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Biotech brainiacs

Gene Connection group
teaches the DNA basics



David Sototmayor (left), 15, and Brian Pang, 14, had teacher Colleen Coolish check their DNA experiment.

By Julie N. Lynem
CHRONICLE STAFF WRITER

Rocelle Aglugue, a sophomore at Daly City's Jefferson High School, is blunt about her distaste for science. "I've just never been that interested in it," she said, matter-of-factly.

Yet on a recent school day, Aglugue had no trouble stepping into the role of forensic scientist in teacher Colleen Coolish's biology class. Aglugue, 15, and her classmates were asked

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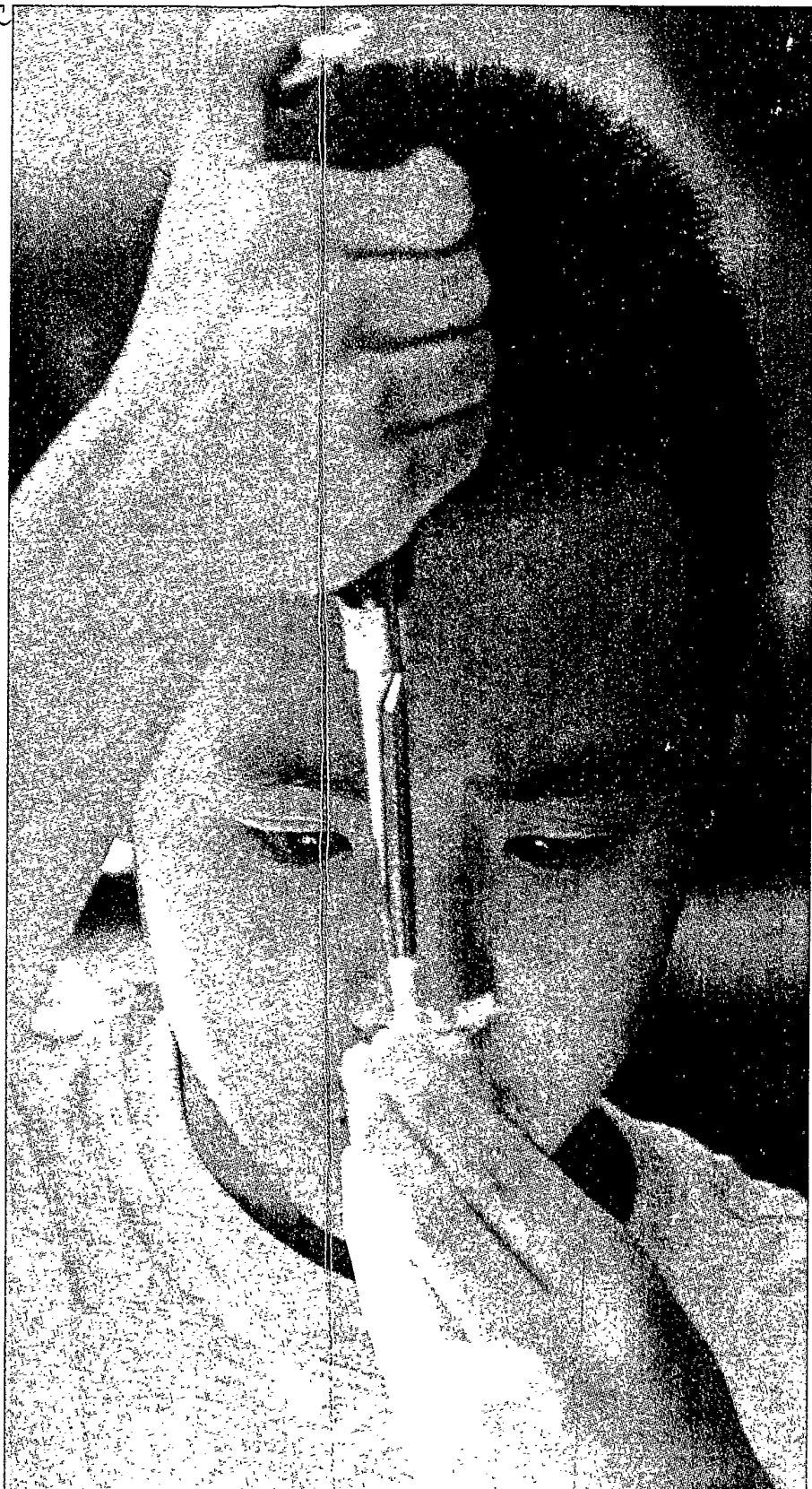
ROCELLE AGLUGUE,
sophomore at Daly City's
Jefferson High School

to analyze a simulated DNA fingerprint to solve an imaginary crime. Before getting started, the students double-checked to make sure their micropipettes — a scientific tool akin to an eyedropper that transfers liquid — were clicked to the proper setting and a tray of test

tubes containing DNA samples were labeled correctly.

"I guess it is better than listening to boring lectures every day," she said.

Like Aglugue, thousands of Bay Area students are rethinking their aversion to science because of Gene Connection, a biotechnology education program in San Mateo County that is giving youths — and not just those in Advanced Placement or honors classes — an opportunity to use high-tech equipment to conduct lab experiments that they



Photos by LIZ HAFALIA/The Chronicle

Jefferson High School student Anthony Lu, 16, practiced micropipetting bacteria into tubes. He is learning to do DNA fingerprinting in science class, which includes lessons in biotechnology.

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Bay Area students learn biotechnology basics

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have seen on television or read about in newspapers. Similar programs are operating in Santa Clara, Alameda, Contra Costa and San Francisco counties.

Students learn about genotypes, or genetic code, and phenotypes, the physical characteristics coded by a particular gene. They learn about electrophoresis, a technique for separating and analyzing charged molecules, and they even get to examine their own cheek cell DNA.

And while teachers admit that the Gene Connection labs probably won't transform all of their students into biotechnology buffs, they say the program is creating a spark in some youths who have long perceived science as dull and irrelevant.

"Sometimes, students think science is only for people in white coats, . . . people who are nerdy," said Pat Seawell, a Gene Connection coordinator and president of the Bay Area Biotechnology Education Consortium. "A lot of the fear of science is that people don't understand what it's all about. This takes the mystery out of it."

Gene Connection was founded in 1990 by three Peninsula educators — Kathy Liu of Westmoor High School in Daly City, Stan Ogren of Menlo-Atherton High in Menlo Park and Sue Black, an Aragon High School teacher in San Mateo. The teachers came up with the idea after attending a two-week biotechnology class at San Francisco State University and were eager to share their knowledge with students.

"We want them to understand what it means when we talk about genetically altered corn so the kids are not freaked out by that," said Jefferson High's Coolish. "Even if students don't want to go on to pursue a career in biotech, at least they'll have the skills and the knowledge to make informed decisions."

Realizing that outfitting school labs with biotechnology kits would be too expensive on their teachers' salaries, they wrote a grant to the Genentech Foundation for Biomedical Sciences.

The foundation and the San Mateo County Office of Education combined to finance one biotechnology kit that first year,

which allowed teachers to conduct the hands-on labs at all three schools. Since then, Gene Connection has obtained four more kits, courtesy of the Genentech Foundation and other foundations and corporations, which educators cart from school to school. So far, about 42,000 Bay Area students — both public and private — have participated in Gene Connection labs.

During a recent lab, students in Coolish's class at Jefferson used DNA fingerprinting techniques to solve a make-believe mystery. The assignment was to determine whether the late Anna Anderson, a woman who had claimed to be Anastasia, was the daughter of the last Russian Czar Nicholas.

With the help of a scientist, the students used DNA samples from a bacteria to simulate DNA from Anderson and three other "suspects," one supposedly being was a distant relative of the Russian czar. The students then incubated the DNA samples with restriction enzymes, which are "chemical scissors" that cut DNA into variably sized fragments based on a particular genetic coding sequence. DNA varies so greatly from one person to another that the chances of two people sharing the same fingerprint DNA is almost slim to none.

The students separated the DNA fragments using electricity, and then stained and photographed the fragments so the individual patterns could be studied on film. After examining the evidence, the students concluded that Anna Anderson was a fraud. Anderson's DNA pattern did not match that of the royal relative.

"This is one of my favorite classes," said Henry Vallabares, a 16-year-old sophomore. "It's amazing how scientists can figure things like this out."

Hilary McFarland, 16, said the hands-on labs help the class to work as a team.

"When we're interested and doing things as a class, we just really get into it," she said.

Even Rocelle Aglugue was impressed enough to give science a chance.

"When you get a chance to do the hands-on labs, you do understand it better," she said.

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