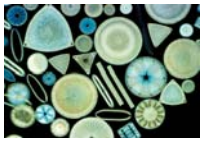
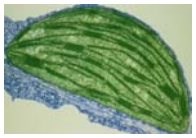




IBPC Course : « Theoretical and practical approaches to solve a scientific enigma in a research laboratory » - MU5BM206 (6 ECTS)

GENERAL PRESENTATION

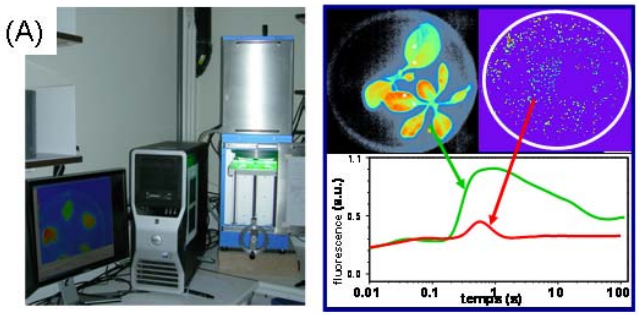
Based on a « hands on » approach, the IBPC Course proposes a total immersion of the students in a research laboratory for a period of two weeks. The Course is different from classical practical trainings at the university, as it emphasizes the realization of a « mini research project », in conditions that are representative of how science is conducted in a modern research laboratory. A few oral presentations help the students to grasp the essential theoretical background to tackle the experiment-heavy practical part of the course. Students work as a team to characterize wild-type and mutant strains relating to a biological question of interest studied in the host laboratory « Chloroplast Biology and Light Perception in Microalgae (UMR 7141)», at the Institut de Biologie Physico-Chimique (IBPC).
The characterization of the mutants puts great emphasis on multidsciplinary approaches, including original experimental setups developped in the host laboratory. A wide array of experiments, including, genetics, biochemistry, molecular biology, cell biology and biophysics are performed by the students in conjunction with the research staff. Personal creativity and imagination, key aspects of research practice, are encouraged during the whole course, leading the students to formulate hypotheses, confront them to their experimental results, and come up with proposals and models about the proposed scientific enigma.

SCIENTIFIC BACKGROUND

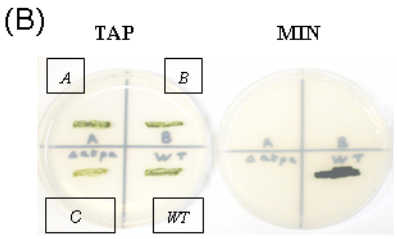
The course takes place at the laboratory of « Chloroplast Biology and Light Perception in Microalgae (UMR 7141)», headed by Angela Falciatore (http://www.ibpc.fr/UMR7141/en/home/). Research topics of the laboratory include the study of chloroplast and nuclear genetics and genomics, the assembly, functioning and regulation of the photosynthetic apparatus, the circadian clock, as well as evolutionary and environmental questions pertaining to photsynthetic microorganisms. Students attending the IBPC Course *do not* need any prior knowledge on photosynthesis or microalgae to participate, as all the relevant information will be made available during the course.

BENEFITS OF THE COURSE

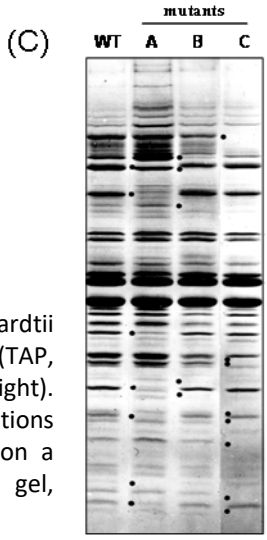
The IBPC course aims to bring real life research conditions to students by immersing them in a host laboratory for two weeks to work on current research topics, using state of the art equipment and experimental approaches. On a practical side, students use a very wide array of technics, some of which were originally developped in the laboratory. Experiments include, among others, genetic screening of mutant strains, crossing and tetrad analysis, biochemical characterization of mutants strains, including membrane preparations, nuclear and chloroplast transformation, as well as biophysical approaches, such as time-resolved fluoresecnce emission and absorption spectroscopy. The emphasis on multidsciplinary approaches to solve a scientifc enigma helps students realize the importance of complementary approaches in understanding and studying a biological question. A second aspect of the course is to provide the students with a working environment that is a *bona fide* research laboratory, in which they will interact with a wide variety of personel. From Master and PhD students, post-docs, technicians, assistant professors and CNRS researchers, the students will share their scientifical experience in an inspiring and challenging atmosphere on a daily basis. Finaly, as the students work as a research team, it encourages fruitful interactions among them, thriving to build a synergy of scientific cooperation.



(A) Time resolved fluorescence emission kinetics after light excitation, realized on higher plant leaves (left, green trace) and on the unicellular microalgae Chlamydomonas reinhardtii (right, red trace).



(B) WT and mutant strains of C. reinhardtii grown on acetate containg medium (TAP, left) and on minimum medium (MIN, right). (C) Proteins from membrane preparations of the WT and mutants, separated on a gardient acryalmide electrophoresis gel, and silver staining .



AUDIENCE

The IBPC Course has been up and running since 2005 and has received overwhelmingly positive responses from the students, as evidence by their anonymous evaluation of the course each year. Formally, the IBPC Course is teaching unit «MU5BM206 » of Sorbonne University and is oppened to students at the Master 1 and Master 2 level, as well as PhD students. The course usually takes place in the two last weeks of november each year. As attendance is limited to 12 students due to space constraints and to keep the working atmosphere as integrative and synergic as possible, applicants should send a CV and short motivation letter to Stephan Eberhard (eberhard@ibpc.fr) not later then by the end of october.

EVALUATION

The IBPC Course is credited with 6 ECTS and students are evaluated in two ways. (i) Oral presention (30 minutes of presentation and 20 minutes of questions): the students present their scientic work during the two weeks, critically discuss the experimental data they obtained and propose hypotheses and models pertaining to the scientic questions at hand. Students are also encouraged to propose perspectives and additional experimental approaches that could help to further understand the biological question. (ii) Written analysis of documents (two hours): the students are given the results of additonal experiments pertaining to the mutants that they have studied during two weeks. These additional documents help them to refine their hypotheses, models and conclusions. This written part is not a « classical exam », in that students are not expected to restitute information that they would have learned « by heart ». To the contrary, all the documents, lab books, articles, book chapter, as well as printouts of all the slides used during the course can be used during the written anlysis. The emphasis, once again, is on critical thinking, imagination and creativity with regards to scientific experimental results.

CONTACT

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