Blood test, 3-D graphics win top prize

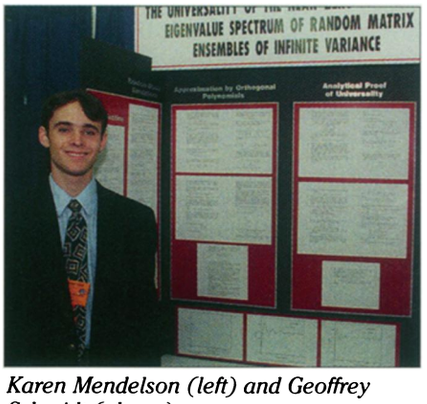
A painless, no-needle way of checking blood hemoglobin and a method of speeding up computer graphics took highest honors among nearly 1,200 entries in the 1998 Intel International Science and Engineering Fair.

The 49th annual fair opened May 10 in Fort Worth, Texas, with a big bang of festivities, including a rodeo. By the end, on May 15, some 740 students had won $2 million in prizes and scholarships.

The formidable competitors arrived from 34 countries. Eight students have already applied for patents on their work, and more than 100 others report plans to do so.

The noninvasive method of measuring hemoglobin came from 16-year-old Karen Mendelson of Worcester, Mass. She shared the top honor with 17-year-old Geoffrey Schmidt of Little Rock, Ark., who developed a way to hasten computer rendering of large, complicated, three-dimensional images. As the top winners, they will attend the Nobel prize ceremonies in Sweden this December.

Photos: Intel



Karen Mendelson (left) and Geoffrey Schmidt (above).

Schmidt also won one of the three $40,000 Young Scientist Scholarships awarded by Intel this year. The others went to Jonathan Kelner of Old Westbury, N.Y., for a study of quark behavior and to James Lawler of Greenwich, Conn., for a mathematical model of electric potentials at phase boundaries in a metal. Mendelson won one of the scholarships last year.

U.S. students dominated the awards for best of category, taking 11 of the 15 prizes. More than half of the $5,000 awards went to girls. In life sciences, the award in behavioral science went to Ashley Eden of Montgomery Blair High School in Silver Spring, Md., for work on color visual noise; biochemistry, Adam Bly, Herzliah High School in Montreal, for fusing a gene to green fluorescent protein; botany, Joseph Hastings of North Attleboro, Mass., for a project on the effects of ethylene; environmental science, Natasha Mensch, Tahoka (Texas) High School, for a study of the gasification of biomass; gerontology, Susie Morris, Carbon High School in Price, Utah, for checking aspartame's effects on learning in rats; medicine and health, Claire Heslop, Notre Dame Catholic High School, Carleton Place, Ontario, for a project on spina bifida; microbiology, Linda Arnade, Stone Junior High School, Melbourne, Fla., for looking at seasonal water contamination; and zoology, Andrew Shuman, Lawrence High School, Cedarhurst, N.Y., for comparing compounds involved in inflammation.

Other best of category honors were chemistry, James Lawler, Greenwich (Conn.) High School; computer science, Geoffrey Schmidt, Little Rock (Ark.) Central High School; earth and space sciences, Cristina Beno, Mast Academy, Key Biscayne, Fla., for groundwater studies; engineering, Mary Manning of Notre Dame Academy, Covington, Ky., for modeling bioelectrochemical fuel cells; mathematics, Anna Salamon, San Diego (Calif.) High School, for investigating factors of Fibonacci numbers; physics, Karen Mendelson of the Academy of Mathematics and Science, Worcester, Mass.; and team project, Chad Ganske, Amit Barman, and Jonathan Haines, James Wood High School, Winchester, Va., for an efficient computer operating environment.

Science Service of Washington, D.C., which publishes SCIENCE NEWS, administers the fair. —*S. Milius*

Looking at an alternative to aspirin

First synthesized 100 years ago, aspirin is a mainstay of the well-stocked medicine cabinet. A new compound, created by researchers at Vanderbilt University School of Medicine in Nashville, Tenn., and tested at Searle in Saint Louis, Mo., may someday provide the benefits of aspirin while avoiding the drug's unpleasant side effects.

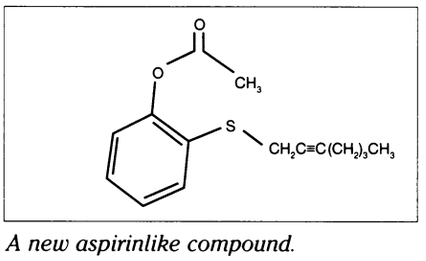
Most people know aspirin to be a fever reducer and pain reliever, but scientists have discovered recently that it combats other conditions too. For example, aspirin cuts the risk of heart disease and of colon and breast cancers, says Charles N. Serhan of Harvard Medical School and Brigham and Women's Hospital in Boston (SN: 6/14/97, p. 374). It acts by inactivating an enzyme called cyclooxygenase-2 (COX-2), which plays a role in inflammation.

The drawback, however, is that aspirin also inactivates cyclooxygenase-1 (COX-1), a related enzyme that produces prostaglandins, substances necessary for normal tissue function. Therefore, people who take aspirin regularly for long periods of time often develop stomach ulcers or kidney disturbances.

The Vanderbilt team's compound, an acetoxyphenyl alkylsulfide known as APHS, skirts these problems by selectively targeting COX-2, with which it reacts 15 times more readily than with COX-1. Aspirin, in contrast, reacts with COX-1 up to 100 times more readily than with COX-2.

Several aspirinlike compounds, including celecoxib, manufactured by Searle, are already being tested on people. Unlike those drugs, APHS causes irreversible changes in COX-2, permanently knocking out the enzyme. Irreversibility is good, says Serhan, because the action of the compound could be long-lasting, thus reducing the dosage needed.

Lawrence J. Marnett and his colleagues at Vanderbilt synthesized a series of aspirinlike molecules and found APHS to be 60 times more potent than aspirin in reacting with COX-2. The compound effectively blocked the action of the enzyme in both inflammatory cells grown in the lab and in rats. APHS also hindered the growth of colon cancer cells in culture.



A new aspirinlike compound.

To determine how APHS works, the researchers created mutant COX-2 enzymes and measured the compound's ability to block their action. APHS appears to inactivate COX-2 in a different way than other inhibitors do, they report in the May 22 SCIENCE.

After a century of aspirin use, "its beneficial aspects are still being appreciated," says Serhan. Considering that "14 billion aspirin tablets are consumed each year, more selective inhibitors could have a huge impact on major health concerns," he adds. —*C. Wu*