Présentations

Les actions Europe
Franc Pattus

The calls from the 7th Framework Programme, an opportunity to get funding and develop collaborative projects. How to get support to apply successfully for funding?
The 7th framework programme through its 4 specific programmes (Cooperation, Ideas/ERC, People/Marie-Curie and Capacity) is an important tool to get funding, get support for PhD and Postdoc, and develop collaborative research projects.
Answering to a call is a bit complicated and a heavy task, but there are many means to get support during the preparatory phase, the proposal writing and the negotiation phase.
The local and national support to help researchers to answer successfully to the FP7 calls will be described.

La clinique de la souris (ICS)
Yann Herault

The **Institut Clinique de la Souris - ICS** is a research infrastructure of excellence for translational research and functional genomics. It combines the capacity of generating mutant mice on a large scale with a high-throughput and comprehensive phenotypic analysis of the animals. The Institute's phenotyping platforms are adapted for the study of genetically engineered mouse models and genetic reference populations but can also be used for preclinical studies including the validation of therapeutic targets as well as pharmacological and toxicological studies in the mouse.
The missions of the ICS are :

- To provide a service platform combining the capacity of generating, on a large scale, mutations in the mouse with high-throughput and comprehensive phenotypic analysis of the mouse.
- To facilitate the access to the engineering, the analysis and the distribution of mouse models for the scientific community.
- To have relevant in-house research and development programs to support the activities of ICS in the domains of mutagenesis, transgenesis, phenotyping, bioinformatics and data analysis.
- To promote the training both internaly and for the users to guarantee the most efficient procedure being committed to comply with the Ethics and animal welfare.
- To be a reference centre for functional genomics and preclinical research.

La société Almetis Bio
Christian Gaiddon

Mission globale : Almetis bio développe des composés anticancéreux innovants à base de Ruthénium.
Objectifs : développer des molécules anticancéreuses aux propriétés innovantes (plus efficaces et mieux tolérées) afin de répondre aux limites des thérapies actuelles connues pour induire des toxicités et des mécanismes de résistance.
Technologie : elle repose sur des composés dérivés d'un métal, le Ruthénium. Ces composés constituent une nouvelle classe thérapeutique potentielle en oncologie.

Conférences et débat

1-Exo/astrobiology in the solar system

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Exobiology (=astrobiology), the study of Life in the Universe, is more precisely the study of the origins, evolution and distribution of life in the whole universe. This very wide domain thus includes not only the search for extraterrestrial life, but also the study of the origin and evolution of life on our planet. Since the Earth is so far the only place we know where life is present and terrestrial life is the only example we have, most of our approaches are based on this one element, taken as a reference.

In fact, one can distinguish different categories of planetary bodies of prime interest for exo/astrobiology.

There are bodies where a complex organic chemistry is going on. The study of the chemical processes and structures involved in this chemistry is crucial for understanding the general processes of complexification of matter in the universe, which is essential in the evolutionary steps to life. In that domain the study of the organic chemistry in comets and meteorites is of paramount importance, since their organic content has probably directly participated in the prebiotic chemistry on Earth.

There are also planetary bodies which show today some similarities with our planet before the emergence of life. Their study is of tremendous importance since most of the conditions which were present on the primitive Earth have disappeared today, erased by geological processes and by life itself. To understand the processes which allowed the origin of life on Earth and check our concepts we need to place them in a realistic environment: the availability today of planetary bodies showing analogies with the early Earth is a unique opportunity. In that domain, Titan, the largest satellite of Saturn is a precious target.

And, finally, there are extraterrestrial planetary bodies where life, either extinct or extant, may be present. Those places are characterized by past conditions compatible with the development of complex prebiotic processes over a period long enough for the emergence of life followed by conditions compatible with habitability. One of the main parameter which drives the habitability of a planetary body is the presence of liquid water. Mars, like the Earth, very likely had large bodies of liquid water on its surface in its early history. If Life was—or is still—present on Mars, Martian bio-signatures may still be present, since the Mars environment, in spite of a drastic evolution of its atmosphere, has probably kept part of these traces owing to the lack of strong tectonic activity. But there are other places in the solar system where liquid water is probably present. This is the case of three out of the four Galilean satellites of Jupiter: Ganymede, Callisto and Europa. This is also the case of Titan, the largest satellite of Saturn and, more recently evidenced, that of Enceladus, a smaller satellite of the same giant planet. Although we have so far no direct evidence of these internal oceans, the most interesting cases are those of Europa and Enceladus. Indeed, if they exist, their internal liquid water bodies may be in contact with rocky materials, facilitating redox reactions that provide chemical energy to sustain prebiotic processes as well as energy for living systems.

These different cases will be quickly presented. That of the outer solar system objects, Europa, Titan and Enceladus, will be described in more detail.

1- J. Wong & A. Lazcano Eds., *Prebiotic Evolution and Astrobiology*, Wiley, (2009).

2- F. Raulin, K. P. Hand, C. P. Mckay And M. Viso, Exobiology and planetary protection of icy moons, *Space Science Review*, 1**53**, 511–535 (2010).

3- M.Gargaud, P. Lopez-Garcia & H. Martin. Eds, Origins and Evolution of life: an astrobiological perspective", Cambridge University Press, 489-506 (2011).

2-Astrobiology on Earth and Mars

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Earth and Mars are today two different planets : while the Earth is covered by an ocean and hosts a wide diversity of life, Mars, on the other hand, is a sterile desert – at least on its surface. This was not always the case. In the past, the young planets had environments that were in many ways similar, although totally different to today's terrestrial environment – an atmosphere of CO_2, more or less no oxygen, liquid water in contact with volcanic rocks and much hydrothermal activity (a good environment for the emergence of life), a constant rain of organic molecules from intra- and extraterrestrial sources…..Both planets were habitable. Mars, however, rapidly lost its surface habitability and any life forms that existed would have had to seek refuge beneath the surface, where they may still exist. A number of upcoming missions to Mars, including the European 2018 ExoMars mission, will be studying the habitability of the ancient terrains and searching for traces of life, past or present. Knowledge of the nature of primitive life forms on Earth and methods necessary to investigate them are useful for defining search strategies and instrumentation for exobiological missions to Mars.

3-Origin of life on Earth : hypothesis and recent results

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I will present the early stages of the origins and evolution of life on earth as well as the main laboratory experiments simulating the synthesis of key molecules.Then regarding the appearance of biological functions I will focus on the "RNA world" hypothesis which proposes that early in the evolution of life, RNA was responsible both for the storage and transfer of genetic information and for the catalysis of biochemical reactions. Current cellular facts allow us to follow the link between biochemical metabolites from ancient to modern world. We shall present results from *in vitro* studies regarding the persistance of RNAs under extreme conditions, which probably occured during the evolution of life, as well as studies on the catalytic events of these species."

1- Delan-Forino,C., Maurel, M-C., Torchet, C.Replication of Avocado Sunblotch Viroid in the Yeast Saccharomyces cerevisiae. Journal of Virology, 2011, 85(7):3229-38.

2- Maurel, M-C. (2010) Life elsewhere : a biologist'perspective. Pathways towards habitable planets ASP Conference series, 2010, vol 430, 331-335.

3- Talini G., Gallori E., Maurel M-C., (2009) Natural and unnatural ribozymes: Back to the primordial RNA world, Research in Microbiology. Volume 160, Issue 7, 457-465

4- Ztouti, M., Kaddour, H., Miralles, F., Simian, C., Vergne, J., Hervé, G., Maurel, M-C (2009). Adenine, a hairpin ribozyme cofactor : high pressure and competition studies. FEBS J. : 2574-2588.