Two STS finalists tie for top prize

This past week has been a high-powered one for the 40 finalists in the Science Talent Search, which is financed by Westinghouse Educational Foundation and administered by Science Service. The finalists received an all-expense-paid trip to Washington where they exhibited their STS-winning projects at the National Academy of Sciences and met with some of the top scientists in their fields of interest. Eight scientists decided, on the basis of both specific projects and overall potential as scientists, which 10 should receive some $90,000 in college scholarship money. This year, for the first time in STS's 39 years, two STS finalists have tied for top prize and will receive a $12,000 scholarship each. They are Lisa Joy Randall, age 17, of Stuyvesant High School, New York City, and John Michael Andersland, age 17, of East Lansing High School, East Lansing, Mich.

Randall's project consisted of a sophisticated paper on perfect numbers, a variation of a subject that has fascinated mathematicians since the time of the ancient Greeks. A perfect number is a positive integer equal to the sum of its positive integral divisors, other than itself. (The number six is a perfect number: one plus two plus three.) Her paper develops conditions about the form a special classification of numbers known as Gaussian integers must possess to be perfect. Randall plans to major in physics or chemistry at Harvard University.

Andersland, in contrast, submitted a project that attempted to define the mechanism by which white leaves are produced in African violets. To do this, he investigated two possible sources of the mutation: the chloroplasts contained in the leaves, which possess the mechanism for production of the material causing the green color, and the plant's nuclear genetic material. He also compared mutations artificially induced with those occurring spontaneously. Andersland plans to study botany at Michigan State University.

The third-place scholarship of $10,000 was awarded to Michael Vincent Finn, age 17, Lake Braddock Secondary School, Burke, Va., whose project related to a mathematical system he developed that he calls "groshing." He defines a "grosh" as a sum of the powers of the digits of a number. By iterating, or repeating, his "groshing" procedure, Finn produces a cyclic sequence of natural numbers. Finn was the only student to receive a perfect score in the 1979 National Math Exam and was a member of the U.S. team at the Mathematics Olympiad in London last summer.

Fourth-, fifth- and sixth-place scholarships of $7,500 each were awarded to Craig Richard Bina, age 17, Wheeling High School, Wheeling, Ill.; Melissa Willene Hull, age 17, Hunter College High School, New York City; and Bryan Edward Penprase of San Marino High School, San Marino, Calif. Bina developed a computer-assisted instructional management system as his project, which is now in use at six of his district's eight high schools. He plans to study physics and astronomy at the Massachusetts Institute of Technology. Hull's project concerned the genetics of yeast. She analyzed the metabolic characteristics of certain yeast mutations that can live and grow in the presence of glucose and maltose, sugars that usually inhibit growth. She plans to major in physics at Princeton University. Penprase studied the biochemical effects of two sulfhydryl reagents, one that inhibits nerve functioning and one that reverses the inhibition, on nerve-nerve junctions. He plans to study physics or biology at Dartmouth College.

Four scholarships of $5,000 each were awarded to Naomi Taylor, Benjamin N. Cardozo High School, Bayside, N.Y.; Paul Neil Feldman, Stuyvesant High School, New York City; Pamela Lynne Epstein, Merritt Island High School, Merritt Island, Fla.; and David Chiang, Bronx High School of Science, New York City. □

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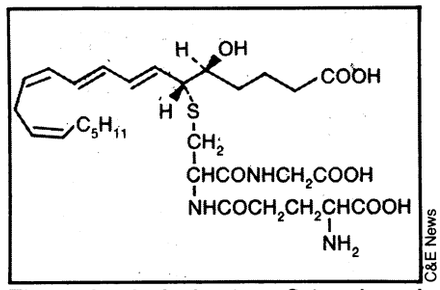
Tied for first place: Randall and Andersland.

Allergy antagonist no longer elusive



C&E News

The molecule leukotriene C is released during asthma attacks or anaphylaxis.

A fugitive molecule involved in asthma and severe allergic reactions called anaphylaxis finally has been nabbed by Harvard researchers. Elias J. Corey and colleagues report in the Feb. 13 JOURNAL OF THE AMERICAN CHEMICAL SOCIETY "the first total synthesis" of the "slow-reacting substance" leukotriene C.

Leukotriene C is named for leukocytes, one type of blood cell in which it is found, and for the set of three double bonds, or "triene," it contains. This substance is released when antibodies on the cells of the lungs react with foreign molecules — drugs or pollen, for example. A powerful muscle contractant, leukotriene C causes constriction of small airways of the lungs, resulting in the wheezing and labored breathing characteristic of an allergic reaction. The powerful muscle contractant differs from histamine, another muscle contractant involved in certain allergies, in that it takes effect more slowly and is longer-acting.

Australian researchers discovered nearly 34 years ago that allergic reactions induced in guinea pigs produce both histamine and another mysterious, more complex substance. Up until Corey's recent synthesis of the "more complex substance," leukotriene C had successfully eluded the chemist's grasp because it is present in body tissues in only picogram (trillionths of a gram) quantities and because of its unusual structure. In fact, a previously announced (SN: 6/16/79, p. 392) proposed structure for leukotriene C was geometrically incorrect and had only a single amino acid for the three amino acids — the peptide glutathione — reported in the corrected version.

Now that the corrected structure has been tested and verified by Bengt I. Samuelsson and colleagues at the Karolinska Institute in Sweden, the path is paved for future production of anti-leukotriene C drugs to combat asthma. "We now know its structure in all detail and can produce this substance in any amount required for medical studies," Corey says, "and that's a step in the direction of ascertaining the underlying causes of hypersensitivity and asthma." □