

Dear Allison,

Welcome to the February newsletter of BioCoR. Firstly, we would like to thank you all for your very positive response to our first Newsletter that was sent out in January.

In this newsletter, we will describe our featured service project (Preservation of Bronchial Alveolar Lavage Fluid, BALf), give you a "**Tip of the Month**" to help improve your preservation practice, tell you about what is new in the BioCoR library and provide information on upcoming educational programs.

As always, your comments are very important to us. We expect to see you at www.biocor.net.

BioCoR is a national resource focused on advancing the science, technology and practice of biospecimen preservation. We are dedicated to developing biopreservation protocols, improving preservation and storage technologies, establishing standards and guidelines and training individuals and institutions in the science and technology of biopreservation.

More information can be found on the **BioCoR** website www.biocor.net. Or you may contact us now at biocor@me.umn.edu

Biochemical analysis of bronchoalveolar lavage fluid (BALF) has shown an exudation of certain proteins in the airways of patients with pulmonary diseases. The protein patterns in BALF are being increasingly studied in the hope to get more information, which can help with early diagnosis of airway inflammatory diseases and enable better understanding of disease development and treatment. It is known that the protein secondary structure can be changed during freeze-thaw or desiccation. These changes can be minimized by the addition of bio-preservatives such as trehalose and glycerol. It is therefore very important to ensure that the biochemical composition of BALf is preserved during storage. To reach this goal, we are exploring the changes in the secondary structures of the BALf proteins in response to freezing (with and without using cryoprotectant agents such as glycerol or trehalose).

In a typical experiment 2 μ l droplets of samples (fresh or freeze-thawed) were placed on a CaF₂ window, dried for 40 mins at 0% or 40% RH and then sandwiched between two CaF₂ windows sealed with a thin layer of grease. Fourier transform infrared spectra were taken to study the changes in protein secondary structure. For each sample, an average of 16 spectra was taken at different positions along the edge of the dried sample where the proteins were deposited during drying. After correcting the baseline, second derivatives of the spectra were taken, and the ratio of α -helix (1650 cm^{-1}) to β -sheet (1635 cm^{-1})

1) structures were measured (shown above in the figure).

When samples were dried at 0% relative humidity (RH), a statistically significant difference was observed between the fresh and the frozen samples (left figure). However, the difference became much smaller in the samples with 0.5% glycerol (a 12% decrease compared to a 42% decrease in structural change with freezing). This suggests that the addition of glycerol helped to preserve the secondary structures of BALf proteins. Similarly, a statistical difference was seen between samples dried under different conditions (right figure). The differences decrease from 9% in the pure sample to 4% in the samples with trehalose and to 1% in the samples with glycerol. This suggests that both trehalose and glycerol could help preserve the protein secondary structure during desiccation and freezing.

Studies are underway to understand how the changes in the secondary structures of the proteins during storage affect the use of BALf as a diagnostic/therapeutic biospecimen.

Tip of the Month will be a regular feature of the newsletter designed to improve your preservation practice. This month's tip will involve post-thaw assessment. In our experience, this step/process is performed incorrectly more than correctly. When preserving cells, please remember to measure yield (defined as the total number of viable cells post thaw divided by the total number of viable cells pre-freeze). During freezing, cells have three basic fates: (1) cells that are intact and viable; (2) cells that are intact but not viable; and (2) cells that are neither viable nor intact. Measurement of cell viability alone (typically defined as the number of viable cells post thaw divided by the total number of cells present) biases the measure of viability upward by failing to account for cells that have simply lysed and disappeared during the preservation process. Calculating both viability and yield helps to correct the bias and give you a more meaningful measure of post-thaw recovery of cells.

Learn more about post thaw assessment and the manner by which you can assay the outcome of your preservation protocol in our short course.

Registration is open now; go to [Short course information](#).

Short course: Registration is now open for, "Preservation of molecular, cellular and tissue biospecimens". This short course, offered for 6 years goes over the scientific basis for biospecimen preservation, protocol development/debugging, facility design, regulatory issues and much more. More information on the

course including a listing of lectures, course instructors, and registration information can be found at the course website. [Short course information](#)
Deadline for early registration: May 1st, 2010.

Protocol specific training: Mononuclear cells obtained from umbilical cord blood or bone marrow is a rich source of hematopoietic or mesenchymal stem cells. We have worked extensively with these cells and provide protocol specific training with cryopreservation of these cells for research uses. Protocol specific training is offered on May 21st, 2010. Contact us at biocor@me.umn.edu to sign up.

The following is a list of presentations, seminars and talks that will be given by **BioCoR** faculty in near future. Come and meet **BioCoR** faculty and learn about our research, service and educational activities.

March 11, 2010,

Department of Pharmaceutics, College of Pharmacy, University of Minnesota, Minneapolis, MN.

Department Seminar by A. Aksan "**Protein Separation and Stabilization**" in Room 7-135 of Weaver-Densford Hall, U of MN TC campus from 4:00 pm to 5:15 pm.

March 24-25, 2010

3rd Annual Biospecimen Research Network (BRN) Symposium: Advancing Cancer Research Through Biospecimen Science

Talk by A. Hubel "**Scientific basis for biospecimen preservation**"

Bethesda, Maryland

<http://www.brnsymposium.com/meeting/brnsymposium/2010/>

May 5, 2010,

Department of Mechanical Engineering, University of Minnesota, Minneapolis, MN.

Department Seminar by A. Aksan "**Biostabilization and Biothermodynamics**"

in Room 1130 of ME Building, U of MN TC campus from 3:30 pm to 5:00 pm.

May 17-19, 2010, at the *AAPS National Biotechnology Conference, San Fransisco, CA.*

Invited Talk by A. Aksan "**Desiccation and Freezing-Induced**

"Microheterogeneity In Protein Formulations"

on Monday May 17, 2010 from 1:30 pm to 4:00 pm.

Mark your calendars!!!

Building the [BioCoR library](#) is intended to be a multi-year process. In our newsletters, we will give you a regular update on additions to the BioCoR library that are viewable to the public.

Answers from the BioCoR Expert on:

- Damage to samples resulting from failure of a -80C freezer.
- Expected viability of EBV transformed lymphocytes
- Preserving liver biospecimens
- Background materials on understanding the science of cryopreservation and protocol development
- Resources for hematopoietic stem cell preservation

BioCoR in Europe

We have the opportunity to offer two half-day courses on preservation. One of the half day courses would focus on biospecimen preservation. The other half day course would focus on preservation of cell therapies. The courses are tentatively scheduled for August 23, 2010 in Edinburgh, Scotland. If you are interested in attending either (or both), contact BioCoR at biocor@me.umn.edu and we will give you more details.

More information can be found on the **BioCoR** website www.biocor.net. Or you may contact us now at biocor@me.umn.edu

Short Course Savings

BioCoR's short course (Preservation of Molecular, Cellular and Tissue Biospecimens) is scheduled for May 18-20, 2010. Groups (2 or more people) from a given institution receive a discount when registering together.

For this year only, transport between Rochester, MN and Minneapolis to attend the short course is available free of charge.

For more information, contact us at biocor@me.umn.edu

Register for the short course at
<http://www.biocor.net/registration>

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