College of Veterinary Medicine

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A new chapter on breast cancer research

Drs. Masaaki Tamura and Deryl Troyer contribute to book on stem cell therapeutics

A team of researchers in the Department of Anatomy and Physiology in the College of Veterinary Medicine at Kansas State University has just closed the book on an exciting chapter on stem cell research. The team, headed by Associate Professor Dr. Masaaki Tamura, contributed "Umbilical Cord Matrix Stem Cells for Cytotherapy of Breast Cancer" for a book titled, "Stem Cell Therapeutics for Cancer," which was published in December.

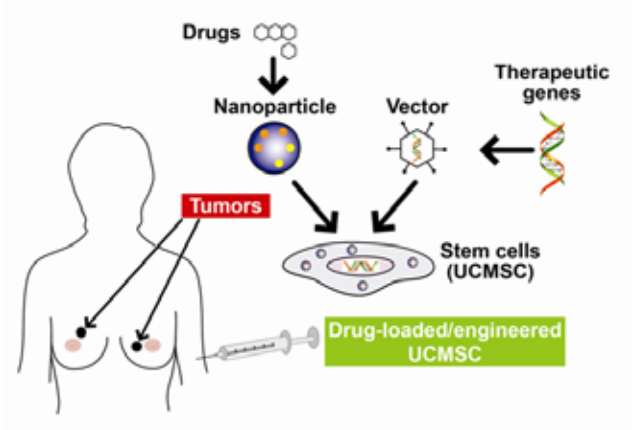
"Stem Cell Therapeutics for Cancer" was edited by Khalid Shah, an Associate Professor at the Harvard Medical School. The book covers the application of stem cells in various cancers, with an emphasis on the aspects of these strategies that are critical to the success of future stem cell-based therapies for human cancer.

"This is very exciting," Dr. Tamura said. He explained that in the chapter he worked on, "A number of researchers have shown a potential for the use of umbilical cord matrix stem cells for therapy in nerve injuries, renal failure and several organ-type cancers. Recent studies suggest there may be potentially good therapeutic cells for human breast cancer treatment."

The chapter explains that breast cancer is the most frequently diagnosed cancer in women in the United States. Approximately one out of eight women develops breast cancer in their life, and this cancer dependent mortality is the second leading cause of cancer-dependent death in women.

Dr. Deryl Troyer, a professor in anatomy and physiology, and a group of graduate students, staff and postdoctoral fellows, Naomi Ohta, Atsushi Kawabata, Deepthi Uppalapati and Susumu Ishiguro helped compose the chapter on breast cancer. The chapter examines immune evasion mechanisms and tropism of umbilical cord matrix stem cells to pathological lesions as well as the impact of therapies for primary breast cancer and breast cancer lung metastasis.

"Although cytotherapy with umbilical cord matrix stem cells seems to be a very promising and practical therapy for human cancer, inflammatory diseases, and degenerative disorders, the potential for human use has not been rigorously studied," Dr. Tamura said. "Our research will further clarify the therapeutic potential and contribute significantly to the research in human stem cell–based targeted cancer therapy."



Since human umbilical cord matrix stem cells traffic to tumor tissues, remain there for a few weeks, and control tumor growth, they can also be used as therapeutic gene or drug carriers. (Illustration by Mal Hoover, the CVM's certified medical illustrator, is from "Stem Cell Therapeutics for Cancer.")

Dr. Gehring researches amoxicillin efficacy in goats with international team

Dr. Ronette Gehring

The Nile is a river in Egypt. Sometimes that river is polluted with industrial waste, such as lead, which can cause detrimental effects on local sheep and goats via the water supply. Kansas State University's Dr. Ronette Gehring, an associate professor of clinical pharmacology in the Department of Anatomy and Physiology, has joined a team of researchers from Egypt, Jordan and the United States in evaluating the effect of chronic lead intoxication in goats. In December, the researchers published an article, "Effect of chronic lead intoxication on the distribution and elimination of amoxicillin in goats" in the Journal of Veterinary Science.

Dr. Gehring has teamed up with other veterinary researchers at Iowa State University, Cairo University and the Jordan University of Science and Technology. The group found that lead intoxication can impair the therapeutic effectiveness of the antibiotic amoxicillin in goats.

"Amoxicillin is used to treat various types of infections in animals," Dr. Gehring said. "The goats with lead intoxication show signs of kidney and liver damage, so we had hypothesized this damage would inhibit the excretion of amoxicillin, leading to higher drug concentrations in these animals."

The test involved intravenous and intramuscular administration of amoxicillin. Blood and urine samples were collected over a period of 10 weeks to measure serum protein and amoxicillin concentrations. The protein concentrations helped indicate levels of kidney damage while the amoxicillin levels helped to demonstrate how much of the antibiotic was absorbed for therapeutic purpose. Surprisingly, the lead-intoxicated goats actually had lower concentrations of amoxicillin compared to the healthy animals.

"We found that amoxicillin was more quickly disposed in the lead-intoxicated goats than in the control group," Dr. Gehring said. "We believe that goats with chronic lead intoxication would therefore need more frequent administrations of amoxicillin administration for the antibiotic therapy to be as effective as it is in the control group of healthy goats."

Dr. Gerhing said a literature investigation had found similar research for lead poisoning in humans, but not in animal subjects. As one of the first studies of its kind, Dr. Gehring indicated that the effects of lead intoxication on drug disposition still warrant further investigation.

Video Feature: Students travel on humanitarian trips

Fourth-year student Matthew Stewart (left) feeds a parrot at the zoo in Belize. See his story as well as three other students in this month's video report.

For some veterinary students, the most memorable experiences during veterinary school take place outside the traditional classroom – half a world away. Several Kansas State University veterinary students, including members of the class of 2014, have been volunteering with different organizations to practice their veterinary skills in African or Latin American countries.

One of these students, Nathaniel Cordel, traveled with the Veterinary Christian Mission to Zambia in southern Africa after his freshmen year.

"We did large animal work in the mornings when it was cool, a lot of deworming, vaccinations of cattle, primarily cattle, a few sheep and goats, but primarily cattle," Nathaniel said. "And then in the afternoons, when it was a little bit warmer, usually we were in the village of Mwande and usually we'd set up a spay/neuter and rabies vaccination clinic underneath a tree in the middle of the village, so it was really neat, just a great way to minister to the people of the village."

Following his sophomore year, Cordel took another trip to Tanzania. Fellow student Molly Melling helped with a spay/neuter clinic in Cuzco, Peru, as part of a World Vet delegation during Fall 2013. Her experience highlighted the challenges of working in a foreign country.

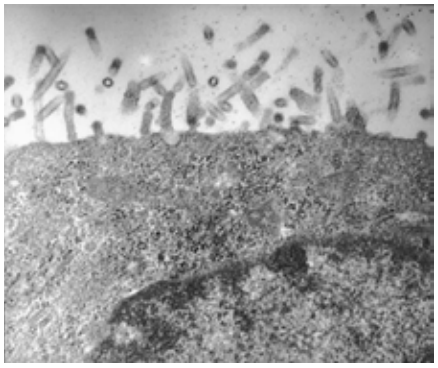
See pictures from Nathaniel's and Molly's trips as well as two other students in this month's video report at Lifelines online: **www.vet.k-state.edu/depts/development/lifelines/1402.htm**

Project finds potential treatment for drug resistant H7N9 influenza virus

The novel avian H7N9 influenza virus has caused more than 130 human infections with 43 deaths in China. New research conducted under the supervision of Dr. Juergen Richt, DVM, Ph.D., is showing promise in helping to fight this deadly virus. "Emergence of a novel drug resistant H7N9 influenza virus: Evidence based clinical potential of a natural IFN-alpha for infection control and treatment" is set to publish this month in an early online edition of the journal "Expert Review of Anti-infective Therapy."

Dr. Richt, the Regents Distinguished Professor at Kansas State University and an Eminent Scholar of Kansas Bioscience Authority (KBA), is the director of the U.S. Department of Homeland Security Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD), which is working with scientists at Hemispherx Biopharma Inc. to develop novel pharmacological treatments. Research for the H7N9 project was conducted at K-State's Biosecurity Research Institute (BRI) mainly by Dr. Qinfang Liu in Dr. Richt's laboratory.

Dr. Richt is recognized as an expert on zoonotic agents and has published extensively on the monitoring of mutations and basic events leading to cross-species transmission of influenza viruses and the opportunities to adapt to human hosts, with the potential to cause a pandemic. Because of the lack of existing immunity against H7 subtype influenza viruses in the human population and the absence of a licensed commercial vaccine, antiviral drugs are critical tools for the treatment of human infections with this novel H7N9.



"Both M2-ion channel blockers (e.g., amantadine) and neuraminidase inhibitors (e.g., Tamiflu, Relenza) are used as antiviral drugs for influenza infections of humans," Dr. Richt said. "The emerging H7N9 viruses are resistant to the M2-ion channel blockers and some also to neuramidinidase inhibitors because of mutations in the respective proteins. In this study we report that Alferon N can inhibit wild type and Tamiflu resistant H7N9 virus replication in vitro. Since Alferon N is approved for clinical use, this would allow a rapid regulatory approval process for this drug under pandemic threat."

CEEZAD was officially inaugurated in June 2010, with its first annual conference held in Manhattan. It was formed to enhance the capability of the U.S. Department of Homeland Security (DHS) by developing "state of the art" countermeasures for high priority emerging and zoonotic animal diseases.

Alumni work together to 'crown' a cougar at Salina zoo

Photo and story by Rolling Hills Zoo

The Rolling Hill Zoo veterinarian, Dr. Danelle Okeson, DVM class of 1996, and veterinary technician, Sara McGinnis, make sure that all the zoo's animals have regular check-ups — that includes their teeth! For many of the zoo's animals, good dental care is as important for survival, as food and enrichment.

With assistance from both "human" and veterinary dentists, many procedures take place on an ongoing basis. Once in a while there is a special case that gets noticed. The zoo's beautiful female cougar, Sadie, was just such a case.

Sadie had shown some abnormal wear on her upper left canine tooth that required some extra strengthening. Enter Dr. Douglas Winter, DVM class of 1987, who has had experience putting crowns on animal teeth. Thanks to the work of these veterinarians, Sadie has a beautiful and strong crown to enable her to use her teeth as she should. Seeing her growl is a little more visually interesting after her "coronation"!

Sadie is not the only animal to undergo some special dental care. It is not uncommon for aardvarks to have dental issues with their unique teeth composition (no enamel) and have had required treatment. Raja, the white tiger, recently had a root canal; Rusa, the orangutan, had some issues with periodontal disease; and Boo Boo, the Andean Bear has been given some special dental attention as well.

February is Pet Dental Health Month.

Second-year student wins travel award for AALAS Meeting

Second-year student Brian Smith was one of five students from different veterinary colleges to win a travel award to the American Association of Laboratory Animal Sciences national convention held in Baltimore last October. He was nominated for this award by Dr. Sally Olson, assistant director, Comparative Medicine Group. The award is sponsored by ASLAP, American Society of Laboratory Animal Practitioners. The intention of the program is to increase awareness of the practice of laboratory animal medicine by assisting students to attend the annual AALAS national meeting.

"I have gotten to know Brian because he is looking to do a residency after veterinary school in laboratory animal Medicine and eventually becoming boarded in laboratory animal medicine," Dr. Olson said.

Second-year Brian Smith (in purple) joins the ASLAP Veterinary Student Travel Award winners who attended the ASLAP luncheon at the AALAS Meeting in Baltimore. They are pictured here with ASLAP President Wanda West (left) and ASLAP Veterinary Student Liaison Committee Chair William Hill (right).

Thirty years and going strong

Audrey Fritz, senior administrative assistant, celebrates upon receiving her 30-year pin as a state employee, presented by Shirley Arck, the VHC hospital administrator.

CVM NEWS TICKER

Registration is open for the **BioKansas One Health Summit** on March 5 and 6 at Sporting Park in Kansas City, Kan. The university is an event sponsor. The One Health Summit offers podium presentations and panel discussions by subject matter experts working across human, animal, and plant sciences. The event also provides networking and exhibit opportunities to enhance connections within our bioscience community. Among the presenters are: **Dr. Ralph Richardson**, dean of the College of Veterinary Medicine; Kent Glasscock, president of the Kansas State University Institute for Commercialization; **Dr. Brian Lubbers**, director of clinical microbiology, Kansas State Diagnostic Laboratory; and **Dr. Scott McVeigh**, adjunct professor of diagnostic medicine and pathobiology.

Congratulations to **Dr. David Biller,** whose son, **Jake,** signed a letter of intent to play baseball at Fort Scott (Kan.) Community College. Jake is primarily a second-baseman and middle infielder. They've shared a link to Jake's recruitment video: http://www.youtube.com/watch?v=wV4ydEL7vhE

Upcoming Events

A&P Seminar Series. Seminars begin at 3:30 p.m., Mara Conference Center, 4th floor, Trotter Hall

Feb. 24: Dr. Jim Lillich, Kansas State University
March 3: Dr. Kristopher Silver, Kansas State University

Instructional Technology and Design workshops: Offered for CVM faculty and staff in the Mara Conference Center. Please watch for email announcements for more information about each workshop.

Qualtrics: The New K-State Survey Tool, presented by Hong Wang, 3:30-4:30 pm, Tuesday, February 25.

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