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1 • EDITORIAL

Dear ISE members,

I am happy to present you the first issue of the newly designed ISE newsletter. When the newsletter was introduced in 2002 it was the intention to frequently inform the ISE members about the activities of the extremophiles society. The newsletter will be published twice a year and will feature reports, events and portraits of leading research groups in the field of extremophiles.

In this issue we will start with the portrait of Joel Querellou's lab at IFREMER one of the leading institutes investigating microbial communities in deep-sea ecosystems such as hydrothermal vents.

Joel Querellou is also the organizer of the 6th International Congress on Extremophiles which will take place September 17-21, 2006 in Brest, France. The ISE thanks Joel Querellou for the organization of this very important event and wishes all participants a successful meeting. The ISE is pleased to provide financial support for young scientists to enable them to participate in Extremophiles2006. For more information check the conference website at www.extremophiles2006.org. The ISE will also be very proud to announce the winners of the ISE award during the conference dinner on September 20th, 2006.

Nowadays, the internet is probably the most state-of-the-art and fastest medium to spread new information. So I would also like to invite you to the ISE homepage (www.extremophiles.org) to get the latest information about the ISE activities and worldwide events in the field of extremophiles.

I really do hope that you will enjoy the current issue of the newsletter and I am looking forward to meeting many ISE members on the occasion of the Extremophiles2006 congress in France.

Garo Antranikian

2 • THE ISE TEAM IN HAMBURG, GERMANY

The ISE office is located on the campus of the Hamburg University of Technology and is affiliated with the Institute of Technical Microbiology. Five voluntary co-workers including the ISE president and the secretary general manage the day-to-day business of the society. Don't hesitate to contact the president and his team whenever you have questions concerning the ISE (info@extremophiles.org).



Garo Antranikian
ISE president



Ralf Grote
secretary general



Petra Esselun
secretariate



Karna Benz
secretariate



Michaela Schilling
member relations



ISE office
Hamburg University of Technology



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3 • Portrait

The **Laboratory of Microbiology of Extreme Environments** (LM2E) is located in Brest, Brittany, France. It is a joint research unit (UMR 6197), bringing together personnel from Ifremer, the CNRS (the main French public research institute dedicated to basic research) and the University of Western Brittany. The main research topics include the characterization of microbial communities (including viruses) in deep-sea ecosystems, mainly hydrothermal vents and continental margin cold seeps and the analysis of DNA replication components and interactions in *Pyrococcus abyssi*, a hyperthermophilic archaea isolated in the laboratory. Laboratory web site: <http://www.ifremer.fr/drvvpmbe/>
Director: **Dr. Joel Querellou**; Vice Director: **Prof. Daniel Prieur**



The group members

Diversity and Dynamics of Microbial Community

Conventional culture and molecular methods are used in the laboratory to describe microbial communities. A considerable work has still to be done in order to isolate and characterize new genera, to study new metabolisms and in turn understand the role of microorganism communities in their relative environments. Differences observed between results obtained with molecular techniques vs cultures, clearly demonstrate that both approaches have to be conducted in parallel to better access microbial biodiversity both in term of species diversity and metabolism diversity.

In the next few years, our group will still use and develop both approaches in order to better understand species diversity (in terms of clones, new species, new genera) and functional diversity. Besides the previous approaches, we plan also to investigate novel culture methods. We address the following questions:

1. What is the diversity and the relative importance of several metabolisms in marine extreme environments and their distribution along physico-chemical gradients, whether vertical or horizontal?
2. What are the major microbial activities *in situ*, what are their roles in geochemical cycles (carbon, sulphur, nitrogen...) and what are their relations with invertebrates?
3. What are the successions of microbial populations, the interactions between microorganisms and with their environment (mineral)?
4. What is the diversity and importance of mobile genetic elements in *Thermococcales* (viruses and plasmids) . What are the proteins encoded by their genomes and their functions?
5. What are the origin and dissemination modes of deep-sea marine extremophiles in these environments? What are the main characteristics of the subterranean biosphere and how does it impact on the deep-sea microbial communities at the sea floor level?



Plumes of *Riftia pachyptila*, *Cyananthea hydrothermalis* and limpets

Mineral / Procaryotes Interactions

In most of natural environments, microbial metabolism depends on macromolecules adsorbed on surfaces, but also on the chemical composition of these surfaces. In parallel, adhesion of microorganisms onto a surface leads to oxido-reduction reactions, adsorption dissolution or precipitation of chemical compounds that modify the surfaces.

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This part of the program aims to answer a series of still open questions :

1. What is the influence of chemical and crystallographic (heterogeneity) properties of a given mineral on bacterial surface colonization, and availability of reduced and oxidized minerals for microbial metabolisms ?
2. What is the role of mineral surfaces? Adhesion substrate or source of electron donors and acceptors ?



Hydrothermal vent shrimps of the species *Rimicaris exoculata*

DNA replication in *Pyrococcus abyssi*

Within the Thermococcales, the *Pyrococcus* genus has drawn considerable interest due to the high thermostability of its enzymes. Their family B DNA polymerases are widely used in *in vitro* DNA amplification since they display a proofreading activity responsible for high fidelity. DNA polymerases interact with different proteins, which modify and regulate their activity, as well as their implication in maintaining the genome integrity. The main questions addressed by our research group are:

- What are the properties of *P. abyssi* DNA polymerases (Pol B and Pol D) and their accessory factors (RP-A, PCNA, RF-C) in various genomic DNA context, including DNA lesions?
- What are their roles in the cell and which one is the replicase, which one synthesizes the Okazaki fragments?
- What are the properties of the DNA primase and how does it interact with the replicase and other replication enzymes?

- Are there other proteins interacting with DNA polymerases and accessory factors and what are their function?

The LM2E has developed a close partnership with two biotech SME. Proteus (Nimes, France) has an access to the collection of microorganisms isolated by Ifremer team and an exclusive right to develop enzymes for the industry. MPBiomedicals (Illkirch, France) has developed *P. abyssi* DNA polymerase B which is currently marketed under Isis™ as well as various polymerase blends for PCR.

6th International Congress on Extremophiles

One of the key action for 2006 is the organization of the conference "Extremophiles 2006"

(<http://www.extremophiles2006.org>)



A carbonate flange at Lost City hydrothermal vent field

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4 • International Symposium on Extremophiles and their Applications (ISEA 2005)

The ISEA 2005 symposium was held from November 29th to December 2nd, 2005 at the Toyo University, Tokyo, Japan. It was organized by Koki Horikoshi, the honorary president of the International Society for Extremophiles (ISE) as a chairman, supported by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), the Japan Society for the Promotion of Science (JSPS) and the Toyo University. The symposium focused on current and future aspects of extremophiles research, particularly on the industrial application. The conference featured 173 presentations including two keynote lectures by Karl O. Stetter and Teruhiko Beppu. All together, the meeting comprised 66 oral talks and 105 poster presentations. Totally 306 scientists from 23 countries joined the international symposium which was a very successful platform for fruitful discussions and new collaborations.

Another keynote lecture entitled "Symbiosis: a new vista of the microbial world" was held by Teruhiko Beppu. He indicated that symbiosis could be one of the most important microbial habitats in natural environment and reported on his current studies about the discovery and genome analysis of *Symbiobacterium thermophilum*. Both keynote lectures were excellent and encouraged many young scientists to carry on their own studies!



Enjoying the conference: Karl O. Stetter and Tairo Oshima



Traditional opening of the sake barrel (Saka-Daru). From left to right: J. Querellou, M. Rossi, J. Reeve, G. Antranikian and K. Horikoshi

Enjoyable social programme

The ISEA chairman and his team also organized a substantial social programme which promoted the formation of new collaborations and networks. Undoubtedly, the conference dinner featuring fantastic food and traditional Japanese drummers as well as the excursion to the ancient town of Kamakura made ISEA an unforgettable experience. The ISE congratulates the organizers of ISEA to this excellent meeting!

Faszinating lectures

In his opening lecture entitled "History of discovery of the first hyperthermophiles from *Methanothermus* to the *Korarchaeota*", Karl Stetter reported on his excellent research in the field of hyperthermophiles. The audience became a strong impression of his enthusiasm and passion towards hyperthermophilic microorganisms growing optimally at temperatures between 80°C and 106°C. After many years of research and valuable contributions Karl Stetter is still very active. He also reported on very recent studies about *Nanoarchaeota* genome analysis and the first cultivation of *Korarchaeota*.



Group photo in front of the Great Buddha in Kamakura

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Meetings

This section informs you about meetings, symposiums and conferences which are within the focus of the International Society for Extremophiles.

September 3rd - 7th, 2006



3rd International Congress on Biocatalysis 2006 (biocat2006), Hamburg, Germany. For more information visit: www.biocat2006.de

September 17th - 23rd, 2006

International Congress on Extremophiles 2006, Brest, France. For more information visit: www.extremophiles2006.org



At both conferences ISE members are entitled to reduced registration fees.

News

Award

The Japanese government science committee decided to award **Prof. Koki Horikoshi**, who is honorary president of the ISE, the **Japan Academy Prize**. The Japan Academy Prize is awarded to persons who have achieved notable research landmarks or who have authored particularly outstanding academic papers or books. The award ceremony will be held in July 2006 in the presence of His Majesty the Emperor of Japan. The ISE congratulates Prof. Horikoshi to this prestigious award.

If you want to announce your meeting or news on the ISE homepage or in the newsletter, please contact Ralf Grote (grote@tuhh.de).

6 • Editorial data

The ISE newsletter is published twice a year by the International Society for Extremophiles.

Editors: Garo Antranikian & Ralf Grote

Design: Bastian Meyer

The International Society for Extremophiles
Hamburg University of Technology
Institute of Technical Microbiology
Kasernenstr. 12 • 21073 Hamburg • Germany
in collaboration with TuTech Innovation GmbH
e-mail: info@extremophiles.org

The editors thank Joel Querellou and Chiaki Kato for their valuable contributions.

A MEMBERSHIP FULL OF BENEFITS

Consider joining and become a member of the International Society for Extremophiles

The International Society for Extremophiles (ISE) invites scientists from all over the world to join the club and to actively support the aims of the society.

Membership will be rewarded by a number of benefits which include:

- First hand information and exchange of experience between colleagues in all fields of extremophiles research
- Reduced subscription fee for the Extremophiles Journal
- Free newsletter
- Reduced admittance fee for Extremophiles and Biocat Congresses
- Scientific summer courses
- Scholarships and travel grants for young scientists

Register now at: www.extremophiles.org

