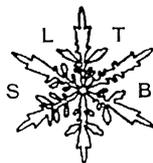


# SLTB Newsletter



## SLTB AGM 2006

SLTB members who attended the 2005 AGM at Univ. York will remember that the next SLTB scientific meeting was to be held in association with the Society for Cryobiology at Cryo 2006 in Hamburg. The decision on the timing and location of the 2006 AGM was left to the new Committee to discuss. The option of holding the meeting in London in the Autumn was considered, possibly in association with a lecture open to the public on a cryobiological theme. The greatest concern of the committee with this plan was that the AGM may not attract sufficient members, particularly in a year when many members will be using their limited travel budgets to attend Cryo 2006. Subsequently, eleven SLTB members have contacted the Secretary and requested that the AGM be held in association with Cryo 2006. Under the SLTB constitution (Article 17) this request is valid and so a Special General meeting will be held during Cryo 2006. This meeting will cover the business affairs normally dealt with during the AGM. Full details will be announced nearer the time.

John G Day    General Secretary SLTB

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## CRYO2006

### 43<sup>rd</sup> Annual Meeting of the Society for Cryobiology held in association with the Society for Low Temperature Biology

The Free and Hanseatic City of Hamburg has an interesting popular history starting in the year AD825 with the building of the impressive moat castle - Hammaburg between the Alster and Elbe rivers. Despite the passing ages, little did these medieval pioneers know, these very foundations were to be the building blocks for the beginning of CRYO2006 between two scientific Titans, the Society for Cryobiology and the Society for Low Temperature Biology. Traditionally the Society for Low Temperature Biology is enthusiastic to promote studies into the effects of low temperatures on all types of organisms and their constituent cells, tissues and organs and their various applications to a diverse variety of scientific fields from biology to medicine. This is one such occasion to hold a 'Society Stand' to promote SLTB research interests and activities to act as a forum for active debate and attract potential new members to this Society. Along with German coffee and regional biscuits conference participants can engage SLTB committee members in discussion, take away Society publications while others can view the SLTB website for up and coming events.

This meeting promises to be an excellent venue for participants to highlight their

research as oral or poster presentations in aspects of biology, molecular biology, physics, chemistry, physical chemistry, biochemistry, physiology, medicine, transfusion medicine, cryosurgery, cryomicroscopy, mechanical engineering, tissue engineering and transplantation within a wide range of subjects: hypothermia, physiology of resistance to cold in plants, and applications of cryobiology in conservation/freeze-drying, surgery, cell, tissue and organ preservation.

### Poster Award

As an appreciation of excellence in these scientific contributions SLTB will make an award for the best student poster presentation to benefit the winning person by 500 Euro! This prestigious award will be given to the student presenting the poster of the highest scientific standard in originality, quality and research excellence. A panel of experts will judge the posters during the Hamburg meeting and select the winner from the poster session, where the award will be made to the student by the Chairperson Professor T. Zhang. The Society for Cryobiology will also make a similar award for the best oral presentation (see <http://www.cryo2006.org/>). SLTB student members wishing to participate in CRYO2006 please note the SLTB does provide support for travel and applications for the Audrey Smith Travel Award are welcome. The deadline for application is 1<sup>st</sup> May, and for details regarding other qualifying criteria please view the SLTB website (<http://www.sltb.info/>).

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### Recent publications roundup

The mechanism behind the cold hardiness of the remarkable diamondback terrapin (*Malaclemys terrapin*), an estuarine species that reaches 42°N along the North American Atlantic coast, is becoming apparent (*Baker et al. Can. J. Zoology 84*

*(1): 116-124 Jan 2006*). Lacking the ability to supercool extensively, diamondback terrapins are one of the few vertebrates capable of surviving the stresses associated with the formation of ice within the extracellular spaces of their tissues. These animals can survive only if freezing is initiated at a relatively high temperature and body temperature falls no lower than -4°C. In lab experiments, hatchlings supercooled extensively, attaining -15°C before spontaneously freezing. However, they were highly susceptible to inoculative freezing through contact with external ice and (or) ice-nucleating agents, which occur in nesting soil. It appears, therefore, that freeze avoidance through supercooling is not a viable cold-hardiness strategy in these turtles. Hatchlings subjected to experimental freezing survived exposure to temperatures as low as -3°C suggesting that freeze tolerance may account for the high winter survival observed in natural nests. It was concluded that freeze tolerance in hatchling diamondbacks is promoted by high susceptibility to inoculation, which is known to moderate freezing, allowing cells time to adapt to the attendant physical and osmotic stresses.

Rapid cold-hardening (RCH) is known to increase the tolerance of chilling or cold shock in a diverse array of invertebrate systems at both organismal and cellular levels. Lee *et al. (J. Exp. Biology 209 (3): 399-406 Feb 2006)* report a novel role for RCH by showing that it also increases freezing tolerance in an Antarctic midge, *Belgica antarctica* (Diptera, Chironomidae). It was found that summer-acclimatized larvae were less cold tolerant, as indicated by low survival following exposure to -10°C for 24 h; by contrast, many cold-acclimated larvae (which had higher supercooling points) could survive -15°C. To evaluate the RCH response in summer-acclimatized midges, larvae and adults, maintained at 4°C, were transferred to -5°C prior to exposures to -10, -15 or -

20°C. RCH significantly increased survival of summer-acclimatized larvae frozen at -10°C for 1 h compared with larvae receiving no cold-hardening treatment, but adults, which live for only a week or so in the summer, lacked the capacity for RCH. In cold-acclimated larvae, RCH significantly increased freeze tolerance to both -15 and -20°C. Similarly, RCH significantly increased cellular survival of fat body, Malpighian tubules and gut tissue from cold-acclimated larvae frozen at -20°C for 24 h. These results indicate that RCH not only protects against non-freezing injury but also increases freeze tolerance.

In plant news, the ability of the rare alpine crucifer *Chorispora bungeana* to survive sudden snowstorms is being elucidated (**Guo et al. *Cryobiology* 52 (2): 241-250 Apr 2006**). In an attempt to explore possible roles of autoxidation rate (AR) and the antioxidant enzymes associated with cryoprotective mechanisms in the plant cells, it was found that when suspension cultures grown at 25°C were suddenly exposed to -8°C for 15 days, 2, 3,5-triphenyltetrazolium chloride reduction was not affected within 9 days and AR remained at a low level. This indicated that the cells maintained considerable amounts of soluble protein and the cell membranes remained intact during the whole freezing test. Furthermore, the activity of antioxidant enzymes such as superoxide dismutase, ascorbate peroxidase and glutathione reductase were prominently enhanced in the freezing-stressed cells. Peroxidase activity significantly increased soon after freezing, possibly to make up for the early decrease of catalase activity in the cells. Findings suggest a synergy between these antioxidant enzymes, leading to a low autoxidation rate that contributes to the protection of cell membranes and plays an all important role in the resistance of suspension-cultured cells of *C. bungeana* to sudden freezing. The rate of change in frost hardiness in

response to the driving environmental factors is a key factor in climate acclimation of trees and while effects of cooling rates on bud frost hardiness have been well studied one of the first investigations of bud responses to thawing is now available (**Raisanen et al. *Annals of Botany* 97 (4): 593-599 Apr 2006**). Since the cell wall pore size has been found to increase with a lack of boron (B), it was thought that B deficiency may affect the supercooling ability of buds in winter. Using differential thermal analysis, however, there was little evidence of reduced frost hardiness in trees with low B status. It was shown that buds dehardened rapidly when exposed to above-freezing temperatures in winter, but if cooled again they rehardened more slowly. According to this study, rapid dehardening of buds has to be taken into account in assessments of frost hardiness.

Many polar marine fish have evolved biological antifreeze proteins (AFPs) to survive in their icy environments. The larvae of Antarctic notothenioid fish hatch into the same frigid environment inhabited by the adults, but the assumption that they are also protected by sufficient AFPs has recently been disproved. Determining the contribution of AFPs to the freezing resistance of the larvae of three species, **Cziko et al. (*J. Exp. Biology* 209 (3): 407-420 Feb 2006)** found that only *Pagothenia borchgrevinki* larvae are protected by high, adult levels of AFPs. Hatchling *Gymnodraco acuticeps* and *Pleuragramma antarcticum* have AFP concentrations inadequate to avoid freezing at the ambient seawater temperature (-1.91 degrees C). In *G. acuticeps* larvae, serum freezing point was -1.34°C at the time of hatch; it began to decrease only after 30 days post hatch (d.p.h.), and finally reached the adult value (-2.61°C) by 147 d.p.h. Additionally, AFP concentrations in their intestinal fluids were very low at hatching, and did not increase with age. Surviving in a freezing environment without adequate AFP

protection suggests that other mechanisms of freezing resistance exist and it was found that *G. acuticeps* hatchlings survived to -3.6°C while in contact with external ice, but only survived to -1.5°C when ice was artificially introduced into their tissues. The gills of all three species were found to be underdeveloped at the time of hatch, minimizing the risk of ice introduction through these delicate structures. Thus, an intact integument, underdeveloped gill structures and other physical barriers to ice propagation may contribute significantly to the freezing resistance and survival of these larval fishes in the icy conditions of the Southern Ocean.

Andy Wetten

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### From the Treasurer

I would like to say thank you to those members who have already paid their 2006 subscriptions and, as the man with the closest eye on the bank account, I would urge colleagues who have yet to pay to organise their 2006 subscription as soon as possible. Also, if you are unsure, can I ask you to check that 2005 was also paid up and, if not, deal with both matters at once. I would also remind members that our current charges are £20 for standard membership and £15 for students, as a number of you are paying at different rates that applied in the past. Clearly, it would be helpful if you were able to adjust your payments to reflect current rates.

For UK members a Standing Order through a current bank account is the most efficient and convenient way to make your payment. The necessary form is available at [www.sltb.info/forms.html](http://www.sltb.info/forms.html), or I will mail one to you if that is easier. If you are an established Standing Order user then, please, would you ensure that this has been adjusted to the current rate. Alternatively,

payment can be made by cheque [increased to cover any service charges], made payable to the Society, and sent directly to me, Brian Grout-SLTB Treasurer, Postgraduate School, Writtle College, Chelmsford CM1 3RR, UK.

At present the Society is unable to accept payment by credit or debit card and so international members will have to use an electronic money transfer although the Committee is investigating ways to remedy this situation. I will be happy to accept payments at the Hamburg meeting in the summer, if that is helpful.

### Gift Aid Declaration

As many of you are aware, the Society is a registered, UK charity, that can reclaim the income tax paid on UK members' subscriptions. Members must declare, formally, that they agree to the Society treating their subscriptions as Gift Aid donations by completing a Gift Aid Declaration form ([www.sltb.info/forms.html](http://www.sltb.info/forms.html)), which will greatly help the Society's balance sheet!

### A Little Excitement

It is rare that anything even moderately exciting occurs that relates to the Treasurer's job, but recently the Society was tangled up in an attempted bank fraud that did fit the bill. I began to see large sums appearing on our balance sheets for mobile phones, which we don't have, and I made the enquiries at the bank. Lloyds put me on to Vodaphone, as the Direct debits seemed legitimate, and it transpired that the phones belonged to a Nigerian shipping company that were using several accounts belonging to other people to pay their phone bills. The bank dealt with this very efficiently and refunded our money, but it has prompted a long investigation into how the direct debit mandate was authorised in the first place. I hope we hear more in the future.

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