This summer, eighteen LAB program students from various schools took part in the Summer Bridge Program – a two week Environmental Biotechnology/Drug Development course, generously sponsored by Amgen, that took place at Ohlone College’s Newark Center for Health Sciences and Technology.

Bridge students conducted two major projects during the program. The first was to determine which version of a bitter taste receptor was encoded in their genomes. To do this, students extracted DNA from their own cheek cells. Using Polymerase Chain Reaction (PCR), they amplified the gene that encodes the receptor protein responsible for the ability to taste bitter flavors. By carrying out DNA sequencing reactions, purifying products, and learning how to load an automated DNA sequencer, students were able to analyze sequences of their own taste receptor genes.

For the second project, students conducted drug discovery labs to learn how bacteria and fungi produce antibiotics. They were given lab strains of bacteria that produce antibiotics and given four test strains that could be used to determine antimicrobial properties produced by the lab strains. They designed their own experiments, testing assays for antibiotic production, and were challenged to collect soil samples that might host Streptomyces strains.

In addition to participating in labs, Summer Bridge students attended presentations given by industry and Ohlone representatives. Two representatives from Genencor came into the classroom for a half-day discussion with students about what it’s like to work at a biotech company, how enzymes are produced, and what specific educational training is useful for entering the biotechnology workforce. On another day, students talked to a counselor from Ohlone College, learning the basics of college, how it differs from high school, and the difference between various higher education institutions.

The Summer Bridge Program was a valuable learning experience that students found entertaining and educational. Participants who completed the entire two weeks were granted an Ohlone Scholarship, available to them once they joined the LAB Learning Community at Ohlone’s Newark Center.
There are currently 57 students that take the ROP Biotechnology class at Tracy High School in Tracy. What differentiates this program from other LAB classes are the multiple levels of students and the mentoring that takes place on a daily basis. There are students that come in five days a week, three days a week, or two days a week, and all of that is multiplied by three different years. So the second year students mentor the first year students and the third year students mentor the second year students while primarily working on independent work.

This structure mimics the mentoring that takes place in most laboratories across the country – when a new person joins the laboratory, they are paired with someone who knows what to do and they are mentored until they understand how to do the work assigned. Not only is the mentoring environment stressed, there is a real emphasis on skills that are used on a daily basis in a biotech lab. Students learn how to make solutions, sterilize broth and agar with an autoclave, make streak plates, calculate the amount of bacteria in a liquid culture, use a spectrophotometer to take Optical Density readings, and so on. Over the course of a year, students will run two types of gels, do Real-Time PCR, make plasmids and purify them, make proteins and purify them, do ELISA tests, Western Blots, and conduct an original research process. By the time they are done with the program, students should have the skills to either get placed in a research lab while going to college or have the basic skills necessary to progress in their training and go to work.

Fifty biotechnology students participated in Mr. Daniel Johnson’s annual Biotechnology Products Fair at Newark Memorial High School. Students prepared poster presentations in small teams on a creative idea for a product that can be made with biotechnology. Students then tried to sell their “product” to interested “investors” that visited the exhibits. At the end, the teams with the most creative idea that captured the most sales were named the winners.

For the first period, Kristian Fuentes, Hal Starrat and David Parks took first place with an awesome idea to engineer bacteria that “eat” plastic for cleaning up the environment. The second period winners were Renae Waldschmidt and Gretchen Carvajal who presented an elaborate idea to engineer odorless onions by putting properties of stainless steel into the vacuoles of the onions and neutralizing amino acid sulfoxides that cause smell and tears.

Another team presented a “miracle” product for cancer patients who lost hair. The team proposed to make this product with collagen and vitamins that make hair grow healthier when applied. There was a clever product application to dissolve blood clots with cytokines and another product was a nasal spray for clearing nasal passages with friendly bacteria that eat mucus.

These and many other creative ideas were impressively presented by our future professionals.
The past three years have seen a terrific biotech program come into existence. Here at Enochs High School in Modesto, what began with 156 students in August of 2006 has grown to well over 420. Using forensics as the hook, with biotech as the skill set, we now offer 14 sections of classes ranging from Forensic Biotech years 1-4 and an anatomy/physiology class with a forensics emphasis. Years 1-3 use a spiral curriculum aligned to California State Standards integrated science tests. Year four is a research methods course taught by our own Carol Schutt, who has taken charge of the latest phase of the Enochs program: the Forensic Biotech Partnership Academy. Given funding by the California Department of Education to address the needs of both at risk and mainstream students, the program now seeks to broaden its base.

Ohlone College concluded a groundbreaking 2+2 agreement with the Enochs program: the Forensic Biotech Partnership Academy. Given funding by the California Department of Education to address the needs of both at risk and mainstream students, the program now seeks to broaden its base.

Enochs students have successfully completed the third year of the program and are preparing for a summative lab exam that determines if the Enochs students have mastered the skills that are required in Ohlone’s Biotech 105 course. This year, eight Enochs students successfully passed the exam. Business partnerships and community support continue to be outstanding for the Enochs program. For example, a $238,000 grant was awarded in 2007 and used in 2008 to develop a plan for attracting bioscience jobs to the Central Valley. This was spearheaded by the local Alliance Worknet, a community workforce development organization. Ohlone College is well represented on the bioscience committee along with Enochs High School. The California Department of Education awarded the program an additional $50,000 as part of its Specialize Secondary Program funding, and the new Academy received substantial support as well.

In late summer, the Enochs program was honored in the local press as an exemplar program that will be used to model new ones under the new Ford Foundation grant to develop partnership academies for regions undergoing severe economic stress.

Twice during the 2008-2009 school year, Enochs Forensic Biotech Leadership students organized and promoted Fun With Science Night outreach events that have served more than a thousand elementary and middle school students and their parents. During these events, Enochs program students demonstrate many of the labs used in the courses, while teaching core science concepts to their younger peers. During last summer, Enochs Students were invited to represent both their high school as well as the National Ag Science Center to be built in Modesto. The demonstrations of biotech lab techniques were taped and resulted in one Enochs student being offered a summer internship at a local beverage company by the president himself.

During the past year, Enochs students have garnered a number of site and district awards. Some have graduated and are now attending as science majors in school such as UC Davis, UOP, UC Merced, and others. Carol Schutt was honored as an outstanding teacher by Chapman College. Fellow teacher Dave Menshew was selected as the 2009 Biotech Teacher of the Year by the Biotechnology International Organization.
Mission Statement:
Our goal is to implement the LAB project into local area high schools in hopes of increasing the number of underrepresented students that enter into Biotechnology and/or other scientific disciplines. In addition, we aim to improve teaching and learning strategies through faculty development and support student learning through tutoring and mentoring programs. The programs will develop and grow through collaboration with industry and educational institutions to incorporate emerging technologies, thus improving the quality of education and opportunities for their students and communities.

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METABOLEX MENTORING DAY

Last spring, students from James Logan and Kennedy high schools attended a Mentoring Day at Metabolex, a Hayward biotech company that develops drugs to treat type 2 diabetes.

Students began the day by listening to Harold Van Wart, Ph.D., Metabolex’s CEO, give a presentation on drug discovery, why it is important, the difference between “big pharma” and biotech, and how he got interested in science. Following that, there was a presentation on understanding diabetes.

Students also sat in on mini presentations about the research, chemistry, biology, and clinical development processes of drug development. After learning all about drug development and diabetes research, the group went on a tour of Metabolex facilities. At lunch, they played a Biotech Jeopardy game. Afterward they split into three Q&A break-out sessions about Med Chem, Biology, and Clinical topics.

The LAB Program would like to thank Diana Petty for making the arrangements of this trip, and Metabolex for generously devoting their time and staff to the education of our students – they thoroughly enjoyed and appreciated the opportunity to visit Metabolex and loved learning all about pharmaceutical drug development.

Students sit in on one of the many informative presentations given by Metabolex employees.

Elvira Espinoza, facilitator & biotech teacher at Kennedy organized the Metabolex trip.

ENVIRONMENTAL BIOTECHNOLOGY

This course offers students who have completed BIOT-105 (or its equivalent) the opportunity to work on projects related to environmental biotechnology and drug discovery, in a guided independent research setting. Students will do background reading to prepare for and inform their research. They will use the scientific method in conducting their experiments, and will practice the behavior and skills required in a modern biotechnology laboratory. Students will maintain a professional laboratory notebook, and will give both written and oral reports on their research progress. For additional information regarding this course, please visit http://www.ohlone.edu/ instr/biotech/courses.html.

And the winners are ... Niel Bezrookove of Granada High School took 1st prize in the shirt design contest and won an iPod Nano. Joanna Gonzalez from James Logan High School took 2nd place and won a $75 gift card. Frank Jose of Tennyson High School won 3rd place, and a $30 gift card. Honorable mentions were Ali Albiani from Granada, Petros Serbana of Tennyson, Yuban Martinez of Logan, Alexandrea Saturenine from Logan, and Kathlene Macaraeg from Logan — each earning a $10 gift card.

I N O T H E R  N E W S  …

Environmental Biotechnology

The 2008-2009 winning sweatshirt design.

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