

Assemblies for diagnostics, imaging and therapy

ECTS	Course (h)
3	18

Mention du master transmettant la fiche UE :	Chimie et Sciences des Matériaux
Composante de gestion de l'UE :	Faculté des Sciences – Département de Chimie
Responsable de l'UE :	Thomas TRIMAILLE
Statut du responsable :	PR

PRE REQUIS

Knowledge in polymer chemistry

PROGRAMM

1-Introduction

- 1.1-Reminders on bioactive molecules (drugs, nucleic acids, proteins) in interaction with polymer systems
- 1.2-Medical diagnostics: definition, challenges, ELISA method
- 1.3-Medical imaging: presentation of the major imaging techniques
- 1.4-Therapy: role of drug delivery systems, pharmacokinetics, pharmacodynamics, targeting methods
- 1.5-Interaction modes between polymer systems and-bioactive molecules

2- Colloids

- 2.1-Colloids obtained from preformed polymers
 - Polyesters: their synthesis, their formulation into colloidal systems, drug encapsulation and release
 - Polyelectrolyte complexes as protein carriers
- 2.2- Application of colloids to *in vitro* medical diagnostics
- 2.3- Lipid-based colloids
 - Elaboration, characterization, surface modification, drug encapsulation, diagnostic, therapeutic and dermatologic applications

3- Water-soluble polymers and hydrogels

- 3.1-Elaboration of water-soluble polymer / biomolecule conjugates (polyelectrolytes, neutral polymers, amphiphilic polymers) for *in vitro* diagnostics, medical imaging and drug delivery.
- 3.2-Hydrogels: elaboration, applications to drug delivery and as artificial organs.

SPECIFIC SKILLS

- To know the challenges/issues and requirements of diagnostics, imaging and therapy
- To know the (macro)molecular assemblies used in these topics, their preparation methods, their physicochemical properties
- To be able to link the requirements of the application to the structure and elaboration mode of (macro)molecular assemblies