

## E. B. WILSON MEDALISTS, 1986



It is a pleasure to celebrate the presentation of the 1986 E. B. Wilson Medal to David Sabatini and Günter Blobel. This award, named for Edmund Beecher Wilson, has been given annually since 1981. It is made in recognition of significant and far-reaching contributions in cell biology during the past 20 years. This is the highest award that the American Society for Cell Biology can bestow and it would be hard to find a more knowledgeable selection jury for an award in cell biology than the members of this Society.

David Sabatini is Frederick L. Ehrman Professor and Chairman of the Department of Cell Biology at the New York University School of

Medicine. He was born in May 1931 in Bolivar, Argentina. He obtained the M. D. degree at the University of Litoral in Rosario, Argentina. After an internship he moved to Buenos Aires, where he was on the faculty of the University of Buenos Aires Medical School and conducted research in the laboratory of Professor De Robertis. A Rockefeller Foundation Fellowship brought him to Yale University. It was at Yale, in a paper that is among the most quoted in biology, that he introduced glutaraldehyde as a fixative. He then moved to The Rockefeller University to the laboratory of George Palade, where he received the Ph.D. degree and remained as a faculty member until he became chairman of the Department of Cell Biology at New York University. David will add the E. B. Wilson award to a list of other honors, including his selection to give the third annual Keith Porter lecture to this Society. He has served the field of cell biology through his work with many advisory groups, editorial boards, and professional societies. The ASCB is one of the societies he has served as president. He has also served three terms as an editorial board member for the *Journal of Cell Biology*, in addition to other editorial duties.

Günter Blobel is Professor of Biology at The Rockefeller University. He was born in May 1936 in Waltersdorf/Silesia, Germany and received the M. D. degree from the University of Tübingen. Günter came to the United States to study for his Ph.D. degree at the University of Wisconsin in the laboratory of Van R. Potter. He then joined the group at The Rockefeller University as a postdoctoral fellow with Phil Siekowitz and George Palade and later was appointed to the faculty. Günter also adds the E. B. Wilson award to a list of other honors, including selection as this year's Keith Porter lecturer. His service to the field of cell biology includes his current duty as an associate editor of the *Journal of Cell Biology*.

I think E. B. Wilson would have been pleased with the

recipients of this year's award because their work has shed so much light on what was at his time a very shadowy part of the cell. Wilson's book *The Cell in Development and Heredity* (entitled *The Cell in Development and Inheritance* in earlier editions) speaks with authority on cytogenetics and developmental biology. There was less to say about the cytoplasm. Some of the larger cytoplasmic organelles, including mitochondria, Golgi, and centrioles, are described. Concerning the rest of the cytoplasm, Wilson says "The structure of protoplasm has always offered a problem of primary interest to students of the cell for it seemed that we might expect here to gain some insight into the mechanism of the protoplasmic activities.... It seemed a reasonable hope that at least some of the features of such an organization might appear in a visible structure of the protoplasm and this has led to a prolonged cytological study of the problem. If this hope has thus far had a rather meager fulfillment, the problem still remains a fundamental interest." Fortunately, the view of the cytoplasm has brightened markedly since that time.

Both separately and together, David Sabatini and Günter Blobel have made major contributions toward our understanding of the mechanism of one of the important "protoplasmic" activities, that is, the proper distribution of newly synthesized proteins within the cell so that the complex architecture of the cell is maintained.

Both David and Günter began to study the protein synthetic apparatus while working for the Ph.D. degree. Studies, primarily by the group at Rockefeller, had built up evidence that secretory proteins are synthesized on attached ribosomes and unidirectionally transported across the endoplasmic reticulum (ER) membrane into the cisternal space. David had shown that partially completed peptide chains were transferred directly into the interior of the microsome if membrane-attached polysomes were treated with puromycin, suggesting that this directional transport was cotranslational. When Günter moved to The Rockefeller University, he and David collaborated on a series of structural and biochemical studies on ribosomes and microsomes. On the basis of their studies, Günter and David proposed the signal hypothesis in 1971. This hypothesis postulated that proteins destined to be translated on membrane-bound polysomes have a common feature, such as a short amino-terminal sequence, that would be recognized by a binding factor in the membrane. This "signal sequence" would then ensure that exported proteins were translated on membrane-bound ribosomes and properly directed on the first step of the journey to their appropriate site.

A few years later Günter developed cell-free heterologous systems that were capable of the synthesis and translocation of secretory proteins. These cell-free systems have provided strong experimental evidence for the signal hypothesis. By this time David had moved to New York University and the two research groups have continued separately to add to our understanding of the regulation of the intracellular protein traffic of secretory, lysosomal and integral membrane proteins.

Günter and his associates have shown that virtually all

secreted proteins have a signal sequence that is later cleaved off the peptide. They also discovered and characterized the signal recognition particle (SRP). This is the component of the system that recognizes the signal sequence and directs it to the ER membrane, where the SRP is released by interaction with the SRP receptor. Much of what we know about the SRP receptor has also come from Günter's group along with the work of Dobberstein and Meyer. Günter and his group have also expanded their studies to mitochondria and chloroplasts and have shown that uptake of newly synthesized proteins in these organelles is posttranslational. They have suggested that there exist a number of "topogenic sequences" that target proteins to a variety of destinations in the cell.

David's laboratory has studied the synthesis and assembly of ER integral membrane proteins, showing that these proteins contain uncleaved signal sequences which play a second role in anchoring the peptide in the membrane. They have also defined two proteins, called ribophorins, that are found only in the rough ER and apparently participate in some way in the binding of the ribosomes to the membrane. The Sabatini group has extended its studies to the problem of how secretory and transporting epithelia maintain the polariza-

tion of the plasma membrane. They have developed an established epithelial cell line for studying this problem *in vitro*, and have shown that the surface from which the enveloped virus buds reflects the targeting of the viral glycoprotein to the plasma membrane. Influenza virus buds from the apical surface and vesicular stomatitis virus buds from the basolateral surface, yet proteins from the two viruses follow similar routes through the Golgi and only then are sorted to different destinations.

Of course this is not the end of the story. Both David and Günter are busy with other experiments and we can look forward to other contributions to cell biology. Today, however, we want to celebrate what Günter and David have already achieved, and to congratulate them both warmly on this award.

*Dr. Sabatini is currently at the Department of Cell Biology, New York University School of Medicine.*

*Dr. Blobel is currently at the Department of Cell Biology, The Rockefeller University.*

These remarks were made by Dr. Mary Lou Pardue, Past President of the ASCB, upon presentation of the medals.