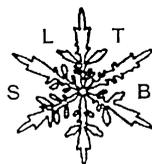


SLTB Newsletter



****STOP PRESS****

New Membership Directory

The up-to-date membership directory (the last one was dated 1998!) is enclosed with this newsletter. If you spot any errors or would like your email address included in the next edition please contact the Secretary (Paul Lynch). Also please could you try to remember to inform the Secretary of your new contact details if you move.

Request for Nominations for New Committee Members

After the forthcoming AGM at the SLTB Annual Meeting 2004 at the Royal Free Hospital (9-10th September) two members of the SLTB will retire. However, we need to plan ahead so we are now looking for nominations for two members of the committee. Nominees must be in good standing and have agreed to stand as a candidate for election to the Society's committee.

Nominations should be sent to SLTB General Secretary (Paul Lynch, p.t.lynch@derby.ac.uk), as soon as possible, and no later than 12:00 on Friday **26th June 2004**.

If more than two nominations are received a ballot will be held and ballot papers distributed with the Summer Newsletter.

Annual Membership Fees

The subscription for the year 2004 is now overdue. Those who have not yet paid are reminded to send your payment to the

Treasurer (Tiantian Zhang) as soon as possible. Please note that the annual fees of SLTB membership have increased to **£20** for a standard member and **£15** for a student from **1st January 2004**. Since the SLTB cannot accept credit card payments, the best way of paying is by standing order. This form is on the website at: <http://www.sltb.info/forms.htm>. Payments can also be made by cheque (any bank charges have to be covered by the payer) or in cash to the Treasurer at SLTB meetings.

Members who have been paying by Standing Order (thank you!) are reminded to check your bank balance and make sure that the right amount has been paid for 2004.



CRYO-programmes 2004 Current Research Activities

One of the key requirements for 'Cryobiologists' is the constant need to obtain research funding to fight against the possible 'cut in the flow of liquid nitrogen'. It is an all too frequent experience to launch new programmes of research activity only to find the level of support is insufficient to meet ambitious intellectual goals. Although national-regional funding agencies can generously provide research support, funding in cryopreservation can be scarce and too often as research projects come to an end, the latest ideas generated from previous projects are rarely supported by continuity in funding – quite often we have the 'start-stop' syndrome of research. I am thereby pleased to inform the SLTB membership

of two forward-thinking EU-funded research programmes in algal (**COBRA**) and plant (**CRYMCEPT**) cryopreservation. Integral to these programmes are many members of SLTB and to the best of my knowledge this degree of support is previously unprecedented in algal and plant cryopreservation research projects. These two programmes are highly dynamic and active engaging a wide range of research issues within cryopreservation, equally matched with collaborative European teams of expertise in cryopreservation and related subjects. Both **COBRA** and **CRYMCEPT** are currently running parallel and overlapping in their interdisciplinary activities with scientific outputs being the subjects of previous and undoubtedly future SLTB meetings.

COBRA: An Introduction

Why and what are Algae? Algae are an ancient group of extremely diverse photosynthetic organisms. They are responsible for fixing ~50% of the earth's carbon apart from acting as carbon sinks they are major producers of oxygen. Some 37,000 species of algae, including the microalgae and cyanobacteria have been described but the total number of species is many times greater. Algae are a valuable source of chemicals and novel pharmacological agents. Some 500 species of algae are currently used in human food or as food products and about 160 species have economic significance and substantial commercial value. The annual Japanese harvest of *Porphyra* (Nod) is worth ~US\$1 billion and the value of algal polysaccharides is worth US\$ 500 million per annum. There is an increasing interest in the use of algae and their products as health foods commodities, also in the aquaculture industries and for the production of pigments and lipids. The ubiquity of algae as primary producers in aquatic food chains enables applications in environmental management programmes as 'indicator organisms' for ecotoxicity testing. Algae are increasingly used in agents in the phytoremediation of wastewater. The future expansion of European algal biotechnology, healthcare and environmental industries is critically dependent upon the development of reliable conservation methods for algae. In

this context, *ex situ* conservation (conservation outside the natural habitat) is an essential prerequisite for the sustainable management and utilization of these living resources within Europe. It is this concept that forms the basis of the "COBRA" project.

COBRA - is the acronym for a European Commission Research Project (No. QLRT-2000-01645) entitled: the **CO**nervation of a Vital European Scientific & **BI**otechnological **R**esource: Micro**A**lgae & Cyanobacteria. COBRA is funded by the EU's Fifth Framework Programme for Quality of Life and Management of Living Resources: Research Infrastructures Biological Collections. COBRA has its own members and public sections in its website (<http://www.cobra.ac.uk>). The overall aim of COBRA is to develop a unique European biological resource centre based on existing algal culture collections. This project will, for the first time, in Europe, utilize cryopreservation as a standard technique to ensure the genetic stability of conserved strains of algae. The COBRA partners represent a range of different sectors (Culture Collections, Biotechnology Industries, Academia) and countries (Czech Republic, France, Germany, Portugal and the UK). Importantly, the inter- and multidisciplinary expertise of the partners will provide exciting opportunities to develop new and improved methods for algal conservation. This will involve the application of fundamental and applied knowledge of cryo-injury to assist the optimization of methods for preserving a wide range of algal diversity. Furthermore, the COBRA partnership will contribute to enhancing a general understanding of algal molecular biology, stress physiology and biochemistry.

The European algal perspective. The COBRA project (duration 2001-2004) will develop a unique European 'Biological Resource Centre' dedicated to the conservation of microalgae and cyanobacteria. This will be based on already existing European Algal Culture Collections supported by the development of an EU-funded collaborative infrastructure. The infrastructure will be built using the aid of state-of-the-art

Information Technology (IT) communications and Knowledge Management (KM) methodologies. Both IT and KM practices will be utilized to assist project coordination, management and information dissemination and to facilitate the generation of new knowledge pertaining to algal conservation. As a result, a 'Virtual' and a 'Physical' European Biological Resource Centre will be created. COBRA will allow for the first time, in Europe, the development and utilization of cryopreservation (viable storage in liquid nitrogen at -196°C) as a standard technique to ensure genetic stability of conserved strains of algae. This will provide the biotechnology community and environmental sectors with the organisms required for their research and development programmes.

COBRA will eventually become an essential underpinning foundation of Europe's fledgling algal biotechnology industry. Many microalgae and cyanobacteria have proved very difficult to conserve. A major aim of this project is the development of novel and effective protocols which are capable of cryopreserving currently 'preservation recalcitrant' strains. Molecular stability tests will be developed to ensure that equivalent strains of micro-organisms supplied by European Collections will give high quality and consistent performance. A key aim of the project is the development of techniques for the currently non-preserved or poorly preserved recalcitrant organisms. It will therefore be essential to optimize methods for conserving algal diversity from a range of different environments from soils to freshwater habitats and even Antarctica. As our ability to isolate and describe new algal and cyanobacterial species increases with traditional and molecular techniques; this is an exciting challenge for the project to undertake fundamental studies in algal stress physiology and cryoinjury.

CRYMCEPT: an introduction

State-of-the-Art: Plant Conservation.

Some 20,000 plant species are believed to be endangered, rare, and threatened with extinction. Their preservation is essential for traditional plant breeding programmes. Plant biodiversity provides a valuable source of compounds to the

pharmaceutical, food and crop protection industries. The value of yet undiscovered pharmaceuticals in tropical rainforests is estimated to be in the region of some \$US 147 billion. Storage of desiccated seeds at low temperature, the most convenient method to preserve plant germplasm, is not applicable to recalcitrant seed and plant species that are vegetatively propagated. This germplasm may be maintained in clonal field collections, but it remains vulnerable and susceptible to genetic erosion and loss due to pests, diseases and adverse weather conditions. Maintenance of clonal field collections is labour-intensive and expensive. Besides its traditional use for the conservation of genetic resources, cryopreservation is now becoming more applied to the long term storage of plant tissues with specific characteristics like medicinal and alkaloid-producing cell lines and hairy root cultures, genetically transformed tissues. Cryopreservation has been shown not to affect the expression of a foreign gene in several transgenic plants and other transformation-competent tissues.

It is here, where *in vitro* storage provides an important, realistic alternative to field collections. However, maintenance of such *in vitro* collections is, even under reduced growth conditions (low light intensity and low temperature), still labour intensive and there is always the risk of losing accessions due to microbial contamination or human error. Moreover, *in vitro* material of some species may well be subject to somaclonal variation (mutations that occur spontaneously of which the frequency is generally increased during *in vitro* culture). Cryopreservation or freeze-preservation at ultra-low temperature (-196°C) is the method of choice for the long-term conservation since under these conditions biochemical and most physical processes are arrested. Cryopreservation procedures have been developed for many *in vitro* tissues and recalcitrant seeds of a wide range of plant species, where under these conditions germplasm can be stored for unlimited periods. Currently, for each species and tissue type, a cryopreservation protocol needs to be developed/adapted to the natural freezing resistance of the species, explant size and type, and water content. Unlike microbial and mammalian cryopreserved culture collections, cryopreservation as a method for plant

germplasm conservation is not common. Compared to microbial and mammalian cryopreserved culture collections, plant cryopreserved genebanks are only in their infancy. This is due to the fact that different plant species behave differently towards cryopreservation and that even within one species different varieties and tissue types behave in a very heterogeneous way towards cryopreservation.

The European plant perspective. A database search of the CORDIS web services revealed that 17 projects dealt with plant diversity conservation, of these only 6 utilise *in vitro* conservation as a main technique and only 2 projects were based on cryopreservation technologies. These projects focus on a limited number of plant species unlike the CRYMCEPT project which clearly breaks new ground because of the development of plant cryopreservation protocols that are applicable to a wide variety of plant species and tissues in Europe. This approach is similar to a related project entitled 'The Conservation of a Vital European scientific and Biotechnological Resource: Microalgae and Cyanobacteria' (COBRA, QLRI-2001-01645). Conventionally, plant germplasm is conserved through seeds, roots, cuttings, etc. For the safe long term storage of plant germplasm, cryopreservation, i.e. storage at ultra-low temperatures, is the only available method. The main drawback for its large-scale utilization to plant germplasm is the lack of a standardized method. This explains that only a fraction of the plant germplasm in a few plant collections is cryopreserved.

CRYMCEPT - is the acronym for a European Commission Research Project (Reference: QLK5-CT-2002-01279) entitled: Establishing **CRY**opreservation **M**ethods **F**or **C**onserving **E**uropean **P**lant **T** Germplasm Collections. The project has its own members website (<http://www.agr.kuleuven.ac.be/dtp/tro/crymcept/>). This project is funded by the EU's Fifth Framework Programme for Quality of Life and Management of Living Resources: Key action 5 'Sustainable agriculture, fisheries and forestry, and integrated development of rural areas including mountain areas', and started in

November 2002 for three years. The general objective of CRYMCEPT is to develop new/improved cryopreservation protocols applicable to plant germplasm collections in Europe. The CRYMCEPT partners represent a range of different sectors (Culture collections, Biotechnology industries, Academia) and different countries (Belgium, Germany, Italy, France, UK). Importantly, the inter- and multidisciplinary expertise of the partners will provide exciting opportunities to develop new/improved protocols for plant germplasm cryopreservation. The strategy to develop new cryopreservation protocols within the framework of this project will be innovative, i.e. using a multidisciplinary fundamental approach instead of trial and error by a single research group. The new strategy should result in widely applicable cryopreservation protocols, which can be quickly fine tuned for specific conditions. CRYMCEPT has 9 different Work packages and covers a variety of the most relevant physico-biochemical parameters relating to cryopreservation; it also involves a very broad spectrum of genotypes, species, and different tissues with a differential responses towards hardening.

Keith Harding
COBRA & CRYMCEPT projects advisor
(k.harding@abertay.ac.uk)



New Members

The following members have recently joined the SLTB:

R Amaral, Eslarreja, Portugal
Ryan Cripps, Royal Botanic Gardens,
Kew, UK
Martin Fray, Medical Research Centre,
Didcot, UK
Birgit Glasmacher, Aachen University of
Technology, Germany
Bruce Knowles, University of Abertay
Dundee, UK
L Kuleshova, National University of
Singapore, Singapore
Paul Matejtschuk, NIBSC, UK
Clare Pattenden, Leicester General
Hospital, UK

New member profiles

Paul Matejtschuk

(pmatejt@nibsc.ac.uk)

Dr Paul Matejtschuk is currently a Senior Scientist at the National Institute for Biological Standards & Control (NIBSC), South Mimms, Hertfordshire UK, where he has worked for the last two years on the formulation and freeze drying of biomolecules. He received his BSc in Biochemistry from the University of York (1982) and a PhD in Chemistry from the University of Warwick (1986) for research into the characterization of genetic variants of human serum albumin. Following two year post-doctoral work at the Immunology Division of Cambridge University, on the preparation and lyophilization of antibody red cell conjugates for use in immunoassay, Paul joined Bio Products Laboratory, Elstree, UK, a unit of the National Blood Authority. Paul was a Project Scientist at BPL for 14 years, has expertise across a wide range of downstream processing, formulation and protein characterization areas, related to the manufacture of therapeutic antibodies (plasma-derived and monoclonal). He was involved with the development of products for human use both through to licensed status and for clinical trial.

Paul's role at NIBSC is to provide formulation and lyophilization expertise to the development and production of biological reference materials across a broad range of biomolecules. This role supports NIBSC's activity in the development of International Biological Standards for WHO and national bodies. His particular interests are in the use of thermal analysis in freeze drying cycle development and the impact of formulation on the preservation of biological activities. He has co-authored a number of papers, edited a book on Affinity Separation methods, and lectured internationally and in the UK. He was part of a team at NIBSC who planned the SLTB meeting held there in September 2003, and chaired and spoke at the one day symposium "New Developments in Freeze Drying of Biological Materials" held as part of this meeting.

Ryan Cripps

(r.cripps@kew.org.uk)

He has a BSc Agric in Horticulture and Botany and a PhD on the effects of abscisic acid (and cytokinins) on the transport and metabolism of sugars in Avocado from the University of Natal, South Africa. He worked in horticulture before returning to research and currently work in cryopreservation at the Royal Botanic Gardens, Kew. The principal objective of his work is to develop methods for the *ex situ* conservation of plants by cryopreservation. He is in the process of building a germplasm bank of a wide variety of plant species including a number of endangered bryophytes, pteridophytes and angiosperms.



SLTB 40th Annual Meeting September 9-10th 2004

The Annual meeting will be held at the Royal Free Hospital, Hampstead, London in September. The two day meeting will include Symposia on **Cryopreserving Hepatocytes** and **Mechanisms of Cryo-injury**. Sessions on Free Communications and Poster Presentations are planned and there will be a Commercial Exhibition of the latest products relevant to Low Temperature Biology. Details can be found on the SLTB website at <http://www.sltb.info/news.htm>.

Registration will be £50 for SLTB members (£30 for Student Members – letter of confirmation of student status from supervisor essential), £75 for non-members, and £30 for one day registration. A registration form can be found at <http://www.sltb.info/forms.htm>.

The Annual General meeting of SLTB will be held on Thursday 9th September at 16:30; the Annual Dinner will also be on the evening of Thursday 9th September (cost about £25; places limited, book early).

SLTB Audrey Smith Travel Bursaries will be available to young Society members (see SLTB website for details) to a maximum of £100.

The **Ken Hobbs Award** (£250) will be made judged on the best oral presentation from students or young scientists within 1

year of PhD qualification (letter of confirmation of status from supervisor essential).

Deadline for submission of abstracts will be **July 31st 2004**. Abstract details and form can be found at <http://www.slbtb.info/forms.htm>. Free communications or poster submissions on any aspect of Low Temperature Biology will be welcome.

Further details can be obtained from Barry Fuller at b.fuller@rfc.ucl.ac.uk; FAX +44 (0)20 7830 2688. University Department of Surgery, Royal Free Hospital, Pond Street, London NW3 2QG, UK.



CRYO 2004 Beijing, China, July 15-19, 2004

The 2004 World Congress of Cryobiology and Cryomedicine will be held on July 15-19 in Beijing, China, organized by the Society for Cryobiology, Japanese Societies & Associations for Cryobiology, Cryopreservation and Cryomedicine, and the Chinese Cryobiology Society.

Plans for the scientific and social programs can be found on the Society's website at <http://www.societyforcryobiology.org>

The deadline for submission of abstracts has been extended to **May 1st 2004**. These can be emailed to: dluo0@enr.uky.edu or sent to Professor Dayong Gao: CRYO2004 Conference Chair
Department of Mechanical Engineering
183 RGAN Building
University of Kentucky
Lexington, KY 40506 USA
Email: dgao@enr.uky.edu



Preservation of Genetic Resources St Petersburg, Russia Oct 19-22, 2004

The above meeting will be held at the Institute of Cytology of the Russian Academy of Sciences (RAS). It is a joint meeting of the International Institute of

Refrigeration (IIR), the Institute of Cytology of the Russian Academy of Sciences, the Institute of Cell Biophysics, the Interdepartmental Ichthyological Commission of the State Committee for Fisheries of the Ministry of Natural Resources of the Russian Federation of the Russian Academy of Sciences, the Scientific Council for Biophysics, the Federal Selection and Genetics Centre for Fish Farming of the Ministry of Agriculture of the Russian Federation, the NI Vavilow All-Russian Institute of Plant-Breeding, the All-Russian Research Institute of Breeding and Genetics of Agricultural Animals of the Russian Academy of Agricultural Sciences, and the State Research Institute of Lake and River Fisheries of the Ministry of Agriculture of the Russian Federation.

The programme includes fundamental aspects and applications of cryobiology of reproductive tissue of plants, animals and microorganisms. The aim of the meeting is international cooperation for the preservation of genetic resources.

An exhibition of modern equipment for cryobanks and research laboratories, visits to research institutes, such as the Russian Institute of Plant Breeding, the Institute of Cytology, which houses unique collections of plant genomes and cell cultures, and cryobanks, as well as to the Federal Genetics and Selection Center for Fish Breeding, are planned. There will also be a cultural program for participants and the Organizing Committee is looking forward to seeing you in one of the most beautiful cities in the World!

The tentative deadline for abstracts is **15th May 2004**. These should be sent (2 pages max.) by email to: prodvincell@hotmail.com, with copies to confer_biores@mail.ru or ananievv@list.ru

For further details please contact:

Dr NA Mikhailova

Organizing Committee "Preservation of Genetic Resources", Institute of Cytology of the RAS, 194064 St. Petersburg, Russia
Fax: +7 (812) 2470341

E-mail: natmik@mail.ru



From the Treasurer

Gift Aid Declaration

Since the SLTB became a registered charity in the UK in 2003, we can now reclaim tax on our UK members' subscription payments from the Inland Revenue. To enable the Society to do this, we need our members to declare that you would like the Society to treat your subscriptions as Gift Aid donations. I would like to urge UK members (tax payers only) to fill in the enclosed Gift Aid Declaration form as this will help the Society's much needed income generation!

Eurozone Bank Account

For the convenience of our members in the Eurozone, the SLTB is exploring the possibility of opening a Euro account in Germany to help members pay their subscriptions and conference registrations in Euros. An update will follow as soon as more details are available.

Tiantian Zhang



Request for Email Addresses

To help improve communication with the membership we want to develop a database of all members' email addresses. The intention is not to replace the traditional Society Newsletter with an electronic version, but rather to supplement it with specific news items etc. which we wish the membership to be aware of between the Newsletter's publication. Would you please fill in the enclosed green form and post it to the General Secretary (Paul Lynch) or send it electronically (P.T.Lynch@derby.ac.uk) to save the inevitable typing mistakes. This will also help the Treasurer to remind you, at no extra cost to the Society, if you do not pay your annual fees on time!

Thank you to those members who have responded to the previous requests for email addresses.



Note: The material for this edition was prepared by Keith Harding.