



Mar 2006, v.1, no. 2

Caduceus Club Newsletter

Mount San Antonio College Pre-medical Professions Club

Exploring careers in the laboratory

Upcoming Events

Monthly Meetings:

March 9th 7am

April 13th 7am

May 4th 7am

Northern California Field Trip

March 9–12th

Faculty Candidate Tours

March 20–21

National Public Health Week

April 3–9th

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-- Advertisements

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In medicine, teamwork is a critical part of patient care. Whether you are a physician, physician's assistant, nurse, phlebotomist, respiratory therapist, or any other team member, the care and treatment of the patient depends on the skills of all the members of the medical team at every level.

This month's newsletter is highlighting careers in laboratory science. If you enjoy working at the lab bench, there are many opportunities to be part of the team and do what you love.

You may want to explore the fields of clinical laboratory science, microbiology, or histotechnology. Perhaps you are more interested in research, either in basic biology or in a field directly related to medicine. There are many opportunities



Students prepare DNA samples for analysis by gel electrophoresis

for you and we hope that this issue will inspire you to learn more about them

Whatever you choose to do, there are many opportunities for you to make valuable contributions within the healthcare field!

Students provide medical care to the homeless in unique summer program

There are many opportunities to explore your professional interests, but few will have a give you a hands-on opportunity to help others in need. This summer, Lane Braver, PA, will direct a group of 30 students in some of the basic skills required to evaluate patients in a clinical setting.

The training is provided during a few 3-hour evening classes. Students will utilize their new skills to evaluate homeless patients during two large sessions, one in Ventura, and the other in San Diego.

Classes will convene on July 3rd and 10th from 6-9pm to train students in how to take a medical history, perform a medical exam, establish a diagnosis, and receive basic training in pharmacology. On July 14th and 15th, from 8-5pm, students will use these

skills to examine homeless patients in San Diego. Following this event, students will meet again with Lane Braver on July 17th and 24th in order to discuss performance and how skills can be improved.

A second opportunity to put skills to use will come on July 28th and 29th in Ventura. This event will also be followed by a final evaluation on August 7th.

If you are interested in participating in this unique summer program, you must register for the Services Learning Seminar in Community Involvement, SL-3. Remember that space is limited to 30 students, so you must register as soon as possible to ensure enrollment.

For further information, please contact Lane Braver at 909-594-5622 x4656.

Histotechnology: Behind the scenes

By Jennifer Macdonald



Dr Rexach at UC Merced for the library roof capping ceremony. Students will be visiting this newest addition to UC in March during the N. California field trip.



Students visit the University of San Francisco School of Dentistry.



UC Merced research labs were set up at the former Castle AirForce Base, pending completion of campus construction.



A former community college student, BJ Goodridge, with wife and daughter, at UOP Pharmacy School white coat ceremony

When choosing a health care career the first choices that come to mind are doctors, nurses, radiology technicians, and respiratory technicians. All of these careers have something in common; patient contact. Other health care careers to consider are in the laboratory sciences. These professionals work behind the scenes to aid the physicians in making diagnoses. The laboratory science professionals include: Medical Technologists, Medical Laboratory Technicians, Histotechnologists, Histotechnicians, and Cytotechnologists.

Individuals interested in the lab sciences should be problem-solvers that like challenge and responsibility. To prepare for a career in the lab, students should have a solid foundation in science, including biology, chemistry, math and computer science.

The Medical Technologist or Clinical Laboratory Scientist requires a baccalaureate degree in Medical Technology or Clinical Laboratory Science. Laboratory Scientists perform complex patient testing and diagnoses in chemistry, hematology, blood banking, immunology, and microbiology.

The Medical Laboratory Technician requires an associate degree and training in the laboratory sciences. The MLT performs general testing in all aspects of the laboratory.

The Histotechnologist requires a baccalaureate degree and training in Histotechnology. The Histotechnician

requires an associate degree and training in Histotechnology. Histotechnicians and Histotechnologists prepare thin sections of body tissues, animal tissues, or plant material. These sections are examined under the microscope for diagnosis. Mt. San Antonio College has a Histotechnician Training Program.

Cytotechnologists require a baccalaureate degree and training in cytotechnology. A Cytotechnologist studies cells under the microscope. They are trained to look for the presence of disease in cells.

Laboratory science professionals are employed in hospitals, private laboratories, pharmaceutical companies, research labs, animal labs, public health facilities, forensic labs, and wherever the diagnosis of disease is made.

To ensure that laboratory professionals are competent in the field in which they are trained, the Board of Registry of the American Society for Clinical Pathology gives a national certification exam. For more information on Laboratory Science Careers and certification visit the ASCP Board of Registry at <http://www.ascp.bor>.

For national accredited programs in the laboratory sciences please see the National Accrediting Agency for Clinical Laboratory Sciences website at www.naacls.org.



Red Cross needs FAST volunteers!

By Belinda Torrez

Those of you who are considering a career in the medical professions might consider the opportunities you will have to gain hands-on experience when volunteering for the American Red Cross. Through the First Aid Stations (FAST) you will gain experience in the role of a First Responder representing the Red Cross in large community gatherings, gain invaluable experience in interviewing and treating the participants under the supervision of the Team Leader, and have the opportunity to attend some great public events. The FAST team provides support to the Pasadena Rose Parade, Industry Hills Rodeo, California Philharmonic Concert Series at the L.A. Arboretum, 24 Hour Cancer Walks, City of Hope Walk, Athletic competitions, Marathons, Dog Shows, Jazz Festival, Wisteria Festival, and many more events where large gatherings of people can be expected.

Adult volunteers for the FAST team must have current certification in Adult, Infant and child CPR/AED and Basic First Aid, and classes are available through your local Red Cross Chapters, and certified youths over 15 years of age may join Y-FAST (Youth in First Aid Station) team.

As a regular FAST volunteer, I can tell you that most of the time, you will be relaxing enjoying the event or studying, and there will be no incidents to respond to at all; the most you will do is to hand out a couple Band-Aids, or give directions. Other times, you will be busy using your first aid skills, taking medical histories, writing up an incident reports, and learning how to deal with the public in your role as a first responder. But, ALL of the time, you are warmly greeted by the event staff and regularly thanked by event participants for your service and your presence at the event. While a member of the First Aid Station, you are the face of the Red Cross representing an army of volunteers who regularly serve our communities.

There are many ways to become involved with the Red Cross, from being a member of a Disaster Response Team, to assisting with blood donations, to becoming a Red Cross Instructor. For more information about joining the Red Cross FAST team and other volunteer opportunities, contact Volunteer Coordinator Richard Stewart at richards@cardinalpaint.com.

Check next month's newsletter for an update on upcoming FAST events.



Kimberly Jow, Belinda Torrez, Melissa Culata, and Janice Gatzke make Caduceus Club shine during Join-a-Club Week at Mt SAC



- Upcoming First Aid Station Events**
- U.S.C. Buddies Walk - March 4
 - 999K Run - March 11
 - Wisteria Festival - March 12
 - Mt. View Track & Field - April 8

Congratulations to Kristen Arden! She passed her psych tech certification exam!



Cindy Anderson and her micobiology class think Microbiology is # 1!

Microbiology is Amazing! (really)

By Cindy Anderson, Professor of Microbiology



A Allied-health science majors: Your future's exciting with lots of possibilities ahead. Greetings to you in Mt.SAC's Caduceus Club!

M Microbiology: What's microbiology, you may be asking? The study of a fascinating world of tiny creatures, so small they're beyond our edge of vision. They (the microorganisms or microbes studied in microbiology) include bacteria, protozoa, fungal yeasts and molds, unicellular algae, and viruses. Fortunately, the majority of these microbes in us, on us and all around us are benign or beneficial; however it's the few bad ones, the pathogens, which cause disease.

Microbes are the invisible emperors and claim to represent the key biological science discipline! Check out www.asm.org (the American Society for Microbiology website with lots of cool links!), and <http://www.microbeworld.org/home.htm> to find out why the microbe world of life is so exciting!

A Avian Flu: Striking terror in some people's minds already for this Bird Flu/Killer Flu has had its share of headline stories to date. This H5N1 viral flu strain, if mutates to a "person to person" means of transmission, could create a global deadly flu outbreak in humans. The vaccine manufacturers are hoping to win this microbial race. Keep up to date at <http://pandemicflu.gov/>, as well as <http://www.dhs.ca.gov/ps/dcdc/VRDL/html/FLU/Fluintro.htm>

Z Zoonotic Diseases or Zoonoses: What diseases like plague and rabies have in common because these diseases can be transmitted to humans but primarily exist in other animals. We tend to be the accidental hosts. At least 150 zoonoses exist worldwide and make up to 70% of the new emerging diseases around our globe, so these types of diseases are not to be ignored, eh?

I Infectious diseases: Infectious Diseases are those resulting from the presence and activity of microorganisms. You'll research many of these during the semester of your Microbiology 22 or 1 course here on campus! Even today, with antibiotics and vaccines to cure or prevent many of these infectious diseases, they still bring concern to us and our healthy bodies (AIDS, mad cow disease, SARS for examples). The 3 most important things to do to prevent infectious diseases (according to the CDC) are 1. Keep immunizations up to date. 2. Wash you hands often, especially during cold and flu season! Most organisms are spread from the hands to the mouth, nose and eyes, thus infecting the respiratory and gastrointestinal tracts. Soap, running water (at any temperature), and spending at least 15 to 20 seconds actively washing all areas of the hands are all part of effective hand washing. 3. Be aware of what you eat, and be careful how you prepare it.

N Nosocomial (Greek for hospital) infections: The hospital as a source of disease? Really? Well, the hospital both serves and creates compromised people (those whose resistance to infection is weakened by disease, therapy or burns) and the hospital setting is a collection place for pathogens! The most common nosocomial infections center around the urinary tract, respiratory tract or surgical incisions as opportunistic pathogens may take advantage of these portals of entry. So you'll want to carefully follow the universal precautions (UPs), plus the medical and surgical aseptic practices. Perhaps a career as an infection control officer maybe of interest to you?

G Genetics, genomics, gene therapy, gene transfers, gene probes. gene maps, gene sequencing, gene swapping, genetic recombinations, genetic engineering techniques: The list now goes on and on for microbial genetics is HOT! From antibiotic production to vaccine production, genetic engineering has so many commercial and practical applications! How amazing human genes can be cloned in bacteria! From detection and diagnosis of unique nucleotide sequences of a pathogen with the use of DNA probes, to the future of forensic DNA, this could be your new frontier? (check out www.dnaresource.com, www.cacnews.org and www.forensicdna.com for more information)

M Microscopy: Invaluable to the study of microbiology for the microscope is the window to the invisible! A reliable microscope offers magnification to enlarge objects and resolving power so that we can still see detail, not just a blurry blob! From visible light and ultraviolet rays as sources of illumination to electron beams that magnify up to 650,000 X with three dimensional images, and now to scanning probe microscopes with the potential to image single atoms! How about an atomic force microscope (AFM) to view details of biological antibodies and enzymes and along with nanotechnology we're talking really tiny!

Continued on page 5

Microbiology is Amazing! (really), continued

I Immune System: A very important component of an elaborate host defense network that tries its best to keep pathogens away. Our first line of defense is usually surface protectors such as intact skin and healthy mucous membranes. If the pathogen is able to penetrate, we have other defenses that come to our rescue which include certain white blood cells that can capture and eat (phagocytes) the invaders before they do much damage. If additional specific assistance is needed, the immune system with its T cells and B cells along with special proteins called antibodies step in to fight the battle in our favor! Eat well balanced meals, get enough rest, and drink plenty of water to keep your immune system strong!

C CDC (Centers for Disease Control and Prevention): One of 6 major agencies of the US Public Health Service. Headquarters in Atlanta, Georgia and there's a museum open to the public if you're ever there on a visit. Check out their awesome website www.cdc.gov They employ 3,500 physicians and scientists with the goal to protect the public health of the US populace by providing leadership and direction in the prevention and control of infectious disease and other preventable conditions, such as cancer. CDC's publication The Morbidity and Mortality Weekly Report is distributed each week to over 100,000 health professionals (<http://www.cdc.gov/mmwr/>). Our County of Los Angeles, Department of Health Services is www.lapublichealth.org.

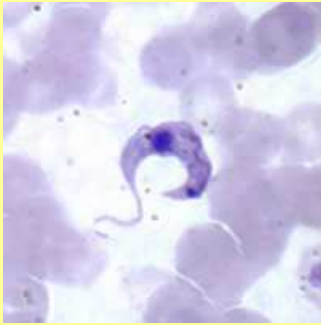
R Resistance (Drug resistance that is): An alarming number of microbes have evolved resistance to antibiotics (a specific group of drugs produced by fungi and bacteria to inhibit other microbes from getting too close in their competitive environments) and other antimicrobial agents. In other words, drugs that once worked to get rid of certain pathogens no longer do because the pathogen has found ways to survive (has developed resistance) and is even willing to pass on this survival tactic to other microbes! So, what can we do to delay this resistance? 1. Do not misuse and abuse antimicrobial drugs. Don't take an antibiotic designed for a bacterial infection if you have a cold or flu (antiviral drugs are specific for viral structure and functions). 2. Take the full dosage for if you leave survivors, they are the ones that are more fit and will then reproduce with the weakened competition now gone. 3. Never medicate yourself with antibiotics or share them with family or friends 4. Be aware of antibiotic abuse in livestock feed, because chronic low doses of antibiotics create ideal growth habitats for resistant strains.

O Outrageous behaviors: Some microbes love to eat garbage in landfills, our sewage, chemical wastes, oil spills and are creating a stir with their potentials in an area of science called bioremediation. Will microbes become our pollution solution? Other microbes are involved in the formation of fossil fuels and have given rise to a new field called geomicrobiology. For those microbes that live in the deep sea and can't see, that's no problem for they brought their own flashlights (microbial bioluminescence). Their habitat diversity and metabolic diversity is amazing!

B Biofilms: (Not the movies you saw in your biology classes!) It's the scum build up on our toilet bowls, the algae that hangs around on swimming pool walls, and the plaque on teeth surfaces. These living layers that could be made of several microbial groups are called biofilms and the microbial communities can develop dynamic, interactive connections! They may even alter gene expressions while in these microbial mats and drugs/antimicrobial chemicals may have a difficult time penetrating to all of them. Thus, biofilms are being taken seriously and studied extensively.

E Emerging Infectious Diseases (EIDs): Those infectious diseases that are new or changing, showing an increase in occurrence or the potential to do so. The microbe could be of any type (virus, bacterium, parasitic worm, fungus or protozoan), and evolutionary changes in existing organisms, and our global traveling with microbes in tow are 2 reasons. West Nile encephalitis (virus appeared in U.S. in 1999), mad cow disease (it was 1986 that microbiologists first became aware of infectious proteins (prions) as disease causing agents), Ebola hemorrhagic fever, Hantavirus pulmonary syndrome (remember 1993 in the Four Corners area of the American Southwest?) would be examples you may know. Interested in more on this? Check out <http://www.cdc.gov/ncidod/EID/index.htm>. But, don't forget the vast majority of microbes are good guys!

S Sensational Science! Microbes are Amazing! Aren't you glad microbiology is one of your prerequisites! So you'll gain even more appreciation for these forms of life and how it's impossible to live without them!



Trypanosoma cruzi in blood smear
(<http://www.dpd.cdc.gov>)



Geographical distribution of
Trypanosoma cruzi



Northern California field trip itinerary

On March 9th, 34 students and 2 faculty members will be visiting Northern California. The final itinerary is as follows:

Thursday, March 9 th 3pm	Leave MtSAC
Friday, March 10 th 9am–noon	UCSF professional schools
Friday, March 10 th 1:30–3:30pm	Lawrence Berkeley Labs tour
Friday, March 10 th 4–6pm	UC Berkeley campus tour
Saturday, March 11 th 9:45am	UC Davis Veterinary Hospital Tour
Saturday, March 11 th 11am	UC Davis Medical School Tour
Saturday, March 11 th 1:30pm	Shriner’s Hospital Tour
Saturday, March 11 th 3pm	UC Davis Medical Center Walking tour
Saturday night	Dinner in Old Towne Sacramento
Sunday, March 12 th 9am	Tour of UC Merced Labs at Castle
Sunday, March 12 th 11am	UC Merced Campus tour
Sunday, March 12 th 10pm	Return to MtSAC

We would like to thank the MtSAC Natural Science Division for their support and those individuals kind enough to provide us with tours at UCSF, UCB, UCD, and UCM.

New symptom associated with Chagas’ disease

By Dr. Carmen Rexach

Infection with the protozoal parasite, *Trypanosoma cruzi*, causes an acute disease most often seen in children called Chagas’ disease. Children living in substandard housing are bitten, often in the face, by the kissing bug, spreading the trypanosomes to the blood, which disseminates the organisms throughout the body.

Chronic infection can lead to dilation of the cardiac muscle and is the most common cause of cardiac failure in young men under the age of 35 years old in endemic areas, extending from Central America to Colombia and Venezuela. In patients who are immunocompromised, additional symptoms such as meningoencephalitis and endocarditis have been described. Chagas’ disease is responsible for 30,000 deaths annually, according to the World Health Organization.

An article published in the March 2006 issue of the Journal of the Federation of American Society of Experimental Biology (FASEB) has added a new symptom to this list, night blindness. An international team of scientists working in Argentina found

that 82% of patients with Chagas’ disease had trouble seeing with at least one eye, and 42% had trouble seeing with both eyes.

Further investigation showed that antibodies produced by the body to fight trypanosomes also block the production of rhodopsin, the light absorbing pigment of the eye. Without rhodopsin, night vision is completely impaired.

Initially, scientists thought that this symptom was the result of an inflammatory response by the body to the presence of the organism. It was later determined that “molecular mimicry” was involved. In molecular mimicry, the structure of molecules normally found in the body is similar to those recognized on an invading organism by the immune system. Therefore, when the body attacks the invader, it also attacks itself.

Additional studies are planned to determine how widespread night blindness is among people with Chagas’ disease



April Miles, veterinary student, leads student tour of UCD Veterinary Hospital



Students tour University Surgical Center



Dr. Rexach and students visit Amgen, a biotechnology firm in the Bay Area



Mt SAC Caduceus Club advocates for Women's Heart Health during Join-a-Club Week

Under the direction of Caduceus Club member, Belinda Torrez, students distributed information and red dress pins from the American Heart Association in support of Women's Heart Health Week from our beautifully decorated Join-A-Club Week booth.

Heart disease is the # 1 killer of women in the United States, resulting in the death of 1 in 3 women. Women, however, seem unaware of the risks and often ignore the warning signs of impending heart attack.

Although the national campaign targeted women between the ages of 40 and 65, the risk factors, such as high blood pressure, high cholesterol, and obesity result from a lifetime of habits that need to be addressed during youth.

Surveys have demonstrated that women fear breast cancer most, although there is

an increased awareness of the importance of heart health. Additionally, heart disease disproportionately affects women of color.

Genetics plays a role in heart disease as well, however, many of the risk factors for heart disease are manageable. These include proper diet, awareness of cholesterol levels and blood pressure through regular screening, weight management, regular exercise, and the realization that even those people who already have heart disease can improve their heart health status.

If you wish to learn more about cardiovascular disease and other health issues affecting women, please check the following website:

<http://www.4woman.gov/campaigns.cfm>

Summer Internship at a National Lab... not just a dream, but a reality!

Have you ever wondered what it would be like to work with top research scientists in one of the most famous labs in the world? This opportunity is available to community college students every year through the Community College Initiative.

The initiative seeks to bring community college students who have completed some basic science courses with a GPA of 3.25 or better to a national lab to participate in a real research experience as part of a scientific team. The program runs year round, but most students opt to participate during the summer.

Students apply online at the following site: <http://www.scied.science.doe.gov/scied/CCI/about.html>. Internships are available at many labs throughout the US, including both Lawrence Berkeley National Labs, in Berkeley, and Lawrence Livermore, in Livermore, California.

Once received, the completed application is circulated to scientists working in the laboratory, and the scientists choose the students they would like to consider for the internship. These students are offered a 10 week appointment, during which they are paid \$450 per week. They are also given the opportunity to work on and possibly publish, a scientific paper.

Students also participate in a poster presentation, in which their work is presented to the community.

It is difficult for community college students to have a research experience before transfer because community colleges often don't have research labs. Even for those that have had a previous research experience, the opportunity to work at one of the eleven national laboratories in the US is remarkable.

If you have considered a career in research, or are exploring your professional options, you should definitely apply.

**Caduceus Club
Executive Committee**

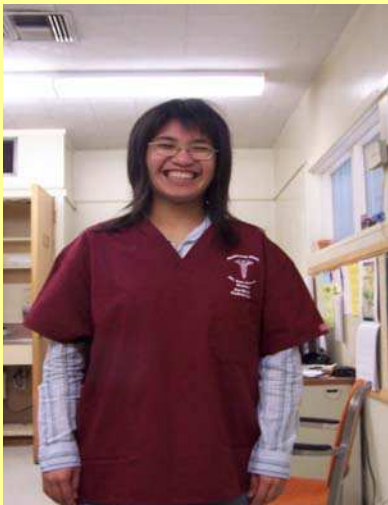
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*..I will remember that there
is art to medicine as well as
science, and that warmth,
sympathy, and understanding
may outweigh the surgeon's
knife or the chemist's drug.*

From Hippocratic Oath



*Caduceus member Kitty Fung models
new Caduceus Club scrub top*

National Public Health Week 2006

**Designing Healthy Communities:
Raising Healthy Kids**
April 3-9, 2006

**Community Solutions to Create
Healthy Communities for Kids**

<http://www.apha.org/NPHW/solutions/>

Summerwood Printing

*Thank you to Caduceus Club member Kathleen Geer
and Summerwood Printing! They designed and
printed our official scrubs!*

Arlene Fiorito, R.N., to speak at March 9th meeting

There have been several recent changes in admissions to the nursing department that have led to lots of confusion among our students. This is your opportunity to hear from a faculty member from the nursing department and learn exactly what the requirements are and how the nursing department expects you to prepare for their program.

The meeting will be held on Thursday, March 9th in 12-1 at 7am, and will be followed at 8am by a brief membership meeting.

If you are interested in a career in nursing, please join us on Thursday to hear about amendments to the admissions process and to learn more about nursing education at Mt SAC.

Order your official Caduceus Scrub Top!

Caduceus Club members can now show off their affiliation by wearing the official Caduceus Club scrub top. Made of durable cranberry colored cotton blend, the top features the Caduceus Club logo above the left front pocket.

Scrub tops are available in XS, S, M, L, XL for only \$9.00! XXL sizes are also available for \$10.00.

CADUCEUS SCRUB ORDER FORM

NAME _____

E-MAIL _____

SIZE _____ **Quantity** _____

AMOUNT DUE _____

Bring completed order form to Dr. Rexach's office, room #13-15D. All orders are payable in advance.