Young scientists reap talent search awards

When two billiard balls collide, do they always stick together for the same amount of time before bouncing apart — no matter how hard they hit one another? One young physicist began a search for the answer after playing a game of pool in his parents' basement. Around the same time, a student with an interest in the physiology of fat cells puzzled over the cause of obesity, and a budding biologist wondered why sea stars living in the tidal pools she visited on a trip to Maine turned themselves upside down, increasing their vulnerability to predators.

These curious young scientists, along with 37 others who undertook similarly inquisitive projects, were named as finalists this week in the 51st annual Westinghouse Science Talent Search, sponsored by Westinghouse Electric Corp.

The physics student discovered that two colliding balls spend the same amount of time in contact regardless of their impact velocity. The biologist found that sea stars turn upside down to soak up oxygen from the air when they can't get enough from the water. And the physiology buff found that fat cells in different parts of the body bind to different amounts of angiotensin II, a hormone involved in blood pressure regulation and cell growth.

The competition drew 1,705 entries. Nearly half of the 35 U.S. high schools represented in this year's list of winners placed a finalist for the first time. Nine finalists were born outside the United States: three in the Soviet Union, and one each in Canada, Hong Kong, Italy, the People's Republic of China, Spain and Vietnam.

"Every dedicated student — whatever his or her geographical or cultural background — has a shot at winning," says Alfred S. McLaren, president of Science Service, Inc., a nonprofit corporation that administers the search and publishes SCIENCE NEWS.

The 40 finalists will journey to Washington, D.C., on March 5 to participate in a five-day, all-expenses-paid Science Talent Institute, in which they will meet with leading scientists and tour local scientific institutions. On March 7 and 8, the students will share their projects with the public during a two-day presentation at the National Academy of Sciences.

In addition, the nine girls and 31 boys will compete for a total of $205,000 in scholarships during a series of interviews with a panel of eight scientists. The top three winners will receive prizes of $40,000, $30,000 and $20,000. Three others will receive $15,000 scholarships, and another four will earn $10,000 prizes. The remaining 30 finalists will each receive $1,000. All of the awards will be announced on March 9.

This year's finalists, aged 15 to 18, are:

CALIFORNIA: Anna Belle Kim, Alhambra H.S., Alhambra; Patrick Lee Purdon, Chula Vista H.S., Chula Vista; Annjoe Golangco Wong-Foy, Samuel Gompers Secondary School, San Diego; Amy Elizabeth Shaw, Santa Ynez Valley Union H.S., Santa Ynez.

DISTRICT OF COLUMBIA: Kiran Sridhara Kedlaya, Georgetown Day School.

FLORIDA: Michael Shayne Agney, Melbourne H.S., Melbourne.

GEORGIA: Kimberly Nicole Edwards, Benjamin E. Mays H.S., Atlanta.

ILLINOIS: Alexander E. Peppers, Lincoln Senior H.S., East Saint Louis; J. Patrick Crosby, Evanston Township H.S., Evanston.

KANSAS: Peter Gabriel Khalifah, Shawnee Mission South H.S., Shawnee Mission.

MARYLAND: Mark David Pilloff, Oxon Hill H.S., Oxon Hill; Zhuangzhuang Peng, Colonel Zadok Magruder H.S., Rockville; Benjamin Che-Ming Jun and Deborah Lynn VanderZwaag, Montgomery Blair H.S., Silver Spring.

MASSACHUSETTS: Claudine Deborah Madras, The Winsor School, Boston.

NEW HAMPSHIRE: Sanjay Shetty, Phillips Exeter Academy, Exeter.

NEW JERSEY: Patricia R. Bachiller, Scotch Plains-Fanwood H.S., Scotch Plains.

NEW YORK: Robin Ann Niles, Commack H.S., Commack; Steven Gene Friedenberg, Half Hollow Hills H.S. East, Dix Hills; Adam Andrew Abramson, Massapequa H.S., Massapequa; Erica Beth Goldman, Hunter College H.S., New York City; Boaz Aharon Weinstein, Midwood H.S., New York City; Igor Yakovlevich Tsukerman, Edward R. Murrow H.S., New York City; Christopher Marshall Linn Bouton, Saint Ann's School, New York City; Gabriel Martin Ortiz, Saint Francis Preparatory School, New York City; Leonid Natanovich Reyzin, Sinai Academic Center, New York City; John Alexander Abraham, Zachary Gozali, Vanessa Wun-Siu Liu and Michail Leyb Sunitsky, Stuyvesant H.S., New York City; Daihung Duong, Townsend Harris H.S., New York City; Oren Eisner and Adam Raymond Healey, Paul D. Schreiber H.S., Port Washington; Kurt Stephen Thorn, Shoreham-Wading River H.S., Shoreham; Edward John Newman, St. Anthony's H.S., South Huntington; Brian David Saunders, Clarkstown H.S. South, West Nyack.

PENNSYLVANIA: Gregory Robert Hoffman, John Piersol McCaskey H.S., Lancaster.

VIRGINIA: David Robert Derkits, Yorktown H.S., Arlington; Benjamin Joseph Raphael, Paul VI H.S., Fairfax.

WISCONSIN: Daniel C. Bradley, Turner Senior H.S., Portage.

New insights on a possible AIDS vaccine

A British scientist stumped AIDS vaccine researchers worldwide four months ago when he announced a startling finding: Macaques inoculated with human cells, but no virus, could fend off infection by the simian immunodeficiency virus (SIV), which causes an AIDS-like disease in monkeys (SN: 11/23/91, p.328).

At the time, some researchers speculated that the human cells had primed the monkeys' immune systems to make a type of antibody that could attack SIV as well as the foreign human cells. Now, experiments performed at Duke University Medical Center in Durham, N.C., rule out such a cross-reaction scenario.

The Duke team, led by Dani P. Bolognesi, reports in the Jan. 17 SCIENCE that blood serum taken from 10 monkeys successfully vaccinated with pieces of SIV did not cause uninfected human cells grown in the laboratory to clump together. Clumping would indicate that the serum contained antibodies against the cells.

However, Bolognesi's group also found that serum taken from 25 monkeys successfully vaccinated with whole, killed SIV *did* cause lab-cultured human cells to clump. The researchers attribute the clumping to antibodies the monkeys developed against human-cell proteins in the whole-virus vaccine.

Whole SIV viruses are usually grown in labware coated with human cells, whereas SIV pieces, or "subunits," are most often produced by cultures of genetically engineered insect cells.

As part of its study, the Duke team also analyzed serum taken from the first group of monkeys to be completely protected from SIV infection by a vaccine made of SIV subunits. Each of the four monkeys warded off SIV infection after receiving two injections, one consisting of a benign virus carrying a gene for a subunit of SIV, and a second consisting of the subunit itself. The results of this analysis appear in the Jan. 24 SCIENCE.

Bolognesi says his group's work supports the British finding while eliminating one possible explanation for it. He and his colleagues "are very keen," he says, to determine how the human cells protected the British monkeys from SIV infection.

"Once we figure this out, we might be able to capitalize on it," says Bolognesi, by using cell proteins from humans or animals to boost the effectiveness of vaccines made from subunits of the virus that causes AIDS. — *C. Ezzell*