

**COURSE DATA****Data Subject**

<b>Code</b>	43034
<b>Name</b>	Pharmacology of psychoactive substance dependence: therapeutic perspectives
<b>Cycle</b>	Master's degree
<b>ECTS Credits</b>	4.0
<b>Academic year</b>	2020 - 2021

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
2138 - Master's Degree in Research in and Rational Use of Medicines	Faculty of Pharmacy and Food Sciences	1	First term
3103 - PhD in Biomedicine and Pharmacy	Doctoral School	0	First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
2138 - Master's Degree in Research in and Rational Use of Medicines	10 - Pharmacology of drug abuse addiction: therapeutic perspectives	Optional

**Coordination**

<b>Name</b>	<b>Department</b>
CANO CEBRIAN, MARIA JOSE	358 - Pharmacy, Pharmaceutical Technology and Parasitology
HIPOLITO CUBEDO, LUCIA TERESA	358 - Pharmacy, Pharmaceutical Technology and Parasitology
ZORNOZA SABINA, TEODORO ANTONIO	358 - Pharmacy, Pharmaceutical Technology and Parasitology

**SUMMARY**

Subject belonging to the researcher module "Master in Research and Rational Use of Medicines" that seeks to study the neuropharmacological basis of treatment for drug addiction. Addiction is a chronic and relapsing disease with very difficult therapeutic approach. This is mainly due to ignorance still existing about the molecular and cellular basis of this phenomenon. Detailed knowledge of the effects that different drugs have on the brain is crucial for understanding, refining and designing new useful therapeutic strategies for the treatment of this disease. The contents of this subject are designed to



illustrate the advances in this scientific field mainly in relation to the molecular and cellular basis of both acute and chronic effects of abuse drugs as well as the phenomenon of relapse in abstinent patients, which is the main obstacle found by the therapist who treats these patients.

In addition, the new therapeutic agents and the mechanism of action of these new anti-relapse drugs will be presented.

## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

### Other requirements

There is no registration restriction

## COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

### 2138 - Master's Degree in Research in and Rational Use of Medicines

- Manejar adecuadamente las fuentes de información biomédica y poseer la habilidad de hacer una valoración crítica de las mismas integrando la información para aportar conocimientos a grupos asistenciales multidisciplinares
- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- To acquire basic skills to develop laboratory work in biomedical research.
- Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.
- Be able to access to information tools in other areas of knowledge and use them properly.
- Dominar la comunicación científica. Poseer habilidades sociales y comunicativas en la práctica asistencial.
- Capacidad de seleccionar y gestionar los recursos disponibles (instrumentales y humanos) para optimizar resultados en investigación.



- Dominar el método científico, el planteamiento de protocolos experimentales y la interpretación de resultados en la búsqueda, desarrollo y evaluación de nuevos fármacos.

## **LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)**

- Students will learn about the neurobiological basis of addiction to drugs of abuse, as well as the effect and mechanism of action of pharmacological treatments used in this disease.
- Students will learn about the new possible targets used in the new anti-relapse drugs development.
- Students will be able to interpret, with critical awareness, information that continually appears in the scientific environment in relation to anti-relapse drugs.

## **DESCRIPTION OF CONTENTS**

### **1. What is addiction?**

In this first introductory topic, we will begin with the definition of the phenomenon of addiction to drugs of abuse, with special emphasis on the definitions and diagnostic criteria established in the DSMV and ICD-10.

The unit will be structured according to the following scheme:

- o Definitions of addiction to drugs of abuse
- o Visions of the problem
- o Vulnerability to addiction

### **2. Neurobiological vision of addiction: hypotheses and theories.**

The different visions that from different angles are proposed for the understanding of the addictive disorder will be exposed.

### **3. Animal models in the pharmacology of addiction**

The different animal models currently used in the study of addiction will be analyzed according to the following scheme:

- o Self-administration animal models
- o Preference conditioning or aversion of place
- o Models of discrimination
- o Resistance to extinction
- o Models of withdrawal and conditional withdrawal syndrome
- o Relapse models: ADE and resumption



#### **4. Psychostimulants**

This thematic unit is dedicated to the study of psychostimulants from various perspectives, including:

- o Definitions
- o History of abuse, use and addiction
- o Pharmacokinetics
- o Abuse and potential for addiction
- o Neurobiological mechanisms at the molecular, cellular and system levels of psychostimulant addiction

#### **5. Alcohol**

This thematic unit is dedicated to the study of alcohol as a drug of abuse. The unit is organized according to the following scheme:

- o Definitions
- o History of abuse, use and addiction
- o Pharmacokinetics
- o Abuse and potential for addiction
- o Neurobiological mechanisms at the molecular, cellular and system level of alcoholism

#### **6. Opioids**

This thematic unit is dedicated to the study of opioids as drugs of abuse. The unit is organized according to the following scheme:

- o Definitions
- o History of abuse, use and addiction
- o Pharmacokinetics
- o Abuse and potential for addiction
- o Neurobiological mechanisms at the molecular, cellular and system levels of opioid addiction

#### **7. Nicotine**

This thematic unit is dedicated to the study of nicotine and the phenomenon of smoking. The unit is organized according to the following scheme:

- o Definitions
- o History of abuse, use and addiction
- o Pharmacokinetics
- o Abuse and potential for addiction
- o Neurobiological mechanisms at the molecular, cellular and system level of smoking



### **8. Neurobiologia de la recaiguda**

En aquesta unitat didàctica s'abordarà l'estudi del Sistema Dopaminèrgic mesocorticolímbic i dels canvis en el produïts pel consum crònic de drogues que expliquen el fenomen de les recaigudes.

### **9. Neurobiology of relapse**

In this didactic unit the study of the mesocorticolimbic dopaminergic system and the changes in the produced by chronic drug use that explain the phenomenon of relapses will be addressed.

### **10. Introduction to stereotaxy**

In this practice, the student will be shown the methodology of stereotaxis, as well as its application in neuropharmacological studies that use both localized drug administrations, discrete lesions, or for the application of in vivo sampling techniques. Subsequently, the students

They will know the materials and elements necessary to carry out the sampling using the microdialysis technique.

### **11. In vivo microdialysis: determination of DA in NAc**

Once the elements necessary to perform an in vivo sampling by the microdialysis technique (P1), a neurochemical tool used in numerous Europharmacological studies in the field of addiction, are known, students will apply this knowledge by carrying out a practical session where they will quantitatively and qualitatively determine the DA in several samples of dialysate obtained in one of the areas involved in the reward system: the Accumbens Nucleus.

### **12. Analysis of motor activation induced by intracerebral drug administration: studies with a mu opioid receptor agonist in rats**

During the development of this practice, students will be shown one of the methodologies used in studies on behavioral activation derived from intrategmental drug administration. Students will learn how different opioid receptor agonists affect the motor response.



**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	24,00	100
Laboratory practices	12,00	100
Seminars	4,00	100
Development of individual work	44,00	0
Study and independent work	8,00	0
Preparing lectures	8,00	0
<b>TOTAL</b>	<b>100,00</b>	

**TEACHING METHODOLOGY**

In this subject the basic methodology in the first sessions is the master class. To complete the classroom hours, the materials provided for face-to-face teaching will be adapted, so that the student can access them at any time. Use of the virtual classroom forum to answer questions.

To be able to follow the development of the topics well, the student must have prior knowledge of physiology, pathophysiology and biochemistry, mainly. To complement the master classes, several practical approaches will be made (blocks 10, 11 and 12) using virtual methods and / or attending the laboratory of the Department of Pharmacy and Pharmaceutical Technology.

The virtual media used are based on the use of video tutorials and videoconferences. In these sessions, various experimental models commonly used in neuropharmacology studies of addiction will be put into practice. In addition, seminars will also be held to debate and clarify doubts with students on the different topics studied throughout the program. During the development of the seminars, the students will have to prepare an expository and individual work that they will have to present in Secondary Education Centers with the background of spreading the knowledge acquired to a subgroup of population that due to their age is considered especially vulnerable and attracted to the consumption of drugs. All this informative work is integrated within the State Network of Teaching Innovation in Childhood, Adolescence, Youth and Society (REIDIAJS 3.0). In summary, the following table sets out the methodology of the subject, as well as the hours of dedication for each type of activity proposed (student contact hours).

Hours	Method
Master lesson	20
Seminars	4
Laboratory practices	4

**EVALUATION**

It will be an essential requirement to pass the subject to attend face-to-face classes, both master classes, seminars and practical sessions in the laboratory or through virtual means. Participation in the debates and discussions on the course content, as well as the individual work carried out, will be especially valued.

The exhibition of

an informative work in a School of Secondary Education directed to students of 3º or 4º of E.S.O.

In any case, the following criteria will be applied in the final evaluation:



Formative evaluation:	Analysis and discussion of topics	20%
Final evaluation:	Expository seminar (REIDIACS Project)	80%

## REFERENCES

### Basic

- Artículos de revisión
- Artículos de investigación específica

### Additional

- Neurobiology of Addiction. GF Koob y M LeMoal (2006). Amsterdam, Academic Press
- Molecular Biology of Drug Addiction. R Maldonado (2003). New Jersey. Humana Press
- Cerebro y Adicción. D Redolat Ripollés. Ed UOC (2008)

## ADDENDUM COVID-19

**This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council**

Face-to-face teaching is planned, but if attendance is not possible due to the establishment of new sanitary measures, the following addendum will be applied:

### 1. Contents

All the contents initially programmed in the teaching guide will be kept.

### 2. Loadwork

The weight of the different activities will be maintained.

### 3. Teaching methodology

Upload the necessary materials to the virtual classroom, which will be adapted to the materials provided in the original guide for non-face-to-face teaching, incorporating annotations and explanatory phrases so that the student can access them at any time. Synchronous or asynchronous videoconferences by BBC will also be used, respecting the same dates and times originally programmed.

The tasks derived from the work carried out individually and in groups must be delivered through the "Task" option of the virtual classroom. If the oral presentation of the papers is required to be non-face-to-face, it will be done by BBC videoconference at the time established for the sessions.



For the Tutorials that are carried out at the request of the student, the email or virtual classroom forum will be used and if necessary by videoconference.

#### **4. Evaluation**

The evaluation will be carried out in a similar way to that indicated in the teaching guide. If attendance is not possible, the relative weight of each block will be maintained as indicated in the Teaching Guide for the subject, adapting the activities to the use of the virtual classroom platform if necessary.

#### **5. Bibliography**

The bibliography recommended in the teaching guide is maintained