### Third (3rd) year of Pharmacy study

#### First semester: from September to December
#### Exam period: early January

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*Free EU can be accessed (subject to availability), but the choice and enrollment in these UEL must be done imperatively on site.

### Troisième (3ème) année des études de Pharmacie

#### Premier semester: de septembre à décembre
#### Période d'examens: début janvier

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*Des UE libres peuvent être accessibles (sous réserve de places disponibles), mais le choix et l’inscription à ces UEL doivent se faire impérativement sur place.
UE 17A ACTIVE DRUG SUBSTANCES 1: Medicinal chemistry

5 ECTS

Content

Classes
- General information on synthetic active ingredients and their control
- Basis of Molecular modeling, design of active ingredients
- Drugs for hormonal pathologies (steroids)
- Synthetic active ingredients used in psychiatry and neurology (CNS drugs)
  Psychotropic drugs (anxiolytics, neuroleptics, anti-depressants)
  Neurology (anti-epileptics, anti-parkinsonian, anti-emetics, anti-migraine, anti-Alzheimer's)
  General anesthesia
  Local anesthesia
- Anti-allergic anti-H1
- Non-steroidal anti-inflammatory drugs (NSAIDs), Analgesics, Diagnostic Drugs

Tutorials
- Neurology
- Psychiatry
- Steroids
- Reviewing work

* Classes (all students in amphitheater), Tutorials (small groups of students).

Assessment

Final exam about classes and tutorials.

Contact

Christophe Fourneau
UE 17A ACTIVE DRUG SUBSTANCES 1: Pharmacognosy

4 ECTS

Content

Classes’
General information on the active ingredients of natural origin
   Heterogeneous polysaccharides
   Essential oils
   Natural polyphenolic substances
   Active ingredients of natural origin acting on the nervous system
   Active ingredients of natural origin acting on pain and inflammation
   Active ingredients of natural origin acting on the digestive tract
   Anticancerous of natural origin (first part)

Tutorials’
About classes content

* Classes (all students in amphitheater), Tutorials (small groups of students).

Assessment

Final exam about classes and tutorials.

Contacts

Christophe Fourneau
UE 17A ACTIVE DRUG SUBSTANCES 1: Coordinated practical works

3 ECTS

Content

Practical works

- **Organic chemistry and medicinal chemistry**
  Control of 2 active substances (sulfamethoxazole et lidocaine) and the corresponding galenic form. Control of raw material and selected corresponding galenic according to the monograph. Introduction to molecular modeling on calculation station.

- **Pharmacognosy**
  Control of medicinal plants, extraction of active substances, control of active substances from plant origin

*Practical works* (smaller groups of students in order to study in adapted practical rooms/laboratories)

Assessment

Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contacts

Christophe Fourneau
Alain Danan
UE 18 PHARMACOLOGICAL SCIENCES & TOXICOLOGY:
Fundamental pharmacology

5 ECTS

Content

Classes

• Introduction: models used in experimental pharmacology
• Drug targets and neural-hormonal-autocoid transmissions
  Serotonergic transmission
  Adrenergic/noradrenergic transmission
  Cholinergic transmission
  Dopaminergic transmission
  Histaminergic transmission
  GABAergic transmission
  Glutamatergic transmission
  Pathway of nitric monoxide
  Neuropeptides (substance P)
  Pharmacology of steroid anti-inflammatory (medicinal chemistry and pharmacology)
• Ion channel receptors: molecular targets of drugs
  Ion channels
    Sodium channels (Nav, ENaC)
    Calcium channels (Cav, R, IP3, RyR)
    Potassium channels (Kv, KATP, KAch)
  Ion pumps
    Na⁺/K⁺-ATPase
    H⁺/K⁺-ATPase
    Ca²⁺-ATPase
  Ion carriers

Tutorials

  Sympathetic and parasympathetic transmissions
  Serotonin
  Dopamine
  Ion channel receptors: GABA and glutamate
  Ion transports

* Classes (all students in amphitheater), Tutorials (small groups of students).

Assessment

Final exam about classes and tutorials.

Contacts

Alain Gardier
Véronique Leblais
UE 18 PHARMACOLOGICAL SCIENCES & TOXICOLOGY:
General toxicology

5 ECTS

Content

Classes
- General toxicology
  Toxicology: definitions, major mechanisms of toxicity, drug iatrogenesis
  Xenobiotic metabolism and toxicity
  Protocols and experimental methods to assess the toxicity of molecules
  Analytical toxicity
- Clinical toxicology
  Clinical toxicology: symptoms, treatments and antidotes
  Salicylate toxicology
- Domestic toxicology
  Lead toxicology
  Carbon monoxide toxicology
  Methanol and ethylene glycol
- Environmental toxicology
  Toxicology of arsenic and pesticides
  Toxicology of cadmium and mercury
  Toxicology of polycyclic aromatic hydrocarbons and dioxins
  Toxicology of endocrine origin, including endocrine disruptors

Tutorials
- General toxicology

Practical works
- General toxicology
- Clinical toxicology
- Environmental toxicology

* Classes (all students in amphitheater), Tutorials (small groups of students), Practical works (smaller groups of students in order to study in adapted practical rooms/laboratories).

Assessment

Final exam about classes and tutorials.
Continuous assessment for the practical works with report writings, oral presentations and/or lectures. Attendance to practical works needs to be approved.

Contacts

Marc Pallardy
Saadia Romer-Kerdin
UE 20 HEALTH SYSTEMS: Public health

3 ECTS

Content

Classes

- **Public health**
  - Definition, fields of intervention
  - Roles of pharmacists
  - Importance of education for health
  - Main actors: at the international and national levels
  - The concept of risks

- **Epidemiology**
  - Definitions and fields of application
  - Main types of investigations (transversal, case-control, cohort)
  - Notions of statistics (expectancy, standard deviation, estimation, sampling fluctuation)
  - Commonly used descriptive and etiological indicators
  - Main biases (selection, ranking, confusion) and notion of adjustment
  - Interpreting survey/investigation results, notion of causality

- **Health: physical and mental hygiene**
  - Physical and personal hygiene: roles in prevention, main pathologies, sport and health, doping and prevention
  - Travel and health prevention
  - Mental hygiene: prevention, depression, suicides

- **Prevention of communicable diseases**
  - General principles of prevention
  - Disinfection, sterilization
  - Examples: tuberculosis, sexually transmitted diseases, flu…

- **Prevention of non-communicable diseases**
  - Cardiovascular diseases and metabolic syndrome
  - Cancers
  - Addictions and dependencies: illicit drugs, smoking, alcoholic disease

- **Contraception**

- **Maternal and child health**

- **Disability and society**

- **Seniors health**

- **Health and environment**
  - Importance - Multidisciplinary - Fields of intervention, major compartments and ecosystems
  - Air pollution and health risks
  - Waste and health risks, management
  - Water and life: pollution and health issues, water resources, quality standards, microbiological risk, chemical risk, drinking water production and distribution, wastewater treatment, packaged waters, the hydrotherapy / balneology, water in hospitals

* Classes (all students in amphitheater).

Assessment

Final exam about classes.

Contacts
UE 20 HEALTH SYSTEMS: Nutrition

2 ECTS

Content

Classes’

- **Introduction**
  - Food and health
  - Bad habits observed in our food in the past 50 years
  - The goals of the National Health and Nutrition Plan (Plan National Nutrition-Santé PNNS)

- **Nutritional needs**
  - The body’s needs
  - Recommended dietary allowances: energy requirements, nutrients (proteins, lipids, carbohydrates, vitamins, minerals and trace elements, dietary fibers)

- **Food**
  - Dairy products
  - Meat, eggs, fish and seafood
  - Vegetables and fruits
  - Bread and cereals
  - Sugar and sweet products
  - Fats
  - Beverages
  - Foods rich in antioxidant micronutrients
  - Processed and industrialized foods
  - Food labeling

- **Balanced diet**
  - Body Mass Index (BMI)
  - International classification of body weight and obesity
  - Balanced distribution of nutrients: typical daily ration

- **Food safety**
  - Food safety government structures
  - Food allergies and intolerances
  - Food-borne diseases
  - Potential chemical contamination of foods

* Classes (all students in amphitheater).

Assessment

Final exam about classes.

Contact

Noureddine Bouaïcha
UE 23A PATHOLOGIES 1: Endocrinology

5 ECTS

Content

Classes

- **Physiology**
  - General endocrinology
  - Principles of the hypothalamic-pituitary axis
  - Pituitary hormones - ADH and oxytocin
  - Thyroid
  - Adrenal glands
  - The growth hormone
  - The adrenal medulla, the catecholamines
  - Male sexual hormones
  - Female sexual hormones

- **Clinical endocrinology**
  - Endocrine pathologies, treatment and therapeutic strategies
  - Endocrine biochemical explorations (including sexual hormones)

- **Pregnancy**
  - Hormonal regulation
  - Placenta
  - Physiology of pregnancy
  - Biological exploration
  - Semiology of pregnancy

Tutorials

- General endocrinology
- Clinical endocrinology

* Classes (all students in amphitheater), Tutorials (small groups of students)

Assessment

Final exam about classes and tutorials.

Contacts

Vladimir Veksler
Imad Kansau