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The Rockefeller University

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The phone call heard round the world

By Joseph Bonner

Professor Günter Blobel thought the early morning phone call last Monday (Oct. 11) was a prank from one of his colleagues. But indeed, it was Nils Ringertz, the secretary of the Nobel Committee, calling from Stockholm, Sweden, to inform Blobel that he was the recipient of the 1999 Nobel Prize for physiology or medicine. The 5 a.m. call signaled the beginning of a long day that would transform Blobel into an international figure.

After attempts by reporters to reach him through members of his lab (see story, below), Blobel was greeted by an army of photographers and reporters as he entered the 66th Street gate around 10 a.m. Stopping briefly to give an impromptu news conference (an official one was scheduled for 11 a.m.), Blobel retreated to his lab in Rockefeller Research Building, journalists on his heels to capture his every move and word.

Photographers recorded the steps of Blobel and his wife, Laura Maioglio, as they walked hand-in-hand from Gasser Hall to Caspary Auditorium, not unlike the First Couple strolling across the White House South Lawn.

Caspary Auditorium was filled with TV crews and photographers from the United States, Germany, Italy and Great Britain and well-wishers from the campus community. President Arnold J. Levine was stuck at a scientific meeting on Monday and, with instructions to notify the campus by e-mail and voice

see **Call**, page 3

Blobel wins 1999 Nobel Prize in medicine

The Nobel Assembly at the Karolinska Institute awarded the 1999 Nobel Prize in physiology or medicine to Rockefeller Professor Günter Blobel for the discovery that "proteins have intrinsic signals that govern their transport and localization in the cell." The 20th scientist associated with the university to garner this award, he will receive a gold medal and a cash prize of \$960,000 at the Nobel Assembly in Stockholm, Sweden, on December 10.

"I am delighted that my colleague, Günter Blobel, is Rockefeller's newest Nobel laureate," says President Arnold J. Levine. "It is indeed fitting that, as we near the close of the century and the approaching Centennial, Günter should receive this award for research that has deep roots in Rockefeller history and represents great promise for the treatment of human disease."

Blobel, the university's John D. Rockefeller Jr. Professor, heads the Laboratory of Cell Biology and is an investigator at the Howard Hughes Medical Institute. Born in Waltersdorf, Germany, on May 21, 1936, he received his medical degree in 1960 from the University of Tübingen and a doctoral degree in oncology in 1967 from the University of Wisconsin at Madison, where he worked with Van R. Potter in the McArdle Laboratory for Cancer Research.

He joined Rockefeller in 1967 as a postdoctoral fellow in the cell biology laboratory of Professor Emeritus Philip Siekevitz and Nobel laureate George Palade. Blobel was appointed an assis-



Professor Günter Blobel, Rockefeller University's 20th Nobel Prize winner, waves to cheering members of the campus community as he walks with his wife, Laura Maioglio, to Monday's news conference, below. *Photo by Reuters*



Photo by Paul Schmeck

tant professor in 1969, associate professor in 1973, professor in 1976 and John D. Rockefeller Jr. Professor in 1992. He received an HHMI appointment in 1986 when HHMI established a unit at Rockefeller.

In addition to a 1993 Albert Lasker Basic Medical Research Award, Blobel has received many awards, including the King Faisal Award (with James Rothman and H. Pelham) in 1996; the Ciba Drew Award in Biomedical Research (with Levine and J. Schlessinger) in 1995; the National Academy of Sciences' 1978 U.S. Steel Foundation Award in Molecular Biology; a 1982 Gairdner Foundation International Award; the 1983 Warburg Medal, the highest award of the German Biochemical Society; the V. D. Mattia Award of the Roche Institute of Molecular Biology; the E. B. Wilson Award from the American Society for Cell Biology (with David Sabatini); Columbia University's Louisa Gross Horwitz Prize; the Waterford Bio-Medical Science Award; and the Max-Planck Forschungspreis.

He became a member of the Leopoldina and was elected to membership in the U.S. National Academy of Sciences in 1983, the year he received the Academy's Richard Lounsbery Award.

Blobel is founder and president of the board of directors of the Friends of Dresden Inc. Blobel and his wife, Laura Maioglio, owner of Barbetta Restaurant in New York City, reside in New York City and Fubine, Piemonte, Italy.

Blobel lab members revel in the buzz of Nobel Prize announcement

By Jim Stallard

The jolt that ran through The Rockefeller University campus Monday morning with the news that Günter Blobel had won the Nobel Prize in physiology or medicine was felt keenly by those most closely connected to his work—the postdocs, graduate students and technicians in his laboratory.

It did not take long for the news—announced at 5:30 a.m. Eastern Standard Time by the Nobel Assembly of the Karolinska Institute in Sweden—to reach the students, and the information set off a wave of excited telephone calls in various languages to confirm that the rumor was true. Others checked the World Wide Web, television and radio to verify the claim. The announcement validated for them Blobel's impressive stature in the field of cell biology. Virtually all of them had come to Rockefeller specifically for the chance to work in his laboratory.

Many were roused from sleep between 5:30 and 6 a.m. by members of the media desperate to get in touch with Blobel. Some press outlets apparently got hold of a list of those in the lab and



Members of the Blobel lab gathered on the steps of Founder's Hall after the media frenzy abated on Mon., Oct. 11. *Photo by Joseph Bonner*

began calling them one by one. Elias Coutavas, a postdoctoral associate from New York City, received a call just before 6 a.m. "The person on the other end said, 'This is CBS news. I don't know if you've heard, but Dr. Blobel has won the Nobel Prize. Do you have his number?'" After I hung up the phone, I was wired. I'm not a morning person, so normally I would go back to sleep. Instead I got dressed and came in to the lab."

Others had similar experiences. Jonathan Rosenblum, a postdoc from New Jersey, received calls from CBS and

the Associated Press radio. Susana Chaves, a guest investigator from Portugal, was contacted by CBS and the Portuguese press. All primarily wanted to reach Blobel, but some asked for comments from the lab members as well.

Jost Enninga, a graduate exchange student, received a telephone call at 5:30 a.m. from his parents in Germany who had just heard the news announced by German media at 11:30 a.m. local time. Enninga woke up his roommate, Ivan Karnauchov, a postdoctoral fellow from Russia, to pass on the scoop.

"It was very exciting for us," Karnauchov says. "I was having trouble saying what I felt because I kept switching between Russian, German and English. We were, of course, very happy."

Hualin Zhong, a postdoctoral associate, heard the news on the radio at home and then confirmed it by checking the Web. "I was very happy and excited," she says. "I was hoping before I came here [in June 1998] that he would win when I was here. It was great news because he really deserves it. I'm very glad to have the chance to work with him and share such an exciting moment."

see **Revel**, page 2

2 Cell biology legacy

3 Don't forget the ZIP

4 Calendar of events

Looking Back: The RU Tradition in Cell Biology

By Betsy Hanson

In his comments at the press conference announcing his Nobel Prize, Günter Blobel thanked his teachers, mentors and colleagues. First was Van R. Potter, his doctoral advisor at the University of Wisconsin at Madison, and then George Palade, Professor Emeritus Philip Siekevitz, and David D. Sabatini, leaders in the world-renowned cell biology laboratory at Rockefeller University that Blobel joined in 1967. By that time Rockefeller had a tradition of cell biology extending back more than 20 years, and was famous as the place where cell biology developed as a field. George Palade was one of the founders of that tradition.

Palade came to Rockefeller in 1946, a year after Rockefeller researchers Keith Porter and Albert Claude and Ernest Fullam of the Interchemical Corporation published the first image of a cell as seen with an electron microscope. With its high resolution and magnification, the electron microscope opened new horizons for exploring the interiors of cells. Earlier researchers using light microscopes had been able to identify the shapes of cells, and to see the nucleus and the shadowy figures of other organelles, which seemed to float in a disorganized chemical soup. The electron microscope revealed and brought into focus an array of new structures within the cell.

With Porter, Palade set out to explore and map the territory inside eukaryotic cells – the kind of cell that contains a nucleus, and that makes up the human body, for example. They recognized early on that the electron microscope provided only a static snapshot of the cell. To learn how the structures inside carried out various processes other techniques were needed – cell fractionation, biochemical analysis, pulse-chase procedures and autoradiography. In time, research in the Cytology Laboratory revealed a surprise for biologists: all cells in the body, whether from liver, heart, or skin, for example, have the same basic internal organization. The Nobel Prize was awarded to Palade, Claude and de Duve for the connections they made



Nobel laureates gather for a photo opportunity in 1975: From left, standing: George Palade, Albert Claude, Stanford Moore, Christian de Duve. From left, seated: H. Keffer Hartline, Gerald Edelman and Fritz Lipmann. Photo courtesy The Rockefeller University Archives

between cellular structures and their functions.

Palade and Porter's first work at Rockefeller was devoted to perfecting the techniques of electron microscopy. The methods Palade developed for fixing cells – preparing them for viewing with the electron microscope – and the microtome Porter invented for creating ultra-thin specimens greatly improved the quality of electron micrographs. Using the new techniques, in 1952 Palade described the internal structure of the mitochondria, the sausage-shaped bodies that serve as the powerhouses of the cell.

At about the same time, Palade discovered a new structure in the cell, first termed the "Palade granule" and now called the ribosome, that synthesizes proteins. In addition to making this finding, in the next decades Palade and his colleagues unveiled the pathway in the cell from the synthesis of proteins to their secretion, in particular the synthesis and secretion of enzymes by pancreas cells. Much of this work was done in collaboration with Professor Emeritus Philip Siekevitz, who joined Palade's lab in 1954, and later with James D. Jamieson. When Siekevitz became a full professor in 1966, the laboratory became

the Palade-Siekevitz lab.

This work laid the foundation for the signal hypothesis by Blobel and Sabatini, which postulated that newly synthesized proteins contain signals that guide their transport to specific addresses in the cell. Blobel's work has also elaborated upon another research interest of Palade and Siekevitz – the structure and function of cellular membranes.

Blobel joined the Palade-Siekevitz lab in 1967 as a postdoctoral fellow. "When I started in Palade's lab, the various structures in the cell had been identified with the electron microscope, and it was known that proteins have to cross membranes, but it wasn't known what the mechanism was," says Blobel. His accomplishments are direct intellectual descendants of those of the earlier Rockefeller group.

"Blobel's excellent work," says Siekevitz, "his biochemical experiments and results, are the culmination of decades of work done at Rockefeller on how newly synthesized proteins traverse the cell."

In addition, Blobel points to Rockefeller's Nobel-prize winning history in protein chemistry as an influence on his work. At Rockefeller, Stanford Moore and William H. Stein worked out the

Nobel Laureates of The Rockefeller University

Since the institution's founding in 1901, 20 Nobel Prize winners have been associated with the university. Of these, two are Rockefeller graduates (Edelman and Baltimore) and five laureates are current members of the Rockefeller faculty (Blobel, de Duve, Lederberg, Merrifield and Wiesel). Prizes were awarded for physiology or medicine, unless otherwise noted.

1912 Alexis Carrel

1930 Karl Landsteiner

1944 Herbert S. Gasser

1946 John H. Northrop and Wendell F. Stanley, with James Sumner

Chemistry

1953 Fritz Lipmann, with Hans Krebs

1958 Edward L. Tatum, with George Beadle

1958 Joshua Lederberg

1966 Peyton Rous, with Charles B. Huggins

1967 H. Keffer Hartline, with Ragnar Granit and George Wald

1972 Gerald M. Edelman, with Rodney R. Porter

1972 Stanford Moore and William H. Stein, with Christian B. Anfinsen

Chemistry

1974 Albert Claude; Christian de Duve; George E. Palade

1975 David Baltimore, with Renato Dulbecco and Howard M. Temin

1981 Torsten Wiesel, with David H. Hubel

1984 R. Bruce Merrifield

Chemistry

1999 Günter Blobel

composition of proteins, and Professor Emeritus R. Bruce Merrifield developed a method of synthesizing them. Says Blobel, "My work connects the chemical work done by these giants to the work that has been done in cell biology, in particular by George Palade."

The tradition continues today in Blobel's lab and in the labs of the next generation of cell biologists across campus, such as Michael Rout, Sanford Simon, Titia de Lange, Thomas Sakmar and others.

Revel, continued from page 1

Zhong called Beatriz Fontoura, a postdoctoral associate from Brazil, at 8:30 a.m. to tell her what happened. "It was a great way to wake up," Fontoura says. "After he won the Lasker Award [in 1993] there was an expectation that he might get the Nobel, but it's always a surprise. He easily could have won it long before now."

For the lab members, the day was one of celebration and bemusement watching reporters mill around the hallway and camera operators scrambling to get footage of Blobel in a laboratory setting. Shots of Blobel pipetting drew much lab attention. There was a small celebration with toasts during the day, with Blobel popping in to join the crowd when he could spare a minute between interviews.

The lab knew Blobel was a strong candidate for the honor, and many had speculated hopefully that this might be the year. Joe Glavy, a postdoctoral associate, said that as Samuel Dales, an adjunct faculty member, left the office on Friday he asked everyone to hope for Blobel to win. "I told my parents he had a good

chance of winning," Glavy says. "They called me at 8 a.m. (Monday) saying they had heard the name on the radio along with the words 'Nobel Prize.' The first thing I asked was, 'Did he win it alone?' They said Blobel was the only name they heard, so I knew what that meant."

Blobel's influence extends to those who have passed through his lab and moved on to other positions. Lucy Pemberton, a postdoctoral associate from England who has been in Blobel's laboratory the longest of the current members, said she found out about the Nobel from former Blobel postdoc Neris Bonfati, who called her from Turin, Italy. "I was just incredibly excited," Pemberton says. "He deserves it more than anyone. The old postdocs have been calling here all day really happy about the news."

Some former lab members are now faculty members at Rockefeller. Assistant Professor Mike Rout, who worked in Blobel's lab for seven years, found out about the Nobel honor when a reporter for National Public Radio called him at home asking for



Günter Blobel stands with fellow Nobel laureate James Watson (left) and Qais Al-Awqati at the reception at Barbetta Restaurant Monday evening. Al-Awqati, Blobel's close personal friend of 40 years, is a physician in the Department of Medicine at Columbia University College of Physicians and Surgeons. Photo by Elias Coutavas

help in tracking down Blobel.

"It's absolutely wonderful," says Rout, who was born and educated in England but came to Rockefeller because of Blobel's reputation. "It couldn't be more well-deserved. Günter is a fabulous researcher and person. In all respects, he is certainly one of the brilliant biologists of the century. It was a tremendous privilege to work with him in his laboratory. He has always been amazingly generous."

Bobel's generosity was displayed in another way, when he announced that he will donate his prize money, \$960,000, to rebuild historical structures in Dresden, Germany and Fubine, Italy. Enninga, was particularly impressed by Blobel's gesture.

"I think it's a great sign for peace," he says. "It's a way of saying 'we will not let the crimes of war destroy an entire cultural life.'"

Molecular ZIP codes shuttle proteins around cell

By Joseph Bonner

Professor Günter Blobel was awarded the Nobel Prize for his work on translocation, the process by which newly made proteins are transported across the membranes of cell structures called organelles. Work in Blobel's laboratory revealed the existence of a ZIP code system in the cell. Each newly made protein has an organelle-specific address, a stretch of the protein referred to as a signal sequence that is recognized by receptors on an organelle's surface. Blobel and his colleagues also showed that, for at least one organelle called the endoplasmic reticulum, the binding of the signal sequence to its receptor opens a watery channel in the membrane through which the protein can travel. Because the accurate distribution of proteins to their proper places in the cell is necessary for a cell to function, these findings have an immediate bearing on many diseases, including cystic fibrosis, Alzheimer's disease and AIDS, and on the pharmaceutical industry.

An average cell possesses about a billion protein molecules that exist in thousands of types and constantly need replacement. Making proteins and shipping them to appropriate destinations, such as the cell's internal organelles, is a vital activity in cells. Proteins are manufactured by cellular structures called ribosomes. Up until the early 1970s, the mechanism by which proteins are transported from ribosomes and integrated into other organelles or transported out of the cell remained unknown. To try and solve this mystery, Rockefeller researchers David Sabatini (now at New

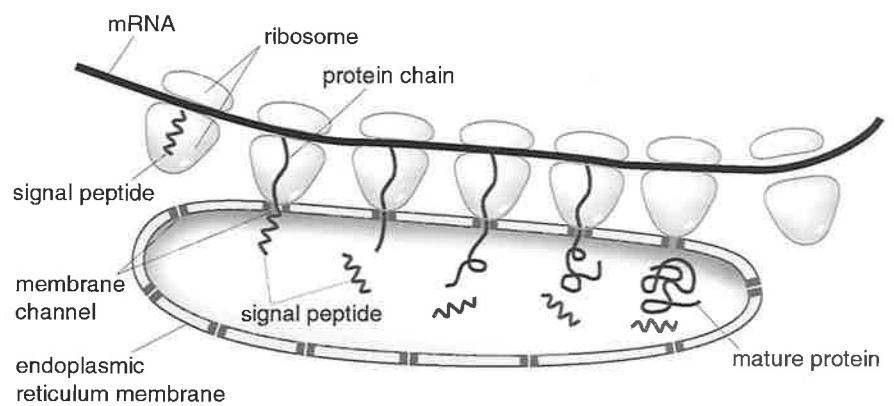
York University) and Blobel proposed what they called the signal hypothesis, in which a signal sequence—a short stretch of amino acids—allows the ribosome to attach to the membrane of the endoplasmic reticulum, an organelle responsible for synthesizing proteins. As translation continues, the protein, led by the signal sequence, passes through the membrane and the signal sequence is cleaved off.

Blobel decided to test this hypothesis by mimicking the translocation process in a test tube. Blobel set up a cell-free system containing mRNA and microsomal membranes isolated from liver cells in a rat, but the membranes blocked the synthesis of the protein (translation). Cells taken from organs of other animals also inhibited translation until he decided to use dog pancreas cells. When he studied the translation products on an SDS gel, he found that they migrated faster than the precursors of the proteins made without the membranes. Blobel concluded that when a protein is translocated across the microsomal membrane, the signal peptide is cleaved off, producing a protein that migrates faster in the gel.

Blobel and researchers elsewhere went on to show that proteins associated with all types of cellular compartments—mitochondria, chloroplasts, etc.—used different signal sequences, or ZIP codes, to target membranes.

"There are thousands of cellular proteins that have to be transported across very specific membranes," says Blobel.

Research in Blobel's lab began to dis-



In the signal hypothesis, a signal peptide is formed as a part of the protein. With the help of binding proteins, the signal peptide directs the ribosome to a channel in the endoplasmic reticulum. The growing protein chain penetrates the channel, the signal peptide is cleaved, and the completed protein is released into the lumen of the endoplasmic reticulum. The protein is subsequently transported out of the cell.

Photo courtesy of Nobel Foundation

sect the translocation process into the endoplasmic reticulum. In 1980, he and his colleagues discovered the signal-recognition particle (SRP), and then its receptor on the endoplasmic reticulum membrane. They showed that the SRP, which consists of RNA and six polypeptide chains, recognizes the signal sequence and directs the whole complex to the SRP receptor on the membrane.

In the early 1990s, Blobel and Associate Professor Sanford Simon showed that the signal sequence is the key that opens a protein-conducting channel through the endoplasmic reticulum membrane, enabling translocation.

Current research in Blobel's laboratory also explores the movement of proteins across nuclear pore complexes (NPCs), huge protein units suspended in the circular openings within the membrane of

a cell's nucleus. NPCs can accommodate the passage of large molecular assemblies, such as RNA or DNA bound to proteins. Each NPC mediates as many as 10 import and 10 export events per second. His laboratory recently determined the three-dimensional structure of a complex of transport factor called karyopherin- β 2 and Ran, which binds to proteins and targets them to the NPC.

Blobel says that the picture of protein translocation is far from complete. "It is like a mosaic, made up of very beautiful stones," says Blobel. "But when you get close, you notice that some stones are missing."

"You may be able to make out the outline of a face, for example, but some of the features are difficult to distinguish. Our job is to complete the mosaic."

Call, continued from page 1

mail of the pending news conference, appointed Mariellen Gallagher, vice president for communications and public affairs, and Professor James Darnell as hosts.

"For all these achievements, we have recognized him for many, many years as a cherished colleague," Darnell told the audience. "Today he gets worldwide recognition."

Reflecting on his work, Blobel acknowledged the support he has received from the Howard Hughes Medical Institute for more than 10 years, and noted the inspiration he receives from "coming here in the morning, walking in the footsteps of...all the other important scientists who have done major breakthrough discoveries."

Taking questions from the audience, Blobel also thanked his wife, whom, he

said, "has tolerated the long hours in the lab." Purnell Choppin, a former Rockefeller professor and now president of HHMI, said that the Nobel Prize happens when "you take a brilliant and innovative scientist like Günter and put him in a place like Rockefeller, which for almost 100 years has been dedicated to pursuing biological research at the basic level."

The New York Times reported that Blobel's comments about disappointments in research, "such as when your grants and papers are rejected," drew "thunderous applause from the hundreds of sympathetic colleagues and younger scientists who packed the auditorium."

Near the end of his remarks about his research, Blobel showed some slides of the German city of Dresden. Blobel recounted witnessing the bombing of Dresden in 1945 when he was eight and a half years old and the ensuing



President Levine toasts Günter Blobel at the President's House last Tuesday night. Photo by Paul Schmeck

firestorm. He then announced that he was going to donate most of the \$960,000 prize to a philanthropy he founded four years ago called Friends of Dresden for the restoration of the historic Frauenkirche and a synagogue that were destroyed during World War II. The rest of the prize money will help to restore part of the historic center of his wife's hometown of Fubine in Piemonte, Italy.

President Levine and his wife Linda, who were at a reception at Blobel's wife's restaurant Barbetta Monday evening, hosted a reception at the President's House the following night. At the President's House, he said Blobel's Nobel Prize "means a lot inside the university, from the security guard right through to the president."

"And outside the university it means that this institution has yet another prize that's very visible. We have quietly labored doing science here and the good visibility, I think is good for New York City and the university. I think Günter has given us something both inside and outside the institution."



David Rockefeller (center) talks with President Levine and Günter Blobel. Rockefeller rushed back to New York after hearing the news on the radio at his home in Maine. Photo by Paul Schmeck

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As proof of this, Mayor Rudy Giuliani declared Thurs., Oct. 14, "Dr. Günter Blobel Day" in New York City.

<http://www.rockefeller.edu/rucal>

THE ROCKEFELLER UNIVERSITY—*Please post*

FRIDAY, OCTOBER 15

8:30 a.m. **Virtual Higher Education? Critical Perspectives.** Neil Postman, Dept. of Communication and Culture, NYU; David Noble, York U., Toronto; Starr Roxanne Hiltz, NJIT; Robbie McClintock, Teachers College, Columbia U., and others. Symposium. 714 Hunter West Building, Hunter College, 68th St. at Lexington Ave. Admission is Free. All are welcome. Walk-in registration will be available, space permitting. For on-line registration or more information visit <http://sonhouse.hunter.cuny.edu/virtual/> or contact Henry Moss, hmoss@nyas.org or 838-0230x410.

12:00 p.m. **Building a Cellular Switch: New Lessons from the MAP Kinase Cascade.** James E. Ferrell, Associate Professor, Dept. of Molecular Pharmacology, Stanford U. School of Medicine. Cell Biology Seminar. F-539 NYPH-WMCCU, 1300 York Ave.

12:00 p.m. **Genes for Estrogen Receptors and Their Physiological Consequences in Mice.** Kenneth S. Korach, Director, Environmental Disease and Medicine Program, and Chief, Laboratory of Reproductive and Developmental Toxicology, NIEHS, NIH. Lecture. 301 Weiss.

12:00 p.m. **Processing of Apoptotic Cells in Relation to Autoimmunity.** Keith Elkon, Professor of Medicine, HSS, WMCCU. Immunology Seminar. 117 Whitney, WMCCU, 1300 York Ave. Contact Michele Lavarde, 746-6452.

MONDAY, OCTOBER 18

9:00 a.m. **The Molecular Flying Circus: Innovations in Biological Mass Spectrometry.** A Symposium Celebrating the 25th Anniversary of the NIH-funded National Resource for the Mass Spectrometric Analysis of Biological Macromolecules at The Rockefeller University. Co-Sponsored by the Pels Family Center for Biochemistry and Structural Biology. Caspary Auditorium. Contact Gladys McMilleon, 327-8847.

12:00 p.m. **Fusion-competent HIV Immunogens Targeting the Functioning Envelope Protein.** Jack Nunberg, Director, Montana Biotechnology Center. CFAR Seminar. 6th Floor Conference Room, ADARC, 455 First Avenue.

4:00 p.m. **Function of Lutheran and LW Glycoprotein in Health and Disease.** Frances A. Spring, Senior Research Scientist, Bristol Institute for Transfusion Sciences, U.K. LFKRI Research Seminar. Lower Level Conference Room, New York Blood Center, 310 East 67th St. Tea at 3:45 p.m. Contact Rosanna Martinez, 570-3357.

4:30 p.m. **Genetic Aspects of Atherosclerosis.** Jan L. Breslow, Professor, RU. PBMM Research Seminar. Weill Auditorium, WMCCU, 1300 York Ave.

TUESDAY, OCTOBER 19

2:00 p.m. **Nucleoside Diphosphate Kinase: A Protein That Phosphorylates Anti-HIV Drugs and Also Displays DNA Binding Activity.** Michel Vernon, Dept. of Molecular Biology, Pasteur Institute. Seminar. 305 Weiss.

Join us in toasting
Günter Blobel, Rockefeller's
20th Nobel laureate,
and our other
1999 award-winning faculty
whose scientific achievements
brought worldwide
recognition and honor to our
research community.

Campus celebration will
be held Monday, Oct. 18,
from 5 to 5:30 p.m.,
outside on the front steps
of Founder's Hall.

3:00 p.m. **Cellular Signaling by Tyrosine Phosphorylation.** Joseph Schlessinger, Professor, NYU Medical Center. Seminar in Cancer Biology. Caspary Auditorium. Contact Jill Benz, 327-8092.

WEDNESDAY, OCTOBER 20

10:00 a.m. **Structure, Electronics, and Reactivity in Metalloenzyme Catalysis: From Cupredoxins to Nitric Oxide Synthase.** Brian R. Crane, Beckman Institute, California Institute of Technology. Pels Family Center for Biochemistry and Structural Biology Seminar. 301 Weiss.

11:00 a.m. **Life and Death in Stationary Phase: Population Dynamics, Evolution, and Survival Mechanisms.** Steven Finkel, Postdoctoral Associate, Department of Microbiology and Molecular Genetics, Harvard Medical School. Lecture. 305 Weiss. Contact John McKinney, 327-7081.

12:00 p.m. **Delineating Genetic Pathways Mediating Susceptibility to Lupus Nephritis.** Edward K. Wakeland, Director, Center for Immunology; Professor and Chair, U. of Texas SW Medical Center. Seminars in Clinical Research. 110B Nurses Residence.

1:00 p.m. **The Ergonomics of Pipetting.** Judy Giberson-Smith, Sales Representative, Rainin Instrument Company. Seminar. 301 Weiss. Please RSVP to Stephen Tennbaum, 800-828-2788x386.

THURSDAY, OCTOBER 21

8:00 p.m. **Quantitative Genetic Variations and Essential Hypertension.** Oliver Smithies, Excellence Professor, Department of Biology and Laboratory Medicine, University of North Carolina. Harvey Society Lecture. Caspary Auditorium.

FRIDAY, OCTOBER 22

11:00 a.m. **Biophysical Applications of Modern Electron Spin Resonance: Structure and Dynamics of Proteins, Lipid-Protein Interactions.** Jack H. Freed, Professor, Dept. of Chemistry and Chemical Biology, Cornell U. Seminar. B Level Conference Room, Smith Hall Annex.

1:00 p.m. **Presentation of Exogenous Antigens to Cytotoxic T Cells: Intracellular Routes for Cross-priming.** Sebastian Amigorena, Director of Research, Curie Institute. Lecture. 301 Weiss.

MONDAY, OCTOBER 25

4:00 p.m. **Bipolar Frogs, Lithium, and Wnt/Frizzled Signaling.** Peter Klein, Assistant Professor of Medicine, Dept. of Cell and Molecular Biology, U. Penn. School of Medicine. Cell Biology and Genetics Seminar. Weill Auditorium, WMCCU, 1300 York Ave.

5:30 p.m. **Stopping Science?** Harold Shapiro, President, Princeton University. Zanvil A. Cohn Forum on Health Affairs. Abby Dining Room. Wine and cheese at 5:00 p.m. in the Abby Lounge. Contact Gloria Phipps, 327-8967.

WEDNESDAY, OCTOBER 27

10:00 a.m. **Chemical Approaches to Dissect Kinesin Function.** Tarun M. Kapoor, Dept. of Cell Biology, Harvard Medical School. Pels Family Center for Biochemistry and Structural Biology Seminar. 301 Weiss.

12:00 p.m. **Adherent Bacteria Activate Ca²⁺-Dependent Signaling Cascades in Respiratory Epithelial Cells.** Alice Prince, Professor of Pediatrics, Columbia University College of Physicians and Surgeons. Seminars in Clinical Research. 110B Nurses Residence.

3:45 p.m. **Biosynthetic Lessons from the Ginkgo Tree.** Duilio Arigoni, Laboratory for Organic Chemistry, Swiss Federal Institute of Technology, Zurich. Frederick S. Philips Memorial Lecture. Auditorium, Rockefeller Research Laboratories, MSKCC, 430 East 67th St. Tea at 3:15 p.m.

THURSDAY, OCTOBER 28

12:00 p.m. **Gonadotropins and Their Receptors: Studies on Structure and Function.** Rajan R. Dighe, Associate Professor, Department of Molecular Reproduction, Development, and Genetics, Indian Institute of Science. Endocrinology and Reproductive Biology Seminar. 301 Weiss.

4:00 p.m. **Growth Hormone in Milk and Human Health.** Martin Sonnenberg, Professor of Medicine, WMCCU; Attending Physician, MSKCC. CNRU Special Nutrition Lecture. F-539 NYPH-WMCCU, 1300 York Ave.

4:00 p.m. **Protein-Protein Interactions in the Malaria Infected Red Blood Cell and Effects on Function.** Ross L. Coppel, Professor, Dept. of Microbiology, Monash U. LFKRI Research Seminar. Lower Level Conference Room, New York Blood Center, 310 East 67th St. Tea at 3:45 p.m. Contact Rosanna Martinez, 570-3357.

4:00 p.m. **Using Computer Experiments to Design Prostheses.** Thomas Santner, Professor and Chair, Dept. of Statistics, Ohio State U. From Molecules to Mobility Seminar. Second Floor Conference Room, HSS, 535 East 70th St. Tea at 5:00 p.m.

THE ROCKEFELLER UNIVERSITY
Friday Lectures

These events are held in Caspary Auditorium at 3:45 p.m. Tea is served in Abby Aldrich Rockefeller Lounge at 3:15 p.m. All are welcome.

FRIDAY, OCTOBER 15

The New Genetics of Gene Expression. Richard A. Young, Member, Whitehead Institute for Biomedical Research, and Professor of Biology, MIT.

FRIDAY, OCTOBER 22

NMR as a Tool in Drug Research: Structures of Proteins Involved in Apoptosis and NMR-based Screening. Stephen Fesik, Senior Project Leader, Abbott Laboratories.

FRIDAY, OCTOBER 29

Death By Design: Mechanism and Control of Apoptosis. Hermann Steller, Professor of Neurobiology, HHMI, MIT.

FRIDAY, OCTOBER 29

11:00 a.m. **From Barrier to Efflux: The Function of Multidrug Efflux Transporters in Gram Negative Bacteria.** Hiroshi Nikaido, Professor, UC Berkeley. Seminar. 305 Weiss.

12:00 p.m. **Molecular Regulation of Intracellular Calcium Release Channels.** Andrew R. Marks, Professor of Medicine and Pharmacology and Director, Molecular Cardiology Program, Columbia University College of Physicians and Surgeons. Cellular Biochemistry and Biophysics Seminar. 116 Rockefeller Research Laboratories, MSKCC, 430 East 67th St.

The Arts and
Other Events

FRIDAY, OCTOBER 15

12:00 p.m. **Tri-Institutional Noon Recitals.** Tapestry, women's trio, with harp, vielle, and percussion. Caspary Auditorium. Open to RU/WMCCU/ NYPH/MSKCC community and guests.

WEDNESDAY, OCTOBER 20

8:00 p.m. **Peggy Rockefeller Concerts.** Audubon Quartet, performing Brahms' String Sextets. Caspary Auditorium. Contact Cathy Rogers, 327-8437.

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