should be translated by a sworn translator.

Many countries signed the Hague Convention. The " Hague apostille " would be accepted only if it has a QR code that shows that the signature of the document is authentic and also the document itself. The Hague apostille verifies the signature, not the document itself.

Enrollment fee:

- First year: 4.470 €
- Second year: 4.275 €

  (The admission fee, 195€, is only included the first year)

Economic help:

The University CEU Abat Oliba offers a financial aid program for the Master in Neurometabolism and Cell biology for Clinicians, called the AMN program. That permits the access to discounts and financial aid for those professionals who, for reasons of income or country, do not have sufficient financial means to cover the program. These aids consist of direct discounts on the cost of registration that can be requested when applying for admission to the Master. You can consult the conditions by sending an e-mail to:

neurometab.bio.master@gmail.com

CERTIFICATION

To obtain the degree, it is essential:

- To be approved in each of the modules with 80% of attendance to the tutoring classes and grade higher than 7.0 (out of 10 points*) in each module separately.
- To participate in the summer schools
- To be approved in the final project

*The points of each module correspond to the average points of all the quizzes of the module (every week, for each seminar, there will be a tutorial class, after which a small quiz will be carried out. Each exam has a maximum score of 10 points).

Distribution of the final grade of the Master:

- Participation in the summer school: 10% of the final grade (maximum score of 10 points)
- Final Project: 15% of the final grade (maximum score of 10 points).
- Modules: 75% of the final grade

QUALIFICATION AWARDED

A diploma of Master Degree of **University CEU Abat Oliba** * in Neurometabolism and cell biology with 90 ECTS credits will be issued.

The Diploma will be issued in a bilingual version, Spanish-English.

***What is a University Lifelong learning master's degree?**

The University CEU Abat Oliba Lifelong learning master's degrees (formerly known as **own degree** masters) are intended for the specialization and deepening of practicing professionals.

This kind of master degree is a **unique qualification certified by the CEU UAO**. Their recognition depends on the institutions or companies to which they are submitted by their holders. In order to guarantee their **academic rigor**, they are subject to similar quality control processes to those used for official programs taught at CEU UAO. It should be kept in mind, however, that this type of qualification, specific to a Spanish university, does not give access to PhD programs in Spain.

What is the difference between own degrees and official degrees?

In accordance with section g) of article 2 of Organic Law 6/2001, of December 21, on Universities, the State grants Spanish universities the autonomy to issue official titles valid throughout the national territory and its own diplomas and titles. With this measure, the University is enabled to expand its official training offer through so-called **own degrees**. Official degrees require a series of procedures and evaluations by different public bodies such as the National Agency for Quality Assessment and Accreditation (ANECA) and are required for the doctorate. **Own degrees** are specialized courses with various names (master's, postgraduate, expert, etc.) and do not require the validation of institutions such as ANECA. They are designed to respond in an agile way to the needs posed by the labor market and society, so they are aimed at achieving objectives such as:

- Provide specialized training with immediate professional projection.
- Update the knowledge of professionals to promote training for professional practice.
- Establish a connection between academic activity and social reality

SCIENTIFIC PROGRAM

The master's teaching program lasts two academic years**.** The educational content of the first year is related to basic knowledge on brain metabolism and cellular neurobiology. The second year aims to connect neurochemistry and cell biology to the main neurological syndromes

FIRST YEAR

Part I: Cellular Neurochemistry and related diseases I-

A. Basis of Brain Chemistry

- I-A. 1-An overview of cell biology and main types of molecules (simple, complex, energy metabolites)
- I-A. 2- Classification of Inborn Metabolic Diseases based on chemistry groups and clinical symptoms
- I-A. 3-Brain circuits and Neurochemistry. Associated neuropsychiatric manifestations

I-B. Small molecules and related diseases

- I-B. 1-An overview of clinical manifestations and treatments
- I-B. 2-Amino acid accumulation disorders
- I-B. 3-Amino acid deficiency disorders
- I-B. 4-Inborn errors of vitamins affecting the nervous system
- I-B. 5-Neurological impairment of Disorders of galactose, fructose, and other small

carbohydrates

- I-B. 6-Neurological impairment of Disorders of purine and pyrimidines
- I-B. 7-Disorders of metals and neurological dysfunction (Disorders of peptides and neurotransmitters will be developed at Part III)

I-C. Complex molecules and related diseases

- I-C. 1-An overview of clinical manifestations and treatments in complex molecule defects
- I-C. 2-Disorders of Sphingolipids
- I-C. 3-Disorders of Cholesterol Biosynthesis, Niemann-Pick and Lipofuscinoses
- I-C. 4-Disorders of phospholipids and intracellular triglycerides
- I-C. 5-Peroxisomal disorders
- I-C. 6-Glycosaminoglycans and Oligosaccharides Disorders
- I-C. 7-Disorders of RNA and DNA metabolism I-

D. Energy molecules and related diseases

- I-D. 1-An overview of brain energy metabolism
- I-D. 2-Energy molecule transporters and related disorders
- I-D. 3-Cytoplasmic energy defects and related disorders
- I-D. 4-Mitochondrial oxidative phosphorylation and related disorders
- I-D. 5-Mitochondrial machinery and related disorders

Part II: Nervous system compartments 1: Intracellular communication and related diseases

- II. 1-An overview of intracellular communication and related diseases
- II.2-Disorders of the exocytic compartment.
- II.3-Disorders of the endocytic compartment
- II.4-Disorders of autophagy
- II.5-Disorders of axonal and cytoskeleton transport
- II.6- Neurological aspects of Congenital Disorders of Glycosylation

Part III: Nervous system compartments 2: Intercellular communication and related diseases

- III. 1-An overview of intercellular communication and related diseases
- III. 2-Signaling molecules I: monoamine neurotransmitters and related diseases
- III. 3-Signaling molecules II: amino acid neurotransmitters and related diseases
- III. 4-Signaling molecules III: other signaling molecules (peptides, growth factors)
- III. 5-Cellular mechanisms of neuronal signaling and related diseases
- III. 6-Glia-Neuronal communication and related diseases

Part IV: Metodology and documentary review

Part V: Summer school I

SECOND YEAR

Part VI: Neurodevelopment and Systems Neurobiology

- VI.1-Development of the Nervous System
- VI.2-Neurobiological Mechanisms underlying neurodevelopmental disorders: an overview
- VI.3-Neurobiological Mechanisms underlying neurodegenerative disorders: an overview
- VI.4-Genetics of Neurological disorders

Part VII: Clinical syndromes and related biological mechanisms

- VII. 1-Early onset encephalopathies with predominant epilepsy
- VII. 2-Early onset encephalopathies with predominant motor symptoms
- VII. 3-Microcephaly
- VII. 3.1-congenital
- VII. 3.2-post-natal
- VII. 4-Macrocephaly
- VII. 5-Epilepsy from early to late childhood (2-12)
- VII. 6-Epilepsy in adolescence and early adulthood (>12)
- VII. 7-Congenital Ataxias

- VII. 8-Ataxia in childhood and adolescence
- VII. 9-Ataxia in adulthood
- VII. 10-Genetic forms of spastic cerebral palsy
- VII. 11-Spastic paraparesis and spastic-ataxia spectrum
- VII. 12-Hyperkinetic movements in early childhood---mixed forms
- VII. 13-Hyperkinetic movements with prominent chorea
- VII. 14-Hyperkinetic movements with prominent dystonia
- VII. 15-Other predominant hyperkinetic movements
- VII. 16-Hyperkinetic movements in adolescence and early adulthood
- VII. 17-Hypokinetic movements in early childhood (or infancy and childhood)
- VII. 18-Hypokinetic movements in adolescence and early adulthood
- VII. 19, 20-Intellectual disability 1, 2 (2 classes)
- VII. 21, 22, 23-Autism 1, 2, 3 (3 classes)
- VII. 24-Prominent behavior abnormalities in neurodevelopmental disorders
- VII. 25-Neuromuscular disorders I
- VII. 26-Neuromuscular disorders II

Part VIII: Biomarkers & New threatments

- VIII. 1-New biomarkers: metabolomics and lipidomics
- VIII. 2-Brain image biomarkers: demyelinating disorders in children
- VIII. 3-Brain image biomarkers: hypomyelinating disorders in adults
- VIII. 4-Brain image biomarkers: basal ganglia involvement
- VIII. 5-Brain image biomarkers: cerebellum and brainstem involvement
- VIII. 6-Advanced treatments I: bone marrow transplant and cell therapy
- VIII. 7- Advanced treatments II: genetic therapy

Part IX: Thesis

Part X: Summer school II