EDUCATION

Merck/AAAS Research Program Expands to Become National

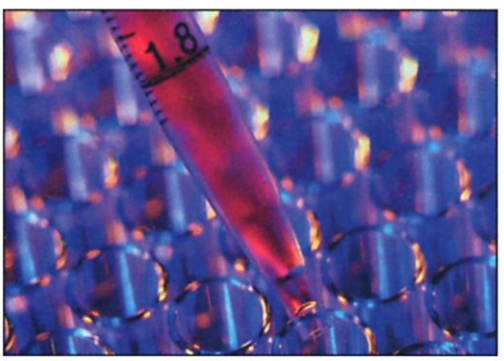
In 1999, students at 15 liberal arts colleges had an opportunity to learn firsthand what it was like to conduct a research project in chemistry and biology. At Swarthmore College, Rodolphe Boulanger studied *Agrobacterium tumefaciens*, a soil-dwelling bacterium that causes crown gall in plants, and Andrew Alderete looked at the *uspA* gene, which is induced in response to virtually any stress or starvation conditions. And at Williams College, Katy Schorling researched hay-scented fern (*Dennstaedtia punctilobula*), a plant found in the forests of the Northeast that has a tendency to overtake other plants and dominate in sunny areas.

The students' research projects were part of the Merck/AAAS Undergraduate Science Research Program (USRP), which facilitates interdisciplinary research experiences for undergraduate students in chemistry and biology, and encourages students to pursue graduate education in those fields. To date, the program has been available in 12 northeastern and mid-Atlantic states, but it will be expanded in 2001 into a national competitive awards program available to colleges and universities throughout the United States. The Merck Company Foundation has approved funding for the program through 2009.

Up to 15 new awards will be made each year from 2001 through 2009. Each award will provide $20,000 per year for up to three years and is intended for joint use by the biology and chemistry departments at the college or university receiving the award.

"By taking the program to the national level, we hope to support more interdisciplinary research by students in chemistry and biology and encourage students to pursue graduate education and careers in these fields," said Shirley Malcom, director of Education and Human Resources at AAAS. "It's important that we build bridges between these two fields of science and encourage scientific advancement in those areas."

Maureen Knab, a professor of biology at Westchester University, has seen how building bridges between the two fields



have helped her students. "It's quite beneficial for them to get that research experience, especially when you tie the two disciplines together," Knab said. "It ends up being a good model, especially since that's how things work in industry, with the two fields tied together."

Knab said that of the 18 students at Westchester who have participated in the Merck/AAAS program, six have gone on to graduate studies and nine have pursued careers in industry (three have not yet graduated). Some students, for example, entered graduate studies in molecular biology while others began working in clinical trials.

Program Goals

Specifically, the program is designed to encourage graduate education in the sciences by providing undergraduate research experiences that forge interdisciplinary relationships between biology and chemistry. In addition to directly supporting student research, a portion of the annual award may be used to support related academic programs such as lectures and symposia.

The program was launched in 1993 to promote undergraduate research at the interface of chemistry and biology. It was developed to educate students in small liberal arts colleges about modern biomedical research, and to inspire students to think about careers in drug discovery. The program emphasizes that students can derive great benefit from working across research boundaries and that chemistry and biology departments can often have great impact on one another.

Public and private colleges and universities must meet certain criteria to compete. They must be located in the United States, offer an American Chemical Society-approved program in chemistry and confer 10 or fewer graduate degrees annually in biology and chemistry combined.

Applications for the Merck/AAAS awards are reviewed and rated by a panel of scientists and educators chosen by AAAS. The panel recommends award selections to The Merck Company Foundation.

Application Deadline

The application deadline for the 2001–2003 awards is 10 November 2000. Winners of the 2001 awards will be announced by Merck and AAAS in February 2001 coincident with the AAAS Annual Meeting. Winners of the 2000–2002 awards include: Smith College; The University of the Sciences in Philadelphia; Amherst College; Purchase College, State University of New York; Hamilton College; Colgate University; Lycoming College; Merrimack College; The University of Richmond; Fairfield University; Manhattan College; Indiana University of Pennsylvania; Salisbury State University; Hofstra University; and Muhlenberg College.

The program affirms the value of undergraduate research experiences in the life sciences, according to Bennett Shapiro, executive vice president, Worldwide Licensing and External Research, Merck Research Laboratories. "The chance to do research as an undergraduate can be the single most defining event in a scientist's life, introducing the nascent scientist to the thrill of discovery," Shapiro said.

CORRECTION

There has been a change in the slate of candidates for the Section on Psychology ("AAAS Annual Election: Slate of Candidates," 30 June, p. 2384). The Electorate Nominating Committee slate that will be presented to the Section members in September follows: C. Sue Carter-Porges, Univ. of Maryland; Morton Ann Gernsbacher, Univ. of Wisconsin; Milton D. Hakel, Bowling Green State Univ.; Molly V. Wagster, National Institute on Aging.

EDUCATION

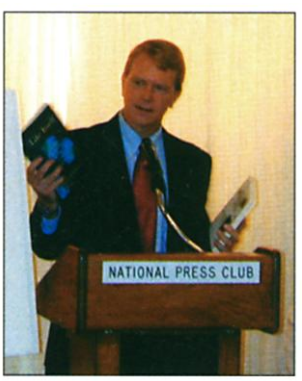
Biology Textbooks Do Not Tell the Story

The recent announcement of the completion of a draft version of the human genome holds great promise for increased understanding of how the human body works and how we can cure diseases. But will that promise be realized in the future if today's students—who are tomorrow's scientists—fail to understand the importance of biology and the implications of the human genome project?

According to the latest study by AAAS's Project 2061, today's high school biology textbooks fail to make important biology ideas comprehensible and meaningful to students, focusing instead on splashy graphics and vocabulary lists. The study pointed to serious shortcomings both in content coverage and instructional design.

"Surprisingly, although the textbooks are filled with pages of vocabulary and unnecessary detail, they provide only fragmentary treatment of some fundamentally important concepts," said George Nelson, director of Project 2061. "Providing bits of information about transmissions, carburetors, fuel injectors, universal joints, and cooling systems doesn't convey a sense of a car as a mode of transportation."

"Without good textbooks even the best teachers find it difficult to convey and illustrate important ideas about biology" Nelson said. "Few kids will learn much about biology by using these textbooks as intended."



George Nelson, director of AAAS's Project 2061, delivers the results of the biology textbook study at a news-conference.

In the evaluation of 10 widely used and newly developed biology textbooks, none were given high ratings. This is the latest in a series of evaluations by Project 2061 of science and math textbooks that are in wide use in K–12 schools.

To help students understand the human genome project, for example, the typical textbook presents a variety of information piecemeal: DNA is described in great detail, the steps of transcribing DNA through RNA are shown, RNA is shown to direct the synthesis of proteins, proteins are shown to catalyze other molecular interactions, and changes in genes and their consequences are described. But seldom are these ideas tied together to convey a coherent story, according to the study.

"The textbooks' piecemeal treatment of the topic either leaves out the simple story or obscures it in needless details. Unfortunately, the details are easy to give tests on and will often be substituted for a coherent picture that most students will never learn. Since the unconnected details are difficult to remember, student may be left with virtually nothing after a biology course," Nelson said.

School systems have relied on Project 2061's ratings in making their textbook selections. Andrea Bowden, chief of the Office for Science and Math Programs for Baltimore City Public Schools, has used the evaluations in choosing textbooks for Baltimore's students.

"The AAAS reviews highlight some significant flaws in the math and science textbooks available to our students," Bowden said "I'm frustrated that 15 years after the call for reform, we still don't have acceptable materials."

Even with the lack of quality textbooks, the reviews have helped Bowden to supplement the available texts. "We know what we want, but can't seem to find it between the pages of these textbooks. Some of the products we purchased may not be perfect, but now we know their weaknesses and how we can adapt."

Nelson gave several examples of how educators could address the weaknesses of their textbooks. He urged them to use some of the trade books that have been published on science topics, to revise classroom activities based on the research on student learning, and to develop more effective teaching strategies through professional development experiences.

Two independent teams of biology teachers, science curriculum specialists, and professors of science education evaluated each biology text, along with its teacher guide. The evaluation examines how well the texts are likely to help students learn the important ideas and skills in the widely accepted *Benchmarks for Science Literacy* (developed by Project 2061) and in the *National Science Education Standards*.

Jo Ellen Roseman, director of the study, said the textbooks ignore or obscure the most important ideas by focusing instead on technical terms and trivial details and including lavish illustrations that are too abstract or inadequately explained.

"The textbooks by sheer bulk and fancy display convey the idea they know the subject. Students who get good grades think they have learned something, but they really haven't," Roseman said.

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MEMBERSHIP

New AAAS Dues Rates Approved for 2001

The AAAS Board of Directors approved a dues increase for 2001 at its May meeting. The Board authorizes increases to cover two kinds of expenses: unavoidable costs associated with running AAAS and publishing *Science* and new expenses that add value to membership. Postage increases and developing new features for *Science* Online and other electronic products are examples of the kind of expenses the Board anticipated in setting the 2001 dues rates.

The new rates are effective for terms beginning after 31 December 2000. As listed below, they do not include postage for international members, which is additional.

Regular professional members	$115
Postdocs and K–12 teachers	$90
Emeritus members who receive *Science*	$85
Students	$65
Patrons	$250
Corporate	$1000
Spouse, supporting and emeritus members who do not receive *Science*	$51
Libraries and institutions	$370
High schools	$285

Full-text *Science* Online will continue to be available to members receiving *Science* for an additional $12 above dues. Institutions may purchase subscriptions to *Science* Online with site-wide desktop access or with access limited to workstations physically located in the library. For further information, librarians should contact AAAS or their catalog agents, or go to www.sciencemag.org/subscriptions/inst-sol-access.dtl on the World Wide Web.

All members whose membership term expires during 2001 will be advised of the new dues rates on their renewal notices.

Member dues and voluntary contributions form the critical financial base for a wide range of AAAS activities. For more information, contact the AAAS Membership Office at 202-326-6417, or www.aaas.org/membership/.