



amsaBruins

newsletter | Fall of 2013

USING **NANODIAMONDS** TO IMPROVE DELIVERY OF DRUGS TO LEUKEMIC CELLS

By Melinda Ng

Scientists Dr. Edward Chow from the National University of Singapore (NUS) and Professor Dean Ho from University of California, Los Angeles (UCLA) discovered that using nanodiamonds can aid in delivering the common leukemia drug to cancerous cells as well as retain that drug in the cells to ensure therapeutic activity. This innovation addresses one of the problems in treating leukemia: cancer cells can often remove these chemotherapeutic drugs from the body by actively pumping them out of the cells.

Daunorubicin, a common drug used in treating leukemia, impedes or stops cancer cells from growing, and ultimately causing these cells' death. However, leukemia may become resistant to this drug after treatment. Chemoresistance, occurs when drug transporter pumps in leukemia cells actively pump out chemotherapeutics, such as Daunorubicin.

Recent approaches to this dilemma have mostly depended on developing competitive inhibitors and have had limited success because of the high toxicity levels and unfavorable results during clinical trials.

The team of scientists from NUS and UCLA decided to try using nanodiamonds, which are tiny, carbon-based particles that are two to eight nanometers in diameter, to neutralize chemoresistance.

The research team attached Daunorubicin to the surfaces of nanodiamonds and introduced this hybrid to leukemic cells. They found that the nanodiamonds were able to transport the drug to the cancer cells without being pumped out. Since nanodiamonds have unique surface features and non-invasive sizes, they can effortlessly be removed without clogging up blood vessels.

The team mentioned that additional development and safety evaluation of nanodiamond systems are crucial to achieve their full potential. To further the research, a team of collaborator will be evaluating the drug-delivery complexes in clinical settings. They hope to use nanodiamonds to deliver other drugs as well.

Source: www.news-medical.net

Growing **Model Brains**

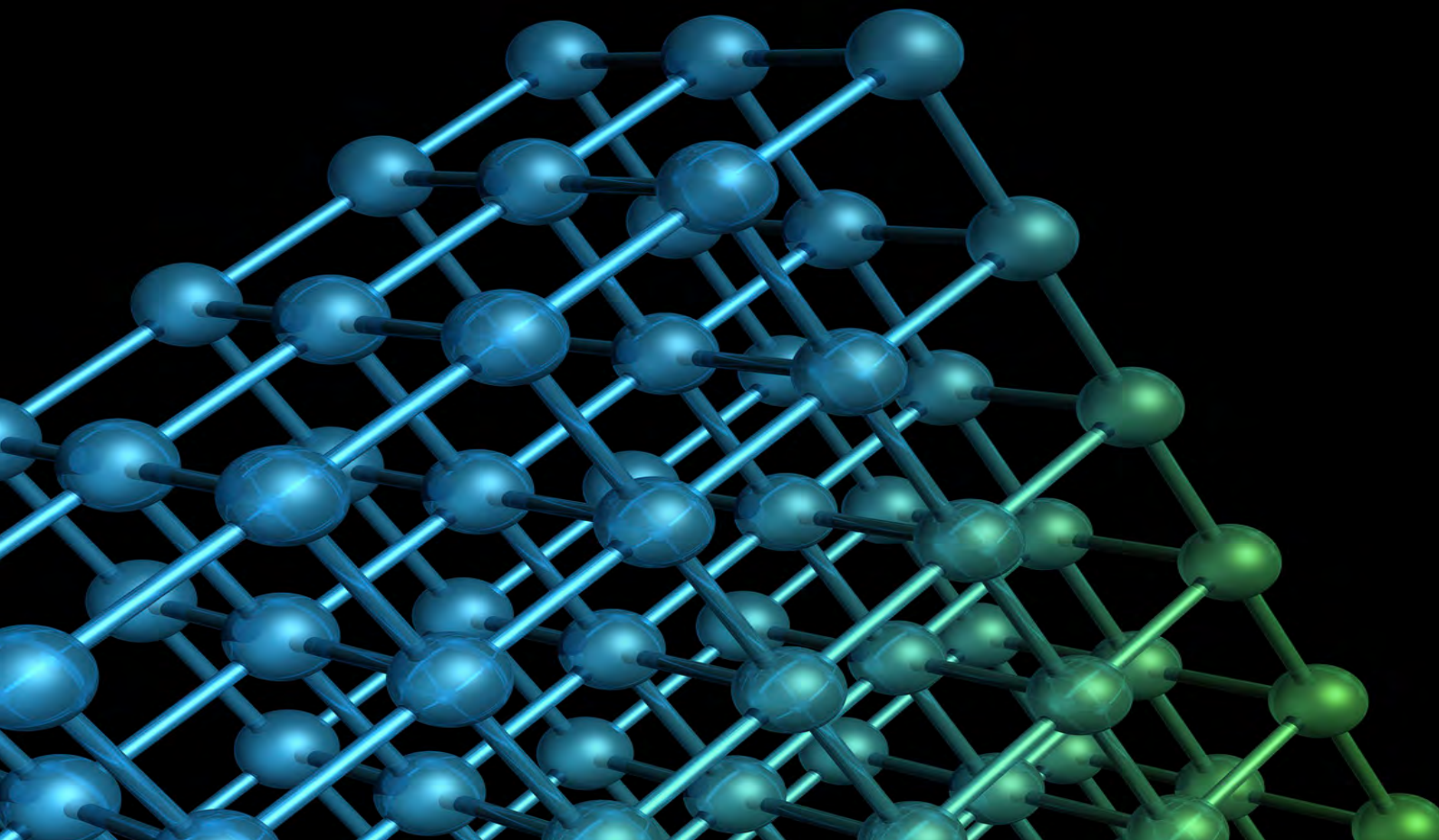
By Neda Bionghi

Dr. Madeline Lancaster of the Austrian Academy of Sciences has made enormous progress for the field of regenerative medicine. Their team has created specimens that are similar to brains in several significant ways. The organoids her team created, while not true brains, do contain nerve types and anatomy much like real brains. These may allow researchers to study brain development without the concern of ethical issues or to test drugs that cannot be tested with cell cultures. Furthermore, by utilizing cells from living people, these organoids could be grown to help study the ailments of specific patients.

Organoids are created from embryoid bodies, which are ultimately created from stem cells or induced pluripotent cells. The organoids created follow a developmental path very similar to the brain: within 10 days neurons have developed, and after 30 days regions similar to the brain have developed. Such regions include lobes of the brain, cortex and ventricles, retinas of the eye (an outgrowth of the brain), and hippocampal cells. While these organoids do not grow much bigger than 4mm, they can survive and function for years.

The researchers hope to utilize these model brains in studying neural diseases such as microcephaly, which results in stunted brain growth. Using skin cells from a patient with microcephaly, Dr. Lancaster's team was able to develop an organoid that suggested the reasons for the disease's progression: neural development progressing too quickly. The researchers now hope to use these organoids to study numerous other diseases, including schizophrenia and autism. While it may be far from creating brains from cells, these model brains have progressed the science of regenerative medicine and expanded methods for disease study in an enormous way.

Source: The Economist





Dr. Jeffrey D. Klausner, MD, MPH

By Lisa Kawakami

Dr. Klausner is a **Professor of Medicine** in the Division of Infectious Diseases and the Program in Global Health. He earned his Medical Degree from Cornell University Medical College and received a Masters in Public Health from Harvard School of Public Health. He has held many official positions including Deputy Health Officer in San Francisco and Branch Chief for HIV and TB at the CDC in South Africa

What led you to become a doctor as well as a researcher?

"Since the age of eight, I wanted to become a doctor. I didn't know what kind of doctor, but I thought it was a great way to learn about the human body, and a great way to take care of my family, others, and myself. When I got to medical school, I started to realize that by becoming a researcher, I could help even more people and have a more lasting impact. I was really motivated by my personal cause to help people."

Why did you become interested in global health?

"When I grew up, I was very lucky to travel a lot with my parents. I saw how people were living in Africa, South America, and the Caribbean. When I went to medical school, I saw an amazing wealth of potential in American medicine. I wanted to help transfer that wealth to applied technology to issues in developing countries. During medical school, I spent a summer in the mountains in Ecuador, which had a rural clinic. I also took an additional year, and lived in Congo, Africa. I worked with

AIDS patients and helped conduct research projects on AIDS and tuberculosis. I saw that a lot could be done to improve health outcomes for peoples in developing worlds, with relatively small and inexpensive interventions."

As a researcher in applied epidemiology and infectious disease, what do you like the most about this career?

"I like the fact that we can work with a lot of other researchers and doctors as part of a team, addressing day-to-day problems in public health with low cost intervention. We can have a major health impact. We also deal with inequity in health. We worked a lot with disenfranchised populations including poor people, people who have inadequate education, people who have been stigmatized because of their occupations, sex workers because of their sexual choices and sexual behaviors, and potential drug users. Being able to do research to improve their health outcomes is a privilege."

talks to amsaBruins

How did you overcome or deal with losing patients?

"In the year 1990, when the AIDS epidemic was at its peak in New York City, I was a medical resident and patients would die on a daily basis. It was difficult. Types of patients who died were young men not much older than I was. We learned how to ease their suffering and support their family and loved ones. I learned to become very open and transparent and to build allegiances or partnerships with the medical team, patients, and family."

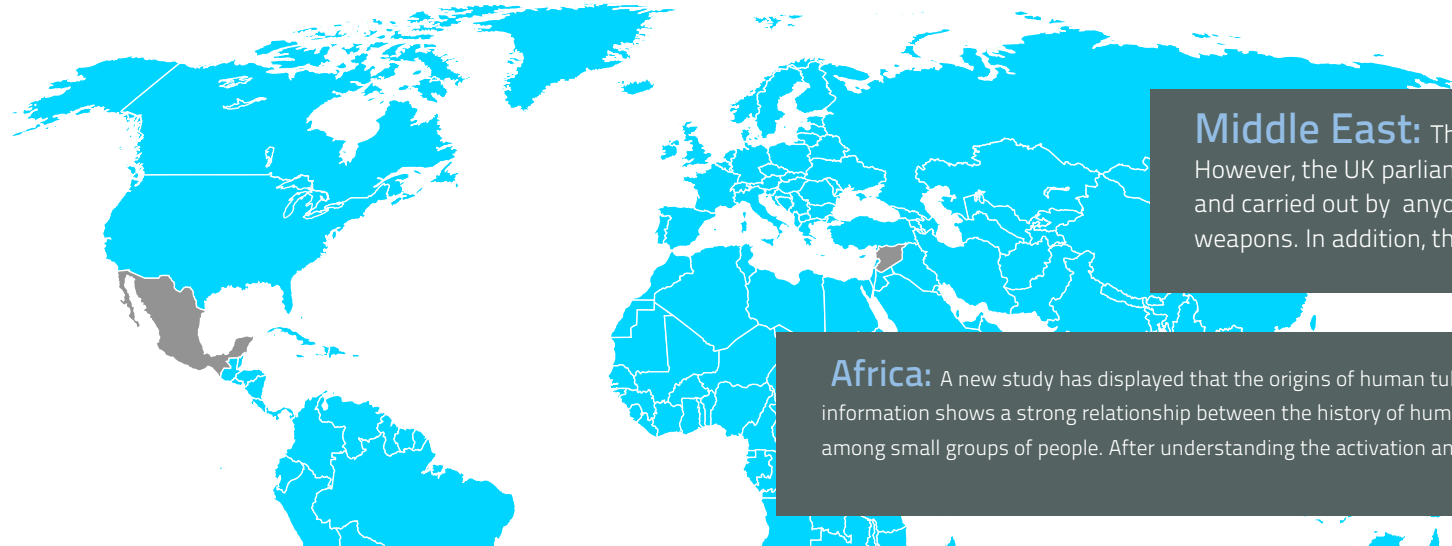
What was it like to work as a Branch Chief for HIV and TB (at the Centers for Disease Control) in Pretoria, South Africa?

"It was very exciting. My family and I were in the capital of South Africa. Being a Branch Chief for the CDC, I had diplomat status and worked closely with the U.S. embassy. I also worked very closely with the Administration of Health in South Africa and other high level officials. At the time, we were building the South African treatment care program for HIV and TB." remember those cases, and it's just something you learn to accept.

Lastly, what advice would you have for the UCLA premedical students?

"The most important thing is to follow your heart and passion. Don't over think things. Don't consider what other people might think is best for you. Often smart people don't want to trust their guts or instincts. For me, that was very important. I never had any regrets about any decisions because it was the thing that I wanted to do. It brought me happiness. Challenge the status quo, never accept good or good enough, and love what you do. It is a great privilege to practice medicine, participate in research, and have a major impact on global health. "

WORLD NEWS



Middle East: The chemical attack that took place close to Syria's capital, Damascus has led France, the US and UK to push for punitive military action. However, the UK parliament rejected taking part in any military action. Recently France had stated that this chemical attack could not have been ordered and carried out by anyone except the Syrian government and seems to be determined to penalize Assad's (Syrian President's) regime for the use of chemical weapons. In addition, the US Congress has voted to determine if President Obama will have enough support to intervene in Syria.

Africa: A new study has displayed that the origins of human tuberculosis have been traced back to hunter-gatherer groups in Africa. Contrary to the popular belief that TB originated in animals and then spread to humans, this new information shows a strong relationship between the history of humans and TB. This horrible disease takes the lives of more than a million people every year has left scientists pondering why and how TB managed to survive 60,000 years among small groups of people. After understanding the activation and deactivation nature of TB, research has shows that the reason TB was able to spread globally was because of the human population expanding during the NDT.

Americas: Recently Mexico's President, Enrique Pena Nieto, vocalized his stance on his government's education reform with a new education bill, which still needs approval of the Senate, and calls for mandatory assessment of teachers for them to keep their jobs and receive promotions. This action has led to thousands of teachers launching weeks of protests against the measure because they claim this would lead to massive lay-offs. President Pena Nieto has also pledged federal funding for the teachers who require retraining. Source: www.bbc.co.uk

HEALTHCARE NEWS

Dissecting the affordable care act

by Rohini Jain

For most college students, the topic of healthcare is often a confusing one. From dense legislation to multiple opposing views, it is easy to get lost along the way. In spite of this, it is important for college students to not get discouraged and take the initiative to learn how the healthcare system affects them. Recently, healthcare reform underwent a radical change with the passing of the Patient Protection and Affordable Care Act, commonly referred to as Obamacare. The major provisions of the reform will go into effect in January 2014, making now the perfect time to finally understand what Obamacare really is. The following is a brief overview of how this reform will impact college students specifically:

Pros:

- >>Children can now stay on their parents' health insurance plans until the age of 26
- >>Insurance companies cannot deny coverage to

students with pre-existing conditions, such as asthma

>>Various preventative services, like immunization vaccines, are now covered without a copayment (no additional payment outside that paid by the insurer)

>>If students do not have coverage through their parents, they will be able to purchase insurance on a sliding scale from the Exchange The "80/20" rule now ensures that health insurance providers must use at least 80% of your premium on your care, not administrative costs.

Cons:

>>Starting in 2014, all students will be required to have some type of insurance, or they will be subjected to a "penalty income tax"

>>Small businesses must insure full-time workers, causing many owners to cut hours for students instead of paying to provide coverage

>>Net cost of Obamacare is estimated to be \$1.1 trillion over the next 10 years, a debt that will be our generation's responsibility

Source: www.obamacarefacts.com

Smart-phones Put to Use In Medicine

Many patients with diabetes and chronic kidney disorders face the daunting task of commuting daily to a hospital for tests. These patients not only struggle with their current diagnosis, but they frequently face challenges getting to the hospital for kidney tests. UCLA is now improving the lives of those who struggle with these daily tests by inventing a light-weight, portable device that conducts kidney tests and transmits data through a smart-phone attachment.

The smart-phone device, weighing a third of a pound, was developed in the research lab of Aydogan Ozcan, a professor of electrical engineering and bioengineering at the UCLA Henry Samueli School of Engineering and Applied Science and Associate Director of the California NanoSystems Institute. The device analyzes levels of albumin in the patients' urine and transmits results almost immediately. Albumin is a serious sign of kidney damage and a

danger warning for patients with kidney disorders.

The smart phone device takes less than one second to process the raw images, ultimately transforming the lives of patients who are now able to test themselves from the comfort and convenience of their own homes. The smart-phone attachment projects beams of light through disposable test tubes, one filled with urine and fluorescent dyes, and the other with a control liquid. The camera attachment on the smart-phone then captures the fluorescent light as it passes through the lens. The accuracy of the albumin concentration in the urine sample is within less than 10 micrograms per milliliter, which is well within clinical standards.

This advancement in technology will ease the lives of those who are already facing daily health challenges. This new device will transform the way albumin tests are performed and potentially increase the quality of life of patients and their families.

Source: www.pubs.rsc.org

DEAR

BY AIR MAIL

PAR AVION

AIR LETTER

AMSA

Dear AMSA,
I am a sophomore and I am not really involved in extracurricular activities. I know that medical schools are looking for students who are active in both academics and extracurricular activities, but I don't know exactly what they want to see on my resume. How many activities should I be doing? What is too little and what is too much?

Sincerely,
Confused

Dear Confused,

You are definitely not alone. Many students speculate about what med schools want to see on their resume. Either they spend so much time worrying they end up doing nothing or they go overboard and do as many medically-related activities as they possibly can. Here's the secret: thinking about what medical schools want to see is the wrong way to go about it. Your extracurricular activities should reflect your passions and interests. Having a new activity each quarter just to fill up a resume is only going to do you a disservice. Instead, pick activities based on what you would enjoy doing and what you feel passionate about. Even among medically-related activities like volunteering programs and hospital internships, there is plenty of variety. Do your research and decide on what is best suited for you. Once you find something you love, stick with it for

more than just a quarter. Continuity of service demonstrates passion as well as commitment. Most successful pre-meds need some research, volunteering, and clinical experience. What you chose to fulfill these very broad and general guidelines will be most effective and will be a rewarding experience only when you do something you personally love and enjoy. When you can talk about your activities with passion during your interviews, this choice will most certainly pay off and set you apart.

Sincerely,
UCLA American Medical Student Association

Have any questions? Email newsletter@amsabruins.org and we'll get back to you in the following newsletter!

Neurology

Neurology is the branch of medicine involved in diagnosis and treatment of disorders of both the central nervous system and the peripheral nervous system.

Neurology is the branch of medicine involved in diagnosis and treatment of disorders of both the central nervous system and the peripheral nervous system. Doctors who specialize in this medical specialty are neurologists. They treat disorders or impaired function of the brain, spinal cord, peripheral nerves, muscles and autonomic nervous system, and the blood vessels that relate to these structures. These disorders include, but are not limited to, headache, epilepsy, stroke, multiple sclerosis, brain and spinal tumors, muscular dystrophy, Parkinson's disease and Alzheimer's disease. Neurologists do not perform surgeries; instead they refer patients in need of surgery to a neurosurgeon. Neurologists spend their regular workday examining patients, visiting patients in hospitals to check their progress, and meeting with doctors who referred patients to them to discuss patients' progress. The training required to become

a neurologist includes four years of undergraduate education, four years of medical school, one year of internship in either internal medicine or medicine/surgery, and three years of specialty training in an accredited neurology residency program. After completing their neurology residency, some neurologists choose to finish a one or two-year fellowship, in which they train in one of the various sub-specialties, such as neurodevelopmental disabilities, neuromuscular medicine, pain medicine, clinical neurophysiology, brain injury medicine, vascular medicine, sleep medicine, epilepsy, or hospice and palliative medicine. Job outlook for neurologists is currently bright. The salary of a private neurologist, who prescribes procedures, such as EEG, EMG, and sleep studies, starts at about \$200,000-\$250,000.

Sources: en.wikipedia.org

Diagnostic Puzzle | Try your hand at diagnosing!

The Problem: A 51-year-old man is in to see his primary care doctor. He complains of nausea and abdominal pain that has persisted for several weeks. His symptoms have become worse over time and when his urine began looking brown in color, he decided to see his doctor.

The Patient's Story: The patient began experiencing nausea and abdominal pain several weeks ago. He is a busy real estate agent and has ignored the flu-like symptoms until now, which have progressed to include vomiting. He claims to currently have a healthy lifestyle but is a smoker and has experimented with several recreational drugs in the past. His vaccinations are incomplete. The patient is an avid traveler and his most recent travels (two weeks ago) included Spain, Russia, and Singapore, where he tried numerous foods he has never had before. He indicates that he is constantly tired and has lost his appetite. He claims to be short of breath, but has felt this on and off for many years. His urine has become dark, prompting him to finally see a doctor.

The Doctor's Analysis : The patient presents with pain in the upper right side of his abdomen as well as the stomach (a more recent symptom) and has intense nausea. He has a low-grade fever and is slightly overweight. He has vomited once in the past hour and complains of a loss of appetite. The whites of his eyes are yellowing. The patient shows signs of fatigue and muscle pain and generally looks unhealthy; however, he does not have diarrhea.

A physical and complete blood cell count (CBC) is done. The WBC (white blood cell) count is low and MCV (average size of RBCs) is normal. His urine is dark but contains no visible blood. A tox screen and liver function panel was ordered but results have not yet returned.

What do the symptoms suggest is the cause of this patient's illness?

HINT: Some of the symptoms may be unrelated, as is the case with any given patient!

ANSWER: A

UCSF School of Medicine

UCSF School of Medicine distinguishes itself from other medical schools by the quality of its students and amazing faculty, including Nobel Prize winners, National Academy Sciences members, and Institute of Medicine members.

As of 2013, the school ranks in fourth place overall in the United States and it continues to rank high in many specialties, such as primary care, pediatrics, AIDS, Drug and Alcohol Abuse, and Family Medicine.

Like many other medical schools, UCSF School of Medicine has its first two years focused on integrated core instruction in basic, behavioral, social and clinical sciences. The school gives the students an opportunity to have an early start on their clinical experience in their first years. The final two years consist of practice-based learning of clinical medicine, elective rotations, research, and sub-internships. Over the past five years, many of the school's graduates chose primary care for their residencies.

Science GPA **3.85 median**

Overall GPA **3.83 median**

Verbal (*MCAT average score)

11

Physical Sciences

12

Biological Sciences

12

MCAT Questions and Admission Tips

An 8-kg object traveling at 5 m/s has a perfectly inelastic collision with a stationary 13-kg object. What is the ratio of the initial speed of the 8-kg object to its final speed?

- A. 8:21
- A. 21:40
- C. 13:8
- C. 21:8

ANSWER: D

Admission tip:

Consider taking a Sociology or Psychology class to increase your familiarity with these topics—the 2015 MCAT will include sections on these subjects, reflecting some of the courses recommended by medical schools.

advertisement

The Princeton Review Advantage

No miracle cures.

Just a healthy dose of excellent prep.



The ULTIMATE in MCAT Prep.

Master the MCAT with intensive prep taught by experts who have mastered the test inside and out. We know how to get our students stellar results; we guarantee* it.

Program Includes:

- 260 hours of prep, including **105 hours of live instruction** (22 of which are Verbal)
- **19 full-length, practice tests**, including all 8 AAMC exams
- **15 diagnostic tests**, including all 5 AAMC diagnostic tests
- **amplifier™**, a revolutionary technology designed to help you learn faster and retain longer
- A team of **3-5 MCAT content experts**

Classes near you:
10966 Le Conte Ave.
Los Angeles, CA 90024

Don't forget...

UCLA AMSA members receive a \$250 discount!

Course #142853: 10/15/13– 1/16/14, M, T, W, & Th at 7PM

Course #122965: 1/30/14– 5/13/14, Sa (9AM) & Tu/Th at 7PM

Course #122986: 3/6/14– 5/9/14, M, T, W, Th, & F at 7pm

Space is limited. Call 888-588-8378, x 5189 or visit PrincetonReview.com to reserve your seat today!



Visit PrincetonReview.com/guarantee for details. amplifier is a registered trademark of Knowledge Factor, Inc. MCAT is a registered trademark of AAMC. Princeton Review is not affiliated with Princeton University.

IMPORTANT DATES

Fall Contract Deadline is 5 pm on October 11, 2013
Instruction Begins ---Thursday, September 26
Veterans Day Holiday ---Monday, November 11
Thanksgiving Holiday ---Thursday-Friday, November 28-29
Final Examinations ---Monday-Friday, December 9-13
Instruction Ends ---Friday, December 8
UCLA SRP Fall Contract Deadline ---Friday, October 11 at 5 pm
MCAT Dates for 2014 will be released in October 2013.



The AMSABruins newsletter is published by American Medical
Student Association, Premedical Chapter at UCLA.
Chief editor : Neda Bionghi
www.amsaBruins.org | newsletter@amsabruins.org
Fall of 2013 | 10.02.2013