Monthly Meeting
Dr. Iona Black speaks about Platinum(II) complexes

Book Review
Designs for Life
by Soraya de Chadarevian

Summer Scholar Report
Exo2, a Tool for Chemical Genetics
by R. Langfield, T. Kirchhausen and G.B. Hammond

Historical Notes
Obituaries of recently deceased chemists and chemical engineers
Courses & Workshops in Nanotechnology

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Offered once: March 26-27, 2003 (CRS# 00.844-001)
To harness the vast untapped potential of enzymes available in nature and new constructs made available by genetic engineering, it is important to focus on the challenges and opportunities that biocatalytic reactions offer in order to make them more generally and widely applicable in different sectors of health and industry. This two day workshop prepares engineers, chemists and material scientists to work effectively at the interface between biology, chemistry, engineering and material science.
Instructor: Dr. Virinder S. Parmar   Cost: $775

Advanced Development of Fullerene Chemistry Toward Potential Technological Platforms
Offered once: April 12, 2003 (CRS# 00.846-001)
Topics to be covered by this one day workshop include chemical, electrical, and physical characteristics of fullerenes, chemical reactivity of C60 toward reagents, preparation of hydrophobic and hydrophilic fullerene derivatives, structural extension of derivatives into polymer-grafted, starburst, dendrritic, and supramolecular 3-D configurations, synthesis and characteristics of C60 conjugates with organic luminescent dyes and electronic donors, photoinduced one-photon and two-photon excitation processes with intramolecular and intramolecular electron and energy transfer phenomena, and molecular assembly systems of fullerene derivatives for applications.
Instructor: Dr. Long Y. Chiang   Cost: $775

Surface Science Aspects of Nanotechnology and Nanofabrication
Offered once: June 3-4, 2003 (CRS# 00.845-011)
The emphasis of the course will be on applications of surface chemistry and surface science techniques and how they can be used to form structures and devices with novel properties. It will begin with an introduction to the techniques and methods and culminate in examples of how nanoscience is beginning to make an impact in industry and technology.
Instructor: Dr. James E. Whitten   Cost: $775

Practical Gas Chromatography: Packed & Capillary Columns
Offered at two different times: June 16-17, 2003 (CRS# 00.842-011)
Individuals working in the area of gas chromatography - beginners and those desiring to update their knowledge of the technique - will find this course to be meaningful and useful. Fundamentals of gas chromatography are presented with emphasis on practical applications for users and method developers.
Instructor: Dr. Eugene F. Barry   Cost: $775

High Performance Liquid Chromatography
Offered at two different times: June 23-24, 2003 (CRS# 00.843-011)
This workshop will address practical aspects and fundamentals of HPLC. Topics to be discussed include modes of HPLC; chemically bonded stationary phases, control of solvent strength, selectivity and retention in various modes of HPLC; packing materials for HPLC columns; overview of hardware, i.e., solvent delivery systems and detectors, dimensions of HPLC columns and theoretical considerations of column performance. Instructor: Dr. Eugene F. Barry   Cost: $775

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Cover: Dr. Iona Black, February speaker

Deadlines:
April issue: February 21
May issue: March 13

The Nucleus February 2003
Nominations

The James Flack Norris and Theodore William Richards Undergraduate Summer Research Scholarships

The Northeastern Section established the James Flack Norris and Theodore William Richards Undergraduate Summer Scholarships to honor the memories of Professors Norris and Richards by promoting research interactions between undergraduate students and faculty.

Research awards of $3250 will be given for the summer of 2003. The student stipend is $2750 for a minimum commitment of ten weeks of full-time research work. The remaining $500 of the award can be spent on supplies, travel, and other items relevant to the student project.

Institutions whose student/faculty team receives a Norris/Richards Undergraduate Summer Research Scholarship are expected to contribute toward the support of the faculty members and to waive any student fees for summer research. Academic credit may be granted to the students at the discretion of the institutions.

Award winners are required to submit a report (~5-7 double-spaced pages including figures, tables, and bibliography) of their summer projects to the NESACS Education Committee by November 7, 2003 for publication in The Nucleus. They are also required to participate in the Northeast Student Chemistry Research Conference (NSCRC) in April 2004.

Eligibility: Applications will be accepted from student/faculty teams at colleges and universities within the Northeastern Section. The undergraduate student must be a chemistry, biochemistry, chemical engineering, or molecular biology major in good standing, and have completed at least two full years of college-level chemistry by summer, 2003.

Application: Application forms are available on the NESACS web site at http://www.nesacs.org. Completed applications are to be submitted no later than March 26, 2003 to the Chair of the Selection Committee:
Professor Edwin Jahngen
University of Massachusetts Lowell
Chemistry Department, Room 520
265 Riverside Street, Olney Hall
Lowell, MA 01854-5047

The awards will be presented at the May 2003 Section Meeting.

Philip L. Levins Memorial Prize

Nominations for the Philip L. Levins Memorial Prize for outstanding performance by a graduate student on the way to a career in chemical science should be sent to the
Executive Secretary,
NESACS,
23 Cottage St. Natick,
MA 01760

The graduate student’s research should be in the area of organic analytical chemistry and may include other areas of organic analytical chemistry such as environmental analysis, biochemical analysis, or polymer analysis.

Nominations may be made by a faculty member, or the student may submit an application. A biographical sketch, transcripts of graduate and undergraduate grades, a description of present research activity and three references must be included. The nomination should be specific concerning the contribution the student has made to the research and publications (if any) with multiple authors.

The award will be presented at the May 2003 Section Meeting.

New Members

Includes members relocated to the Northeastern Section

Invitation to attend a Section meeting

You are cordially invited to attend one of our upcoming Section meetings as guest of the Section at the social hour and dinner preceding the meeting. Please call Marilou Cashman for a reservation, letting her know that you are a new member.

Directions

Holiday Inn, Newton
399 Grove Street

From I-95/128 Southbound
Take Exit 21B/22 keeping sharp right (“MBTA”) into Grove St. After crossing over Rte. 95/128, The Holiday Inn is the first building on the left. Parking at the rear.
An elevator to the lobby serves all levels.

From I-95/128 Northbound
Exit 22 to Grove St. The Holiday Inn is immediately on the left.

From the Mass. Turnpike
Exit to Rte. I-95/128 Southbound.

By MBTA
Take the Riverside Green Line (“D”) to the end. Exit the station and parking lot to Grove Street (on your left). Turn right into Grove St. and walk to the Holiday Inn, (total 900-1000 feet).
Biography

Dr. Iona Black, educator and researcher, is a lecturer and researcher at Yale University, Chemistry Department. She received a B.S. degree from Marymount College in chemistry and mathematics, a Masters degree in Biochemistry and education from Boston University and a Masters and Ph.D. in Physical Chemistry from Duquesne University. She has held academic positions at: Hampton University (Asst. Prof., chemistry and mathematics departments), University of the District of Columbia (lecturer), District of Columbia Teachers Center (lecturer and curriculum development), Georgetown University (Upward Bound lecturer and curriculum development), and District of Columbia public school system (teacher in chemistry and mathematics departments).

She also has held summer research positions at Aluminum Company of America, National Institute of Standards and Technology, Naval Research Laboratory, and the Atlantic Environmental Group.

The research interests pursued under her direction involve: basic research in potential anticancer, antiviral drug development and characterization using laser spectroscopy; science education coupled to mentored research; computer assisted science and medical education; metal coupling and interaction in biological media; and bond distance predictability using laser spectroscopy.

She is deeply involved in the Yale University community. She is the Academic Director of the Science, Technology and Research Scholars Program (STARS), and is on various university and national scholarship and fellowship committees.

Monthly Meeting

The 840th Meeting of the Northeastern Section of the American Chemical Society

Thursday, February 13, 2003, Holiday Inn, 399 Grove St., Newton, MA

5:30 pm Social Hour
6:30 pm Dinner
7:45 pm Evening Meeting, Dr. John Neumeyer, Chair, presiding

Dr. Iona Black, Yale University, An Investigation of Bonding in Selected Platinum (II) Complexes

Dinner reservations should be made no later than noon, February 6. Please call or fax Marilou Cashman at (800) 872-2054 or e-mail at MCash0953@aol.com. Reservations not cancelled at least 24 hours in advance must be paid. Members, $25.00; Non-members, $28.00; Retirees, $15.00; Students, $ 8.00.

THE PUBLIC IS INVITED.

We particularly invite NOBCChE members to attend.

Anyone who needs special services or transportation, please call Marilou Cashman a few days in advance so that suitable arrangements can be made.

Free Parking on site


Note different schedule: At Science Center, 2nd floor lounge area: 5:30 Social Hour; Science Center, Room 277: 6:30 Address by F. Frankel; At Wellesley College Club: 7:45 Dinner.

YCC Symposium

Alternative Careers for Chemists

When: Feb. 13, 2002
3:30 – 5:30 pm

Where: Holiday Inn, Newton 399 Grove Street 617-969-5300

Speakers:

Jack Cunniff, Ph.D., Thermo Finnigan, Regional Sales Mgr.
Melissa Huang, Rhodia Chirex, Mgr. Business Development
Darlene Vanstone, J.D., Geltex Pharmaceuticals, Senior Patent Counsel

Two other speakers TBA.

Visit the YCC website at http://people.bu.edu/nsycc for more information.

There is no cost to attend this symposium and no registration is necessary. Younger chemists are invited to stay for the social hour and dinner following the symposium. The cost of dinner for students is only $8.00! Reservations for dinner must be made by Feb. 6th.

Contact Marilou Cashman at mcash0953@aol.com to make a reservation.

YCC News

2003 YCC Leadership Development Workshops

Three YCC Leadership Development Workshops will be held at ACS regional meetings in 2003: the Western Regional Meeting in Long Beach, CA (October 15 – 18), the Central Regional Meeting in Pittsburgh, PA (October 19 – 22), and the Southeastern Regional Meeting in Atlanta, GA (November 16 – 19).

ACS members who would like to apply for a YCC Leadership Development Award to attend one of these workshops should submit their applications to the Younger Chemists Committee.

continued on page 6
ACS Scholars Program

The American Chemical Society sponsors scholarship programs for qualified applicants who want to enter the fields of chemistry, biochemistry, or chemical engineering, and students seeking a two-year degree in chemical technology. The programs are designed to encourage African-American, Hispanic, and American Indian students to pursue undergraduate college degrees in the chemical sciences and chemical technology. The goal of these scholarship programs is to aid in building an awareness of the value and the rewards associated with careers in science and to assist students in acquiring the skills and credentials needed for success in these areas.

The scholarships are awarded on the basis of merit and financial need to high school seniors planning a science preparatory program of study, and college students who are currently freshmen, sophomores, or juniors who are committed to the study of chemistry, biochemistry, chemical engineering, or other chemically related fields such as environmental science, materials science, or toxicology and are interested in pursuing careers in one of these fields. Students interested in two-year chemical technology programs and careers in this field are also eligible. Students must have strong academic records and show an interest in and potential for careers in the chemical sciences. Students intending to pursue careers in medicine are not eligible for scholarship awards.

The amount of each individual award will depend upon the availability of funding, the number of scholarships awarded, and evidence of financial need. Scholarships will be given up to a maximum of $3,000 per year. The awards in the ACS Scholars Program, as well as those in the co-sponsored programs are renewable.

To be considered a candidate, students should meet the following criteria:

• African-American, Hispanic/Latino, or American Indian;
• U.S. citizen or permanent resident of the U.S.;
• full-time student at an accredited college, university, or community college; high academic achievers in chemistry or science (Grade Point Average 3.0, “B” or better);
• able to demonstrate evidence of financial need according to FAFSA form (Free Application for Federal Student Aid) and the Student Aid Report (SAR) form; a graduating high school senior, college freshman, sophomore or junior intending to or already majoring in chemistry, biochemistry, chemical engineering or a chemically-related science and planning a career in the chemical sciences or chemical technology;
• Note that students intending to enter or currently in pre-medical programs or pursuing a degree in pharmacy are not eligible for this scholarship.

The deadline for applications is February 15, 2003. Application forms can be obtained directly from <http://chemistry.org/scholars>.

For additional information about the ACS Scholars Program, please contact:
Robert J. Hughes, Manager
ACS Scholars Program
1155 16th Street, NW
Washington, DC 20036
1-800-227-5558 (ext. 6250)
fax 202-776-8003
e-mail: r_hughes@acs.org
**Book Review**

*Designs for Life: Molecular Biology After World War II*

The birth of molecular biology
How biophysicists and biochemists in the 1950s shaped a new science.

Reviewed by Vernon M. Ingram*

The history of the genesis and development of the molecular-biology group at Cambridge University, UK, under Max Perutz is endlessly fascinating. Why did it begin? Why in Cambridge? Why at that time? And why these particular scientists?

Soraya de Chadarevian presents a historian’s account of the conception and birth of the group that founded what is arguably the reigning movement in modern biology. She describes the circumstances and tactics needed to enable the field of molecular biology to mature from a child to become an adolescent, with predictable awkwardness, and then to achieve adulthood. Throughout gestation and childhood it was nurtured by Perutz, who had a clear vision of the next essential step in the development of biological science.

Perutz, who died earlier this year, set out to solve the chemical structure of haemoglobin, the protein molecule that carries oxygen in vertebrates. He took from John Desmond Bernal and Lawrence Bragg the notion that the young science of X-ray crystallography could be used not only to find the chemical structures of small molecules such as salts and sugars, but also the structure of enormously complex molecules such as haemoglobin. Many people told him he was crazy, that the task was impossible; however, he succeeded after some 25 years. De Chadarevian gives a clear account of this story.

In the late 1940s and early 1950s, Perutz attracted a nucleus of remarkably able young collaborators. His single-minded devotion to the task and his personality were key to this collaboration coming together. There was John Kendrew, who solved the structure of the muscle protein myoglobin; Francis Crick and James Watson, who solved the structure of DNA; Tony Broad, the engineer who made the most powerful X-ray machine in the world; Hugh Huxley, who (with Jean Hanson) solved the molecular mechanism of muscle contraction; and, a little later, Sydney Brenner, who with Crick founded much of modern molecular genetics. I was fortunate to be an early member of the group (1952-58), working as a protein chemist, helping the X-ray crystallographers, and studying the defect caused by the sicklecell-anaemia mutation. Perutz was mentor to the whole group.

The excitement about our work was palpable; it permeated every conversation and dominated our leisure time. However, the book fails to capture this excitement. This is unfortunate, because we were spurred on and held together by an obsessive desire to understand the molecules of life — proteins and nucleic acids. In *Designs for Life*, the historian eclipses the storyteller.

Also lost is the spirit of intense competitiveness that we felt towards Linus Pauling and his group at the California Institute of Technology, and the X-ray crystallographers at King’s College London. Although de Chadarevian gives historical credit to other groups who worked on X-ray crystallography, and protein chemistry in particular, she only touches on the crucial importance of knowing the amino-acid sequences of myoglobin and haemoglobin when progressing from a crude to a detailed structure of these proteins. This information/continued on page 9
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Mechanistic and Physical Organic Chemistry 2 (Prerequisite: Mechanistic and Physical Organic Chemistry 1)

(Additional courses will be offered in the Fall Semester of 2003)

Students new to the program must complete an application for admission. Deadline: March 1, 2003, for the Spring term.

For Additional Information contact: Department of Chemistry
102 Hurtig Hall
Northeastern University
Boston, MA 02115
Tel: (617) 373-2822
information was developed in the United States, and was not available earlier to Perutz and Kendrew.

The early X-ray crystallographers’ use of existing and new technologies to solve major biological problems is well described in this book — they were “the right men at the right time”. Also fascinating is the crucially important and parallel development of digital computing in the Cambridge University Mathematics Department next door. There was a difference in personality between Perutz and his pupil Kendrew. The latter embraced and spearheaded the development of computers, but he had to be defensively careful about their use because of Perutz’s early scepticism about the accuracy of the new method.

*Designs for Life* deals well with certain important areas of history. The author links the timing of the appearance of the early Medical Research Council (MRC) unit in Cambridge to the availability of new technologies developed during the war in Britain and the United States, and to the availability of young and eager scientists who had had maturing experiences during the Second World War. The early group, led by Perutz, used their success in solving these incredibly difficult structures to publicize the new science of molecular biology by television, radio and newprint. They encouraged the development of similar research groups elsewhere, and taught molecular biology to a new generation of students from many countries.

Especially detailed is de Chadarevian’s account of the politics involved in expanding the group to the size of an institute, large enough to be varied and self-sustaining. The difficulties encountered were both academic and governmental. Although there is much repetition of this theme, there is also a great deal that is interesting.

The group’s expansion was helped enormously by the arrival of Fred Sanger, a protein biochemist who went on to win two Nobel prizes — he was the first to establish the complete chemical structure of a protein, insulin, and he later invented the current method for sequencing the genome.

In the late 1950s and early 1960s, the vigorous drive to establish new molecular-biology departments was in full swing in the United States but had barely begun in Britain. As a result of the reluctant atmosphere at Cambridge University, the hoped-for expansion did not occur within a university department. There were delays, prevarication and disappointments before the group arrived at their large new MRC site on the outskirts of Cambridge. Unfortunately, this was far away from the university, so the researchers were not integrated into its teaching and collegiality. This enforced separation was in part responsible for the desire of so many of the group to leave the MRC laboratory for teaching positions elsewhere. It is interesting to speculate whether a true integration into Cambridge University would have prevented the exodus.

Much space in this book is devoted to the discovery and worldwide expansion of structural protein biochemistry, and rightly so. It is therefore surprising that less attention is paid to the discovery of the Watson-Crick model of DNA. The impact of their double-helix structure was tremendous and lasted for years. Even more than the great influence of protein-structure determination, the DNA model and its consequences were crucial to fashioning modern molecular biology.

In describing the development of molecular biology, de Chadarevian pays some, but not enough, attention to the vital role of scientists such as Erwin Chargaff, William Cochran, Rosalind Franklin and Linus Pauling, not to mention the other American and French groups. After all, truly great advances in biology are built on the work of others — to give them credit would not diminish the achievements of Watson, Crick and Brenner.

Perhaps de Chadarevian should have paid more attention to the influence of Crick and Brenner on the development of the new and exciting fields of molecular genetics and pro-
tein synthesis. Their work and the publicizing of their ideas made molecular biology the lingua franca of modern biology. Even the new generation of engineers feel the urgent need to learn this new treatment of biology.

The author deliberately focuses on the (unique) instance of the MRC Unit for the Molecular Structure of Biological Systems, housed in the Cavendish Laboratory, Cambridge, and its direct descendant, the MRC Laboratory of Molecular Biology. The account of these units’ relationship to government, to private funding agencies and to the university makes an interesting and valuable book. One must realize, however, that the narrow focus does not imply that the group was entirely self-contained — we depended, at the time, on the outside world for scientific nourishment and for funding. In short, de Chadarevian’s historical account is recommended to all who are interested in the development of molecular biology.
Membership: 435 New Member Letters have been sent in October and November.

Nominating: T. Frigo submitted the names of J. Billo, D. Lewis, D. Rickter, and M. Simon as the nominees for the board members of the 2003 Nominating Committee. By written vote, J. Billo and D. Lewis were elected by the Board.

Chemistry Education: R. Tanner reported that the Connections to Chemistry 2002 program took place October 9 at Burlington H.S. 172 registration requests had been received, but only 133 could be accepted. 89 different high schools were represented. In view of the great success of the program, the committee is planning to expand the program. The committee also will review the budget for the program.

The 11th annual NE Regional Undergrad. Day on November 2, 2002 at B.U. had over 150 registrants from 19 academic institutions, including some from outside the NESACS area: SUNY-Stony Brook, U. of Connecticut, U. of Southern Maine, UMass Amherst and U. of New Haven.

Four undergraduates have received Grants-in-Aid to attend the spring National ACS Meeting in New Orleans, LA, March 23-27, 2003 to make poster presentations of their undergraduate research at the Chemistry Education Division: Andrew Pagano (Boston U.), Toni Lamoureux (UMass Dartmouth), Warren Ansaldo (Boston U.), Justin Tourigny (Boston U.). Fewer applications than in past years had been received, apparently because of difficulties in contacting Student Affiliate Advisors. Tony Fernandez, the new Student Affiliate Coordinator will establish an e-mail network to assure better communication.

Professional Relations: T. Light reported that he and Arlene Wick Light will attend the weekend workshop: “How to establish a local mentoring group” sponsored by the National ACS to increase student and minority participation.

Norris Award: Everything is in place for this night’s Award Meeting.

Esselen Award: A. Heyn reported that to date 5 nominations have been received.

Other Committees: Continuing Education: A. Viola reported that the Short Course on Organic Chemistry of Drug Design and Drug Action has 20 registrants so far.

Natl. Chemistry Week: S. Iacobucci, via a written report, reported that the 2002 NCW celebration went well. At the Boston Museum of Science on October 20, Bassam Shakhashiri’s lecture demonstration: Quest for Chemistry: Moles, Molecules, and Mummies drew packed houses for each of the two presentations, and 300 Boston school children for the special Monday presentation. The event was under the sponsorship of the Phyllis A. Brauner Memorial Lecture Committee. The current exhibits about Ancient Egypt at the Museum were coordinated with this year’s NCW theme: The Chemistry of Cleaning. Many volunteers were on hand on October 20 to give demonstrations and coordinate activities and answer questions.

It was the SENSE OF THE BOARD to commend Sarah Iacobucci and Chris Jaworek on their magnificent 2002 NCW program un coordinating with the Museum of Science and the Ancient Egypt Exhibit.

D. Lewis recommended that in future years a special effort is to be made to include local High School students in NCW activities

Summerthing: W. Gleekman, via written report, stated that after successful 2002 Summerthing events, similar events are to be planned for 2003. Two of three events are to be Red Sox games because of the popularity of these games.

In 2002 400 tickets for the May game had been sold, and 340 for the July game. Should we replace the second Red Sox game with a Patriots game in September?

Younger Chemists: A. Tapper via written report stated that on December 4 a holiday networking social event is...
Board of Directors
Continued from page 11
planned, including collecting of gifts solicited from those attending for donation to a Boston Children’s charity.

M. Strem reported that the German Exchange Task Force is composed of M. Strem, R. Tanner, A. Tapper, M. Hoffman, and P. Gordon.

Corporate Affiliates: A second letter soliciting corporate support has been sent out. Corporate Patrons are those donating more than $1,000, Corporate Sponsors those donating $250-1,000.

NERM: H. Mayne reported that a new NERM Executive Board has been selected, with M. Hoffman being the 2003 representative from NESACS to NERM.

Have you looked at the NESACS website?
WWW.NESACS.org

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The First Annual Undergraduate Environmental Research Symposium

On Saturday, November 16, 2002, the First Annual Undergraduate Environmental Research Symposium was held in the John Joseph Moakley Center at Bridgewater State College, assisted by the Bridgewater State College ACS Student Affiliate Chapter. The symposium was organized by Drs. Edward J. Brush and Tammy De Ramos-King, both faculty members at the chemical sciences department, Bridgewater State College.

The Symposium ran from 9:00 AM to 2:30 PM and featured 30 poster presentations from 41 student presenters. A total of 100 students, faculty and mentors were in attendance. The formal program began at 10:00 AM with a talk by our guest speaker, Dr. Brian R. Brodeur, Director of the GIS Program at the Massachusetts Department of Environmental Protection. The title of Dr. Brodeur’s talk was “Dimensions and Scale of Environmental Issues in Southeastern Massachusetts”, which fit in perfectly with the theme of the Symposium which focused on environmental issues of particular concern to Southeastern Massachusetts. Dr. Brodeur’s past experience as a science teacher was evident as his talk was geared for undergraduates. Two poster sessions were held immediately following Dr. Brodeur’s talk.

The sponsors for the event were the Northeastern Section of the American Chemical Society, Manomet, NCUR/Lancy, (grant surplus) and the BSC-Adrian Tinsley Program for Undergraduate Research.

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Summer Scholar Report

Exo2 as an Inhibitor of the Exocytic Pathway and a Tool in Chemical Genetics.

Richard D. Langfield*, Tomas Kirchhausen#, Gerald B. Hammond*

Introduction

The compartments located in eukaryotic cells separate metabolic reactions and create different environments within the cell. These compartments require certain proteins, which are synthesized either in the cytosol or on the endoplasmic reticulum. Therefore, transport of these essential proteins must occur while still maintaining the protein composition in different compartments.1

A number of proteins are required for the various processes associated with membrane transport. Regulation of the transport pathways is very complicated. One must determine the function of each protein, and how this is integrated with the rest of the pathway. Both genetic and biochemical approaches are lengthy procedures, and therefore, the effects seen may not directly represent what is happening. Moreover, usually only part of the pathway can actually be reconstructed, and then does not truly represent the true in vivo pathway. The method used in this project employs small molecule inhibitors and activators of the pathways in question.1

The emerging field of chemical genetics stems from the integration of chemistry and biology in which identification and manipulation of small molecules helps to identify specific biological activity. Biologists examine the biological pathways associated with exocytosis, and consequently, the inhibition of these pathways by the test compounds. Several compounds that inhibit or activate certain exocytotic pathways have been found in prior screening of chemical libraries. Of these compounds Exo2, Figure 1: 4-hydroxy-3-methoxy-(5,6,7,8-tetrahydro[1]benzothieno[2,3-d]pyrimidin-4-yl) benzaldehyde hydrazone was found to perturb the endoplasmic reticulum (ER)-to-Golgi apparatus movement. Our objective was to discover how the action of Exo2 differed from that of a previously identified and well-known compound Brefeldin A (Bref A), which was originally discovered by the screening of natural products.1

![Figure 1](image-url)

**Figure 1**

Bref A causes changes in the appearance and function of the Golgi. The Golgi tubulates then redistributes its contents and membrane to the ER.2,3 Phenotypically it would appear that Exo2 and Bref A act in the same way, that is to say they both stop the ER-to-Golgi transport and cause the collapse of the Golgi. When cells are treated with Bref A, the protein Arf1 disassociates from the Golgi membrane before the actual collapse of the Golgi.3 The question is, does Exo2 also cause the release of Arf1 into the cytoplasm before the collapse of the Golgi or does Arf1 stay attached to the membrane during collapse?

Materials and Methods

**Exo2, Cells, Transfection, and DNA Constructs**

Exo2 was obtained through the Chembridge Corporation. In all of the experiments, Exo2 was used at a concentration of 50 mM. BSC1 fibroblasts, African green monkey (*Cercopithecus aethiops*) normal kidney cells were used in all of the experiments. The cells were cultured in Dulbecco’s Modified Eagle’s Medium (DMEM) supplemented with fetal bovine serum, penicillin, and streptomycin. Unless otherwise noted, all of the cells used were transiently transfected using Fugene 6 from Roche. The minipreps of DNA were made using QIAGEN’s QIAprep Spin miniprep kit. The ARF1 YFP DNA construct was provided by Yan Feng (Institute of Chemistry and Cell Biology and Department of Cell Biology, Harvard Medical School, Boston, MA). The Galtransferase GFP (GT-GFP) was obtained from Clonetech.

**Time-lapse Fluorescence Microscopy**

For all of the experiments the cells were plated on 25mm glass coverslips and transfected with either the Arf1-YFP or GT-GFP using Fugene 6. Approximately 24 to 72 hours after transfection, images were taken at 37 °C of live cells using a Zeiss Axiovert 200 M inverted microscope. The objectives used were either a 40X oil-immersion or a 63X oil-immersion lens. The image capturing was performed using a Photometrics Cool Snap HQ camera from Roper Scientific. Image capturing was controlled by Slidebook 3.0.9.11 Beta for Macs. Images were collected approximately 5 minutes after the addition of Exo2. The first image of each series was normalized to minimize the background cytosolic signal’s effect on later images in the series.

Results and Discussion

Both Exo2 and Bref A have the same apparent phenotype. Both disrupt the ER-to-Golgi transport, which is seen by a decrease in the Golgi signal over time. The run with Exo2 using cells transfected with the GT-GFP showed some tubulation of the Golgi complex as it collapsed. The collapse was not a simple diffusion of the signal into the cytosol (Figure 2). This is also the type of action seen when cells are treated with Bref A.3

A major difference can be seen when one compares Exo2 and Bref A with regard to their actions on the Golgi when labeled with Arf1-YFP instead of the GT-GFP. When cells are treated with Bref A, the Arf1 diffuses

Continued on page 14

* University of Massachusetts Dartmouth, North Dartmouth, MA. R.D. Langfield was a 2002 Norris/Richards Summer Scholar
* The Center for Blood Research, Harvard Medical School, Boston, MA.
into the cytosol instead of tubulating and incorporating into the ER (Figure 3). On the other hand, Exo2 caused the Golgi to collapse with the Arf1 still attached to the membrane (Figure 4). Tubules formed and left the Golgi complex during the collapse. The Arf1 did not simply diffuse into the cytosol, which is evidence of Arf1 remaining attached. There was a notable time difference between the run using Arf1-YFP and Exo2 and the run using GT-GFP and Exo2. This difference could be due to the degradation of the Exo2 since the two runs were not performed on the same day.

Conclusions

Although both Exo2 and Bref A have a phenotypic similarity with regard to their activity on the ER-to-Golgi traffic there are many underlying differences. Bref A causes the disassociation of the Arf1 protein from the Golgi membrane before the actual collapse of the membrane. While Exo2 does not cause the disassociation of Arf1, it still causes the collapse of the Golgi. This would be better visualized by co-transfection of the cells with both the Arf1 and GT fluorescent proteins. This could qualitatively determine whether cells treated with Exo2 undergo a collapse of the Golgi with Arf1 still attached, or if there is some disassociation of Arf1 from the Golgi before the collapse.

Co-transfection is a useful idea, but in practice simply was not possible. The co-transfection of the cells with both proteins did not work due to complications with cell cultures and some of the constructs prepared. According to the data that were obtained using a single transfection, the Arf1 protein does not appear to disassociate from the Golgi during collapse. As previously mentioned, the co-transfection would help to strengthen this argument.

Bref A and Exo2 can be and have been useful as tools to determine the metabolic pathways associated with exocytosis. The combination of chemistry and genetics is important to the study of cellular processes on a molecular basis as this obviates the degree of outside interference or bias typically found in older methods.

Acknowledgements

R. Langfield acknowledges the gracious support of the Northeastern Section of the ACS through the Norris/Richards Summer Research Fellowship. The author would also like to express his gratitude to Dr. Tomas Kirchhausen for his support and advice throughout rather trying times and for the opportunity to work with him, and also to Dr. Gerald B. Hammond for his support and opening up the opportunity for me to work at Harvard Center for Blood Research.

References

2. Lippincott-Schwartz, J.; Yuan, L.; Tip-

Figure 2: GT-GFP Labeled cells treated with Exo2. The signal (GT-GFP) redistributes from the Golgi to the ER. The collapse of the Golgi is incomplete. The box indicates the cell that the image was cropped to.

Figure 3: Arf1-YFP Labeled cells treated with Exo2. The signal (Arf1-YFP) redistributes from the Golgi to the ER. This is hard to visualize in the still frames. The collapse of the Golgi is incomplete. The box indicates the cell that the image was cropped to.

Figure 4: Arf1-YFP labeled cells treated with Bref A. The signal (Arf1-YFP) diffuses from the Golgi to the cytosol and does not redistribute its contents to the ER.

The Nucleus February 2003
**Nesacs Web Page**

**Did You Know the Northeastern Section Has a Web Page?**

The Northeastern Section has had a web page for five years. It was started by Arthur Obermayer, then, after three years was updated by Marietta Schwartz to its current location: http://www.nesacs.org. It was revised again, and is currently maintained by Frank Gorga and two other volunteers.

The web page includes a wealth of information, ranging from historical facts to NESACS Board of Directors and committee member information to meeting reports to local grant information. The complete text of The Nucleus is available as a PDF (portable document format) file. There is also a current calendar of events.

WE NEED YOUR HELP! Upkeep of our web site is a major task, and more help is needed.

The NESACS Board of Publications, which oversees the Section web site, is calling for volunteers. We are looking for a group of energetic and reasonably web-savvy people to join our web team.

If you are interested in helping to maintain and update our web page, or have ideas on how to make it better and especially if you have had experience in web authoring, please contact Marietta Schwartz at marietta.schwartz@umb.edu to volunteer and to obtain more information.

**Summer Scholar**

Continued from page 14

1. Lippincott-Schwartz, J.; Yuan, L.C.; Continued from page 14

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**Historical Notes**

By Edward R. Atkinson, Amherst, MA

We present here short biographies of chemists and chemical engineers whose deaths have been reported to us during the past twelve months. Death notices received from the National ACS Office include only the address of the deceased. We obtain biographical material from the public press and from material that the Northeastern Section requests from the estates of the deceased. Unfortunately, no replies are received from a significant number of these requests.

Caryl (Magnus) Boyden, 73, died on May 23, 2002 at the Winchester Hospital. She was a native of Medford, MA. In 1940 she graduated from Arlington High School where she played trumpet and French horn. She received the B.S. from Tufts University in 1950 and the M.S. from Northeastern University in 1957. She was employed for 27 years in the surgical research laboratory of what is now Brigham and Women's Hospital under the direction of Dr. Francis D. More. She was the co-author of several publications with More and others, including a book on the body cell mass and its supporting environment.

An emeritus member of ACS, she was well known to fellow chemists when serving on the hospitality committee of the Northeastern Section. It was on such an occasion that she renewed her acquaintance with Richard Boyden who had been a fellow undergraduate at Tufts and who had returned from Army service in 1953. She interested Dick in pursuing the evening graduate program at Northeastern. It was my pleasure to meet them both there in my course in advanced organic chemistry and to learn in 1959 of the marriage of my students.

Caryl and husband Dick were members of the Tufts Alumni Council for over 20 years. She was president of the Boston alumnae chapter of the Alpha Omicron Pi sorority and treasurer of its Delta Corporation. After moving from Woburn to Winchester in 1966 she was active in all aspects of the Winchester Community Players. Funeral services for Caryl were held on May 28 in the Pleasant Street Congregational Church in Arlington where she had been a member for over 50 years. Celebration of her life made by Sheila McDermott and Ron Brinn, friends from the Tufts staff, described a devoted chemist and an asset to the communities in which she had lived. In addition to her many interests in professional and community affairs, she was noted for her devotion to the New England Patriots, cats and dogs, and the Republican Party.

J. Boyd Britton, 93, died on October 15, 2002 in Vero Beach, FL where he had lived in retirement. He grew up in St. Louis and received the B.S. from Washington University there. His early career in industrial chemistry was with Shell Oil, Swift Packing, and the St Louis chamber of commerce. In the mid-1930s he began 35 years with the Cabot Corporation where he established additional research laboratories in Billerica and became a member of the Cabot board of directors. To escape the constant need to travel he left industry to become vice-president of Radcliffe College where his job included handling negotiations that led to the merger of Radcliffe with Harvard University. In 1979 after 14 years there and the death of his wife he retired to Florida. During his years in the Boston area he was active in the affairs of the Town of Needham, the Glover Memorial Hospital, and Christ Church. His associations included Alpha Tau Omega, the Chemists Club, the Harvard Club, and the Northeastern Section, ACS. A long obituary and portrait was published in the Boston Globe.

John F. Coburn, 91, died on August 21, 2002 at the North Hill retirement Community in Needham, MA. Known to his friends as “Bud”, he was a native of Cleveland who received the B.S. in chemical engineering from.
Princeton University. After eight years service in the U.S. Navy he returned to Cleveland for employment at the Glidden Paint Co. In 1950 he joined Archer Daniels Midland in Minneapolis and spent the next eleven years overseeing the company’s business in Peru and founding his own company for fishmeal production. Upon returning to the U.S., Bud lived in Sarasota FL and then in Chatham, MA where he built a model home and gained fame as a fisherman. He competed in backgammon tournaments and passed his love and skills of the game to his sons. He was survived by his wife, three sons, and six grandchildren.

John T. Edsall, 99, died on June 12, 2002 in Boston. He was a native of Philadelphia who received the M.D. from Harvard in 1928 while his father, David L. Edsall, was dean of the medical school. While serving the faculty of the school John Edsall established in the 1950s the biochemistry department of Harvard College. As editor of the Journal of Biological Chemistry he established its widespread influence. His gentle nature allowed him to praise points in papers he rejected. He led the Committee on Scientific Freedom and Responsibility of the AAAS. He spoke for moderation in an investigation of published false data. However, he did not restrict his challenge of the U.S. government when it attempted to censure Linus Pauling’s campaign against the testing of nuclear weapons.

Edsall became the international authority on the chemistry of proteins. His influence went beyond the laboratory. He was Harvard’s head tutor in biochemical sciences for 25 years. He advised fellow faculty and friends from other schools. One such was George Scatchard at MIT whom I often heard speak kindly of Edsall. Edsall was a co-author with Walter Stockmayer of Scatchard’s obituary published by the National Academy. As professor emeritus at Harvard Edsall published on the history of
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Calendar

For additional information:
Check the NESACS Homepage for late additions: http://www.NESACS.org
Note also the Chemistry Department Web pages for driving directions and updates.

Feb 3
Prof. Mark Grinstaff (Duke Univ.)
“Biodendrimers: New Materials for Medical Applications”
Boston Univ., Metcalf Center, 590 Commonwealth Ave, Boston, 4 pm

Feb 4
Prof. Dalibor Sames (Columbia Univ.)
“Complex Organic Synthesis via C-H Bond Functionalization”
Boston College, Merkert 130, 4:00 pm
Prof. Christopher Arumainayagam (Wellesley College)
“Electron-Induced Reactions in Nanoscale Thin Films”
Tufts Univ., Pearson Chemistry Building, 62 Talbot Ave., Medford, Room P106, 4:30 pm
Guy Crosby (Private Consultant, Food and Nutrition Chemistry)
“Recent Developments in the Chemistry of Nutrition and Their Impact on Human Health”
UNH, Iddles Auditorium Room L103, 11:10 am

Feb 6
Dr. Terry Shirey (Nova Biomedical)
“Critical care profile blood testing for high risk surgical patients”
Dr. George Parsons (Future Diagonistics)
“Rapid, sensitive immunoassay guidance in endocrine surgery”
American Association for Clinical Chemistry at DoubleTree Guest Suites Hotel, Waltham at 128

Feb 10
Prof. Huw M. L. Davies (SUNY - Buffalo)
“Catalytic Asymmetric C-H Activation”
Boston Univ., Metcalf Center, 590 Commonwealth Ave, Boston, 4 pm

Feb 11
Prof. Peter Seeberger (MIT)
“Automated Oligosaccharide Synthesis Drives Chemical Glycomics: From Carbohydrate Arrays to a Malaria Vaccine”
Boston College, Merkert 130, 4:00 pm
Prof. James McKnight (Boston Univ.)
“Cross-Examining a Villin: Structure, Function and Folding of a Small F-Actin-Binding Domain”
Tufts Univ., Pearson Chemistry Building, 62 Talbot Ave., Medford, Room P106, 4:30 pm

Feb 12
Prof. Clark Landis (Univ. of Wisconsin)
Inorganic Chemistry Seminar
MIT, Room 6-120, 4 pm

Feb 13
Daniel C. Harris (Naval Air Systems Command)
“Invention of the Analytical Chemistry Textbook and Curriculum”
UNH, Iddles Auditorium Room L103, 11:10 am

Feb 18
Prof. Linda McGown (Duke Univ.)
“DNA Aptamers in Proteomic Analysis”
Tufts Univ., Pearson Chemistry Building, 62 Talbot Ave., Medford, Room P106, 4:30 pm

Feb 19
Prof. Omar Yaghi (Univ. of Michigan)
Harvard/MIT Inorganic Chemistry Seminar
Harvard Univ., Pfizer Lecture Hall, Mb-23, 4 pm

Feb 24
Prof. Keith Nelson (MIT)
“Terahertz Polaritonics: Coherent Spectroscopy and Coherent Control”
Boston Univ., Metcalf Center, 590 Commonwealth Ave, Boston, 4 pm
Prof. Carolyn Bertozzi (UC-Berkeley)
“New Therapeutic Targets in Human and Microbial Sulfation Pathways”
Harvard Univ., Pfizer Lecture Hall, 4:15 pm

Feb 25
Prof. Louis Barriault (Univ. of Ottawa)
“Tandem Pericyclic Reactions and Synthesis of Natural Products”
Boston College, Merkert 130, 4:00 pm
Dr. Russell Petter (Biogen, Inc.)
“Remarkably Potent Antagonists of Integrin VLA-4”
Tufts Univ., Pearson Chemistry Building, 62 Talbot Ave., Medford, Room P106, 4:30 pm

Feb 26
Peter Tsang (MIT, Schrock Research Group)
Inorganic Chemistry Seminar
MIT, Room 6-120, 4 pm

Notices for the Nucleus Calendar should be sent to:
Dr. Donald O. Rickter, 88 Hemlock St.,
Arlington, MA 02474-2157
e-mail: rickter@rcn.com

Modern science. A student and lifelong friend (who hesitated for 20 years to address Edsall as “John”) characterized Edsall as a “warm and supportive yet very much reserved New Englander. I was always in awe of him”.

The above material was based on a long obituary (with portrait) published in the Boston Globe on page B11, June 30, 2002. I suspect that publications of Harvard and the National Academy will be even more informative.

Casper Ferguson, 85, died on September 29, 2002 from injuries suffered in a fall. He grew up in the Roxbury section of Boston and in 1937 became the first African-American graduate of Boston College, where he majored in chemistry. He was an Army officer in World War II, then settled in Newton, MA where he worked in the U.S. Postal Service until changes in racial attitude allowed him to secure a position with the U.S. Army Natick Laboratories where he worked until retirement in 1981.

“Cappy”, as he was known, was active in the public affairs of Newton, the NAACP, and the Red Cross. His longtime friends praised his competitive spirit and passion for learning that allowed him to progress despite the racism that was common during his life.

Charles Lerner, Jr., 50, died on May 1, 2002. His education was in the public schools of Concord, MA and at Tufts University where he received the B.S. in chemical engineering in 1974. He subsequently received the M.S. and M.B.A. from Northeastern University. During the 1977-2001 period he was employed by the Polaroid Corp. in Waltham as a senior product development engineer. More recently he was employed by the CDI Engineering Corp. in Boston. Among his professional associations were ACS, AIChE, and ISPE. A resident of Princeton, MA, he was ‘a licensed pilot ’and a sailor. He was survived by his wife Elise (Welch), sons C. Charles III and Seth H. of Princeton, his parents, two sisters, and a brother. ◇ to be continued