

# Fiche de renseignement AMETYS – UE

Nom de l'UE : Chemobiologie (HAC919C9)

## Onglet « Présentation »

### Description\* :

The course will focus on organic chemistry and post-functionalization of biomolecules applied to peptides, proteins and nucleic acids (DNA and RNA) with applications in gene therapy, biosensing and design of probes for biological studies.

### Mots-clés :

Chemical biology tools and reactions, proteins engineering, extended genetic code, DNA-encoded library

### Objectifs\* :

The teaching is meant to be inclusive and will have as main objective to understand the molecular basis of cascades that allow to go from the gene to the protein and to hack and use these reactions for applications in life sciences.

### Volumes horaires\* :

CM : 15 H

TD : 5 H

TP :

Terrain :

### Pré-requis nécessaires\* :

Organic Chemistry level Master 1

### Pré-requis recommandés\* :

Knowledge in the synthesis and function of major biomolecules

### Syllabus :

Cours : 15H

#### 1. Fundamentals

Concepts covered: from gene to protein, sequencing, phenotypes, transcriptomes, post-translational modifications, immune system, function and chemistry of cellular compartments.

## 2. The tools of chemical biology.

Concepts covered: bioorthogonal reactions, bioclivable linkers, chemical probes, directed self-assembly, self-immolating probes, vectorization, vector viruses, chromophores, biosynthetic libraries, phages, protein expression systems, monoclonal antibodies, stem cells, model organisms for in vivo testing.

## 3. Manipulating DNA and RNA

Concepts covered: DNA targeting drugs, SELEX and functional nucleic acids (aptamers, DNAzymes, RNAzymes), DNA-encoded chemistry, DNA-based nanobiotechnology. Extension of the genetic code beyond 20 amino acids.

## 4. Manipulating proteins and peptides

Concepts covered: protein-targeting probes, protein (e.g. enzyme, antibodies) engineering and synthesis (native ligation), mutations. Secondary structure of proteins: domains and folds that provide function; supramolecular assemblies (e.g. Zn fingers, peptide/RNA interactions, self-assembling peptides).

TD : 5H

The concepts presented in a lecture style format will be reinforced through classroom discussion of articles from scholarly journals, presented and discussed by students.

## Onglet « Contacts »

### **Responsables\*** :

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### **Equipe pédagogique** :

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