

<b>MU5CI361 Chemical Biology for probing life and discovering drugs</b>									
Keywords: Chemical Biology, Non-Natural Biomolecules, Bio-orthogonal Chemistry, Chemical Genetics, Epigenetics.									
Responsable <b>Arnaud Gautier (SU) &amp; Paola B. Arimondo (CNRS - Institut Pasteur)</b>									
<i>ECTS</i> 6	<i>Cours</i> 40 h	<i>TD</i>	<i>TP</i>	<i>Tutorat</i> 10 h	<i>Ecrit</i> 40%	<i>CC</i> 30%	<i>TP</i>	<i>Oral</i> 30%	<i>Eval. répartie</i>
<p><b>Descriptif de l'UE:</b> Chemical biology gathers a community of scientists interested in science encompassing both chemistry and biology. The reasons why chemists and biologists find a common interest in chemical biology are complementary: on one hand, for chemists, the complexity of biological systems appears like the ultimate playground in terms of chemical reactivity and analytical challenges; on the other hand, for biologists, chemistry appears like the most appropriate level of description to understand biological processes and develop new therapies.</p> <p>Through examples, this course will present how chemical biology (i) provides a new framework for the design of chemical entities for discovering new drugs and inventing new therapies, and (ii) allows the design of innovative approaches to understand and manipulate biological systems in new ways.</p> <p><b>Chemical Probes and Drug Discovery</b></p> <ul style="list-style-type: none"> <li>- Introduction to drug discovery</li> <li>- Nucleic Acids: biosynthesis and chemistry</li> <li>- Carbohydrates: role, function, synthesis and potential in biomedical sciences</li> <li>- Epigenetics: Introduction and Applications</li> </ul> <p><b>Chemical biology approaches to understand and manipulate biological systems</b></p> <ul style="list-style-type: none"> <li>- Bioorthogonal chemistry for labeling biomolecules in live cells</li> <li>- Synthetic and genetically encoded fluorescent probes for illuminating cellular components</li> <li>- Expansion of the genetic code to create proteins with new functions</li> <li>- Molecular Glues for controlling cellular functions</li> <li>- Chemical-genetic tools to study post-translational modifications</li> <li>- Optochemical tools to control biological activities with light</li> </ul> <p><i>Teachers:</i> Paola B. Arimondo (CNRS - Institut Pasteur) ; Marcel Hollenstein (Institut Pasteur) ; Laurence Mulard (Institut Pasteur) ; Yves Janin (MNHN-CNRS) ; Anton Granzhan (CNRS Institut Curie) ; Arnaud Gautier (Sorbonne Université)</p>									
<p><b>Objectifs d'apprentissage</b> Learn how to understand biological systems using the knowledge of chemistry. Be familiar with new ways to manipulate biological systems with the tools of chemistry. Learn skills in research article analysis and oral presentation.</p>									
<p><b>Prérequis</b> This course requires basic knowledge about Proteins, Nucleic Acids and Carbohydrates (Structure, Molecular Recognition, Biocatalysis...), Organic Chemistry, Molecular and Cell Biology (Central Dogma of Molecular Biology, Cell Organization)</p>									
<i>Langue<sup>(1)</sup></i> English	<i>Cours, TD, TP</i> English							<i>Documents</i> English	<i>Bibliographie</i> English