Bioscope

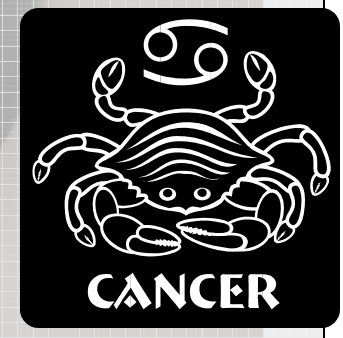
Southwestern University
DEPARTMENT OF BIOLOGY

Two Special Surprise Grants Awarded to Biology Department

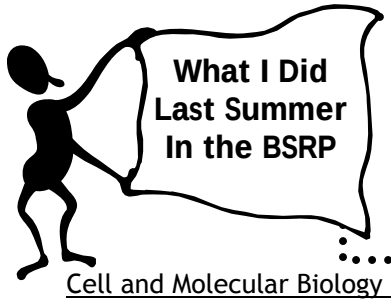
This Spring brought good news to the Department of Biology in terms of additional money to support the weekly Biology Seminar Series as well as student research related to cancer studies.

An anonymous donor to the University gave additional funds to enrich the weekly Biology Seminar Series (BSS). The Biology Department works diligently to provide a weekly series. Dr. Maria Cuevas and Dr. Maria Todd have served as recent organizers of the BSS. The Biology Department hopes to use these funds to bring in a special speaker, possibly a collaborator with current faculty. The Series frequently includes talks from distinguished scientists from area Texas universities, medical schools and other graduate programs. In addition, some capstone students may present their research in this forum. The Department also gives students the opportunity to go to lunch with the speaker after the presentations. The Series takes place usually on Thursdays at 12 in Fondren Jones 151 (see pg. 11 for a list of future seminars).

Along with the Chemistry Department, the Biology Department has received special funds for securing equipment and supplies that will provide for undergraduate research opportunities related to cancer investigations. President Jake Schrum facilitated this graph from the JP Morgan (Crump Fund) for Cancer Research.



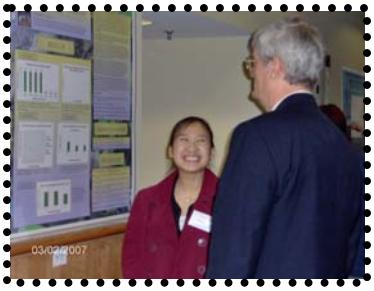
Many of the research efforts of our cell and molecular faculty could ultimately relate to cancer research, such as Dr. Todd's work on the Cyclin E gene in ovarian or breast cancer, Dr. Cuevas's work with tamoxifan and anthrapyrazoles (i.e. potential cancer drugs) or Dr. Gonzalez's work on DNA repair. Funds like these help the Biology Department to continue to provide special opportunities for our students, be it seminar or research opportunities.



Nine *2006* BSRP Students Present Research at Texas Academy of Sciences, including 1 Award Winning Poster!

Cell and Molecular Biology Posters:

- **Jason Burnham**, Dr. Frank Guziec, Dr. Lynn Guziec and Dr. Martín Gonzalez. The Effect of the Dipeptide D-Alagly on Lexa Cleavage in *E. coli*
- **Julianne Stafford** and Dr. Martín Gonzalez. Identifying the LON Recognition Sequence in the Carboxyl-terminus of the UMUC Protein.
- **Erica Navaira** and Dr. Maria Cuevas. *In Vitro* Effects of 4-OH Tamoxifen and 17 Beta Estradiol on the Human Cervical Cell Line HeLa.
- **Kurt Seilheimer**, Dr. Frank Guziec and Dr. Maria Cuevas. Cytotoxicity of Anthrapyrazoles in various reproductive cancer cell lines .
  - **Awarded 3rd Place as Best Undergraduate Poster. Congratulations!**



Jessica Hua (above) and Erica Navaira (below) each explain their research research.

Terrestrial Ecology and Management Posters:

- **Jose Grande**, Dr. Ben Pierce and Jessica Hua. Effect of Disturbance, Position of Observer, and Moonlight on Anuran Call Survey Efficiency.
- **Jessica Hua**, Dr. Ben Pierce and Jose Grande. Salinity Tolerance of Tadpoles from Central Texas.
- **Brian Miller**, Holly Allen and Dr. Max Taub. A Meta-Analysis of the Effects of Rising CO_2 Levels on the Nutritional Content of Staple Crops.

Freshwater and Marine Science Oral Presentations:

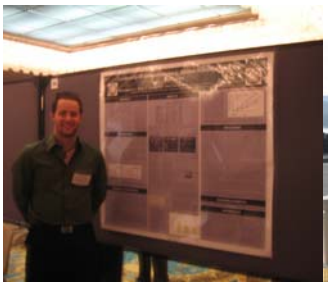
- **Brandon Boland,** Abby Youens and Dr. Romi Burks. Small Snails, Big Appetites: Contrasting Resource Consumption between Two Species of Applesnail.
- **Abby Youens,** Brandon Boland and Dr. Romi Burks. Growing at a Snail's Pace: Negative Impacts of Salinity and High Density on Growth Measures of *P. insularum*.
- **Matt Barnes** (back for a visit), Abby Youens, Sarah Hensley and Dr. Romi Burks. In Too Deep: Egg Clutch Water Exposure May Suppress Hatching and Increase Conspecific Predation of Eggs in the Potentially Invasive Applesnail, *P. insularum.*

Faculty and students at the Texas Academy of Sciences annual banquet.

Taking SU-Biology National!

Senior Kurt Seilheimer and Dr. Maria Cuevas travel to San Francisco, CA to the AAAS meeting to present their research!

"I marvel at the progress I see in the student's writing ability when they take ownership of their work." Dr. Cuevas



ABSTRACT FOR AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE MEETING IN SAN FRANCISCO!

Cytotoxicity of anthrapyrazoles in various reproductive cancer cell lines. Seilheimer, K.C., Boet C., Guziec, F.S. and Cuevas, M.E. Southwestern University, Georgetown, TX

Anthrapyrazoles (APs) are potent cytotoxic agents that intercalate with DNA, causing DNA strand breaks and inhibition of DNA synthesis and topoisomerase II. These compounds were developed in an attempt to lower the high cardiotoxic side effects seen with the use of anthracyclines. The objective of this study was to determine the cytotoxic effect of AP-10 and AP-11 on human MCF-7 (breast), HEC 1A (endometrial), SK-OV-3 (ovarian), and DU-145 (prostate) carcinoma cell lines. Cell cultures were treated for 1 hour with different concentrations (0.1μM-20.0μM) of AP-10 and AP-11. Cells were allowed to recover for 48 hours in fresh media, and cell viability was determined by MTS assay or trypan blue dye exclusion assay. The IC50 of AP-10 on MCF-7, HEC 1A, SK-OV-3 and DU-145 was determined to be 1.5μM, 4.5μM, 3.55μM and 0.4μM respectively. Whereas the IC50 of AP-11 on MCF-7, HEC 1A, SK-OV-3 and DU-145 was found to be 2.5μM, 7.65μM,6.5μM and 3.2 μM respectively. Using trypan dye exclusion assay we were able to confirm the cytotoxic effect of AP-10 and AP-11 distinguishing it from cell growth inhibition. To determine if cells were able to recover after exposure to AP-10 and AP-11, DU-145 cells were incubated in the presence of the IC50 concentration. After exposure, fresh media was added daily for 5 days and cell growth compared to control. Although cells exposed to AP-10 and AP-11were able to recover, they never attained the cell number observed in cultures that were never exposed to the compounds. Finally, based on DNA gel electrophoresis, apoptosis seems not to be the underlying cellular mechanism of AP-10 and AP-11's cytotoxic effect. In conclusion, our results demonstrate that AP-10 has a higher cytotoxic activity than AP-11, their cytotoxiciy is indeed due to cell death, but apoptosis seems not to be involved. Future studies will include further analysis of alternate cellular mechanisms involved.

Keywords: Anthrapyrazoles, prostate cancer, endometrial cancer, breast cancer, ovarian cancer, cytotoxicity.

What did you think of the AAAS meeting?
DR. CUEVAS: "It was a good meeting to attend as it provided the perfect forum for the interaction among scientists from multiple disciplines. This year's general theme was "Science and technology for sustainable well-being", where the influence of science and technology on the human condition was discussed at a multitude of levels.
KURT:"The AAAS meeting was a very interesting experience. It was amazing to see all the different types of research going into the science and technology of today. There was a great diversity of research.

How was it presenting your research as an undergraduate there?
KURT: "For me, presenting my poster as an undergraduate was quite an experience, personally because I was one of the only undergraduates present. Many of the presenters of the posters were graduate students. I was a bit nervous at first, but once I started talking and getting questions asked, it became a great experience."

What would you share with students about presenting a poster?
DR. CUEVAS: "To be confident in their knowledge! After all, they did the work and interpreted the data, so they know more than the person reading the poster. Also, I tell my students to take their time in "walking" the people through their poster.
KURT: "Presenting a poster can be a lot of fun. It is great to see a final product that looks great that you know a lot of work and time was put into making it. By presenting your work in a poster format, not only do you get to impress people with the final poster product, but you get to show them your hard work and determination in your research."

What was the highlight of the meeting for you?
DR. CUEVAS: "Attending the symposia on "Life Science for Sustaining Health". Great speakers and very interesting research."
KURT: "The highlight for me was being able to see San Francisco because I have never been there. San Francisco reminded me a lot of Austin in many ways. It is a very diverse city and I got to see such things as the Golden Gate, Alcatraz, Chinatown and PIER 39.

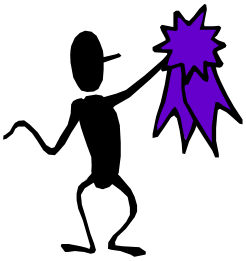
CONGRATULATIONS

BIOLOGY STUDENT OF THE YEAR:
Tracey Einem

For her dedication to the Biology Dept., Tracey received Molecular Biology of the Cell!

·Undergraduate Researcher with Dr. Maria Cuevas
·Denmark Study Abroad
·βββ Officer
·2005 MERCK/BSRP Participant
·Plan: Fellowship Position at the National Institutes of Health

AWARD OF EXCELLENCE IN ANIMAL BEHAVIOR:
Sarah McCracken

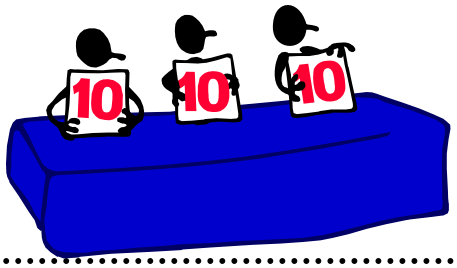


For her dedication to the AB Program, Sarah received her own stethoscope!

·Undergraduate Researcher with Dr. Fay Guarraci in Psychology
·Veterinary Technician
·Animal Behavior Program Committee
·Plan: Vet School

Dr. Guarraci with the newest addition to the AB Program – Cole Thomas Frohardt. Only 4 months and already reading!

SUCCESSFUL HONORS STUDENT:
Kristen Meerbrey



Honors Student with Dr. Maria Todd
·2005 BSRP Participant
·Varsity Athlete (Soccer)
·Plan: Pursue a Ph.D. in Cancer Research

Have exciting news? Share it with your fellow biologists in *BioScope!*

UNCF-MERCK FELLOWSHIP (+research $ to program):
Delia Shelton (Animal Behavior Major)

·Undergraduate Honors Student with Dr. Jess Purdy
·Plan: Graduate School
·Past experience: REU
·SMArTeams member
·Coordinator for Animal Behavior Day!

βββ Goals

1) **To promote biological understanding and appreciation.**
2) **To provide activities and experiences in biology.**
3) **To expose students to numerous avenues in the biological field.**

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Faculty and Officers:

Front row: Dr. Rebecca Sheller, Kurt Seilheimer, Dr. Maria Cuevas, Ms. Linda Southwick, and Dr. Romi Burks
Back Row: Dr. Ben Pierce, Greg Hagemann, Kurt Seilheimer, Dr. Martín Gonzalez, Abby Youens, Dr. Max Taub, Matt Kauffman and Jason Burnham.

βββ gathers together for Induction Ceremony:

Tri-Beta inducts eligible applicants who have completed the introductory Biology course as well as 1 upper-level Biology course, and who have a 3.0 Biology GPA and a 2.5 overall. Students who do not meet these requirements, but who have an interest in Biology are inducted as Associate Members.

Primary faculty sponsor: Dr. Maria Cuevas. Strongly endorsed by all faculty of the Biology Department.

Current *βββ* Members, New Inductees in ***Bold Italics***

Barnett, Amanda
Battarbee, Ashley
Boland, Brandon
Bolton, Jessica
Bothwell, Ian
Burnham, Jason
Chatfield, Laura
Clay, Sarah
Cordevas, Carlos
Culling, Brad
Daulton, Ian
Decker, Heather
Einem, Tracy
Evans, R. Shug
Ferrero, Sarah
Figueroa, Amanda
Fonseca, Erendira
Ford, Brittany
Foster, Bryce
Frankel, Anna
Frantzich, Kara
Fu, William
Gandhi, Roshni
Garza, Alheli
Gibbs, Jennifer
Gibson, Caitlin
Gonzalez, Adriana
Hagemann, Greg
Herberger, Jean
Hoerauf, Amber
Horst, Kalyn
Huie, Sara
Hust, Michael
Ingram, Jordan
Jampana, Sumith
Jones, Jason
Jones, Taylor
Kainthla, Radhika
Kauffman, Matthew
Kaufman, Christopher
Kramer, Jaclyn
Kwee, Eileen
Kyle, Colin
Le, James
Le, Kim
Leerberg, Dena
Levenson, Lauren
Lockwood, Robert
Manusov, Scott
Mareno, Mary
Martinez, Michelle
McConnell, Carlee
McCracken, Sarah
McDavid, Jessica
McDonough, James
Miller, Brain
Mohammed, Amanda
Montemayor, Veronica
Nadal, Berenice
Navaira, Erika
Nguyen, Gem
Nguyen, Phuong (Fern)
O'Connor, Meghan
Osborne, Rachel
Pattie, KerryLynne
Penney, Samantha
Piana, Brytanie
Raeke, Sheila
Robey, Meredith
Russell, Stephanie
Sanchez, Valeria
Seilheimer, Kurt
Shroff, Jay
Siciliano, Katherine
Smith, Shane
Stafford, Julianne
Staloch, Dustin
Stanzer, Melanie
Stribling, Mariel
Sudhakar, Sunita
Tieu, Loc
Unzeitig, Alison
Watson, Josh
Wedig, Evan
Yeung, Kristin
Youens, Abigail

BIOSCOPE FOCUS: Pedagogical & Scholarly Updates

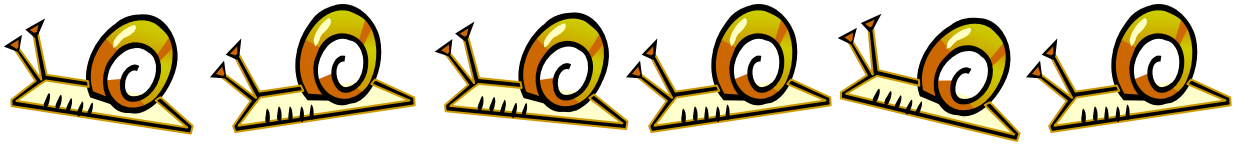
- **NEW BIOLOGIST TO ENRICH PAIDEIA –** Congratulations to **Dr. Maria Cuevas** who will join the ranks of the Paideia Professors next year. Dr. Sheller will see her 2nd cohort graduate and Dr. Taub continues to be involved in Paideia. Biology remains well-represented in this program!
- **BIOLOGY FACULTY HEADED TO INTERNATIONAL CONFERENCES:**

  Dr. Max Taub will present his meta-analysis on CO_2 dynamics at the EcoSummit 2007 conference in Beijing, China.

  Dr. Romi Burks will present recent research on the fate of egg survival at the SIL meeting (International Society of Limnologists – those that study lakes) in August in Montreal, Canada.
- **SOUTHWESTERN UNDERGRADUATE RESEARCH GROUP EXPERIENCE** Funded. **Dr. Maria Todd** and **Dr. Romi Burks** will participate with other faculty across campus [Dr. Potter (Comp. Sci), Dr. Alexander (Physics), Dr. Purdy (Psychology/AB), Dr. Stockton (English), and Dr. Nenga (Sociology)] in collaborative research with students. A Fleming Grant from the University will provide for this new experience.
- **PAPERS ACCEPTED:** Congratulations to Visiting Faculty **Dr. Veronica Martinez** on the following publications from her post-doc and Ph.D.:
  - Martinez, VG, Javadi, CS, Ngo, E, Ngo, L, Lagow, R, Zhang B (2007). Age-related changes in climbing behavior and neural circuit physiology in *Drosophila*. *Developmental Neurology* (Accepted 7/2006).
  - Zoran, MJ and Martinez, VG (2007). *Lumbriculus variegatus* and the Need for Speed: A Model System for Rapid Escape, Regeneration and Asexual Reproduction. In: Annelids as Model Systems in the Biological Sciences. Shain, D (Ed.). (Invited Chapter - Submitted).
- **Dr. Ben Pierce** also recently had a paper accepted to the *Journal of Herpetology:*
  - Pierce, B. A. and K. J. Gutzwiller. Inter-observer variation in frog call surveys.
- **BOOK REVIEW:**
  - **Dr. Romi Burks** wrote a review on *Introduction to Population Ecology* that appears in the March issues of *BioScience*.
- **PAPERS SUBMITTED:** Alumni Matt Barnes '06 and his "writing team" of Abby Youens, Brandon Boland, Becca Marfurt '05, Jen Hand (Houston) and **Dr. Burks** recently submitted their paper to *The Nautilus.*

Cracking the shell: a first look at fecundity, growth and resource assimilation of the exotic applesnail, *Pomacea insularum*, in Texas. Picture of "Saturday Writing Day on 01/06/07"

- **MS. SOUTHWICK TO TEACH IN NEW MEXICO:**
  - This summer, Linda Southwick will be teaching at the University of New Mexico at Gallup. She will be providing anatomy classes to future nursing majors.
- **NATIONAL SCIENCE FOUNDATION GRANT SUBMITTED:**
  - **Dr. Romi Burks** submitted an Ecology Grant in January to fund more collaborative research with students and international experiences in Uruguay. **Dr. Maria Todd** would participate in examining microsatellites. In February, **Dr. Burks** also served on a grant review panel for NSF. We'll keep our fingers crossed!



Mini-Courses (7 weeks only – see WebAdvisor for specifics on lab days and schedules):

1. Biodiversity – Dr. Burks – MWF 10 & 11 + Lab
2. Cell Biology – Cuevas – MWF 10 & 11 Lab
3. Methods in Ecology & Evolution – Dr. Pierce – TuTh 8:45 – 10: 45 a.m.
4. Methods in Cell & Molecular Biology – Dr. Todd - TuTh 8:45 – 10: 45 a.m.

Upper-Levels

1. Organ Physiology (32)– Dr. Sheller – MWF 9 with M or Tu Lab
2. Evolution (16) – TBD – Tu/Th 1-2:15 with Th Lab
3. Fundamentals of Immunology (32)– Dr. Gonzalez – Tu/Th 9:30 – 10:45 with W or Th Lab
4. Biochemistry (28) – Dr. Foote – MWF 9 with M or W Lab
5. Cellular Physiology (16) – TBD – Tu/Th – 8-9:15 a.m. with T Lab

Capstone Options

1. Organ Physiology
2. Fundamentals of Immunology
3. Research Capstone with Biology Faculty
4. Pre-Approved (i.e. Proposal to Dept) Internships

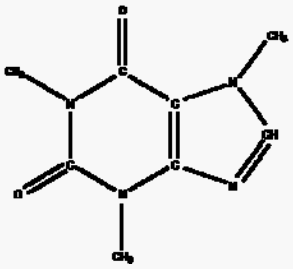
New Biology Technician:

WELCOME TO CHRIS POMAJZL

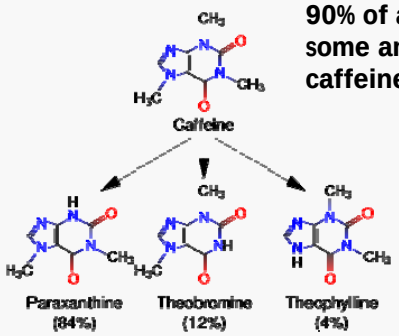
Hello. My name is Chris Pomajzl -- pronounced *Puh-my'-zul* -- but please call me Chris. With great enthusiasm, I have come to SU to be the Biology Department Technician. I would like to take this opportunity to tell you a little bit about myself. I grew up in Dallas, began my college career at Texas A&M and received my BS in Zoology from UT in 1994. I worked in small animal veterinary medicine for several years, then went on to be a research technician at UT Southwestern Medical School in Dallas. While there, I began working in the Molecular Pathology Core lab where I learned the science of Histology. Our research projects primarily involved the characterization of novel genes in animal models using various histological techniques, and our group performed most of the histology and digital imaging for the entire research community at the medical school. In 2003, I passed the national exam to become a certified Histotechnologist. Shortly thereafter, I met my future wife Kiersty. I moved to Georgetown in 2004 to be with her, and we were married in 2005. I was hired to be the Histology Department Supervisor at Clinical Pathology Laboratories in Austin - CPL is the largest private reference laboratory in the United States. I ran a department of 30 employees with several labs located throughout the Central Texas area. And now I am very happy to be back in the academic environment, and I have found Southwestern to be a wonderful place to be. My wife and I have two children, Elijah who is 4 and Violet who is 5 months old. I enjoy music, sports, cycling, working in the yard, and spending time with my family. I look forward to meeting and working with all of you. Please feel free to stop by and say "Hello".

Learn something new from BioScope Magnifications:

- **MOLECULE and PATHWAY: Caffeine**



Global consumption of caffeine has been estimated at 120,000 tons per annum, making it the world's most popular psychoactive substance. This number equates to one serving of a caffeine beverage for every person, per day. In North America, 90% of adults consume some amount of caffeine daily.



Caffeine is metabolized in the liver by the cytochrome P450 oxidase enzyme system (specifically, the 1A2 isozyme) into three metabolic dimethylxanthines, which each have their own effects on the body:

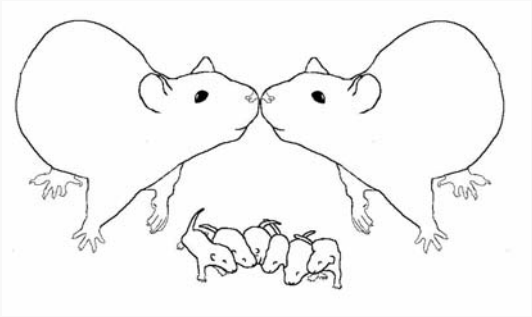
* **Paraxanthine (84%) –** Has the effect of increasing lipolysis, leading to elevated glycerol and free fatty acid levels in the blood plasma.

* **Theobromine (12%)** – Dilates blood vessels and increases urine volume. Theobromine is also the principal alkaloid in cocoa, and therefore chocolate.

* **Theophylline (4%)** – Relaxes smooth muscles of the bronchi, and is used to treat asthma. The therapeutic dose of theophylline, however, is many times greater than the levels attained from caffeine metabolism.

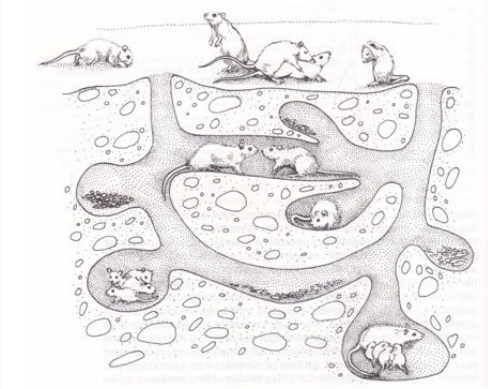
http://en.wikipedia.org/wiki/Caffeine#Metabolism

- **ORGANISM: Common laboratory rat *Rattus norvegicus***



Used extensively as a model organism for studying normal and disease processes in the human, primarily because of an extensive body of knowledge of rat physiological mechanisms, a significant number of rat models that mimic human diseases, the ease of breeding the rat, and the ability to generate inbred congenic and consomic rat strains. In relation to caffeine, Dr. Guarraci in the AB Program found that female rats exposed to moderate doses of caffeine increased their sexual behaviors (Guarraci & Benson 2006). However, they had never been exposed to caffeine before!

- **ECOSYSTEM: Belowground soils**



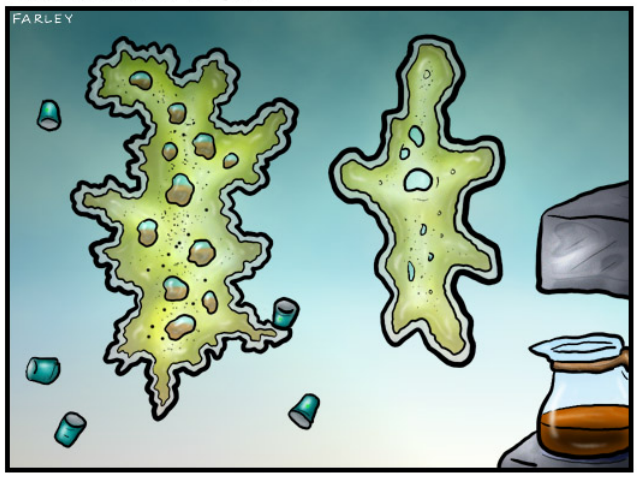
The typical social organization of wild Norway rats is a ***breeding deme****. A breeding deme is a small group of animals consisting of a few females, a small number of males, and their many subadult offspring. From McClintock 1987.*

Belowground soils provide homes to many rodents, not to mention a ton of invertebrates, fungi and other microbes. Soil properties including the amount of organic material, mineral and nutrient composition and water holding capacity all interact to provide habitat.

Students and Faculty interested in submitting announcements, items for focus, profiles or highlights (i.e. Magnifications) to *BioScope* should email Dr. Burks (burksr).
Next Issue: August 2007

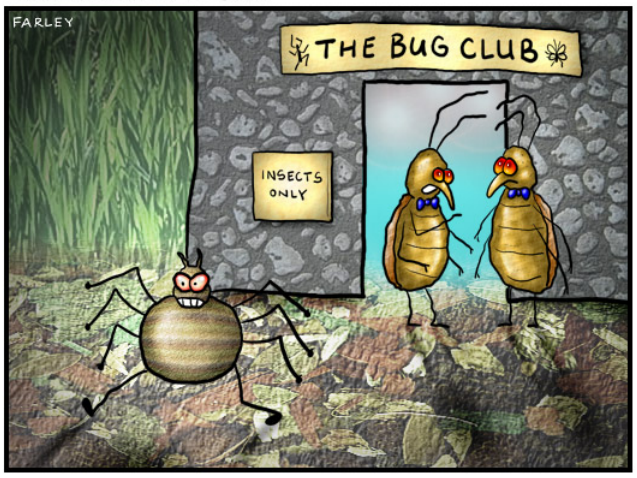
Laughs Across the Phyla: Send an email to burksr@southwestern.edu correctly identifying the 6 phyla below and win a prize! First one with all correct answers!

DOCTOR FUN



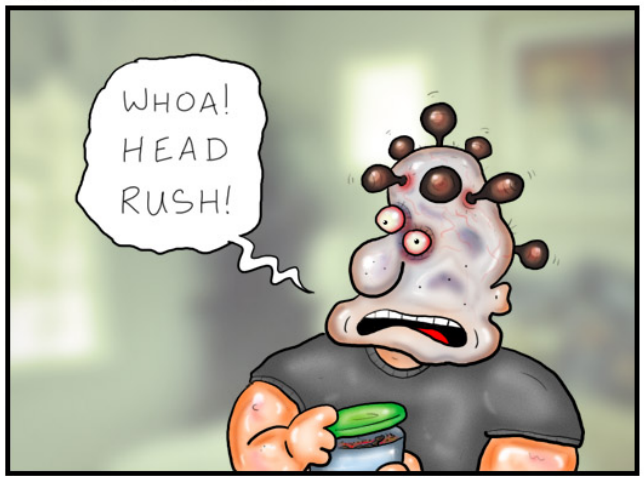
"Don't you think you've had enough coffee?"

DOCTOR FUN 11 Aug 98



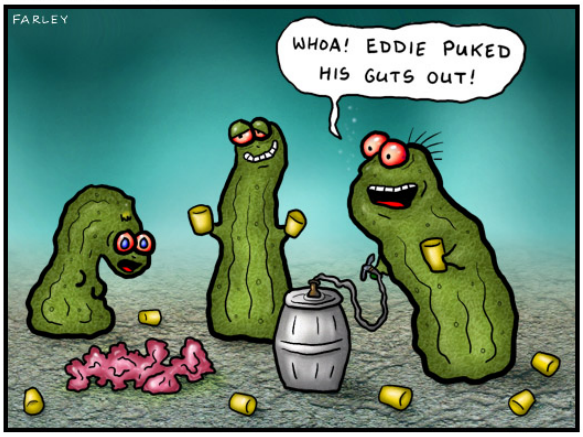
"Dang it, Willy! How many times do I have to tell you to count legs?"

DOCTOR FUN



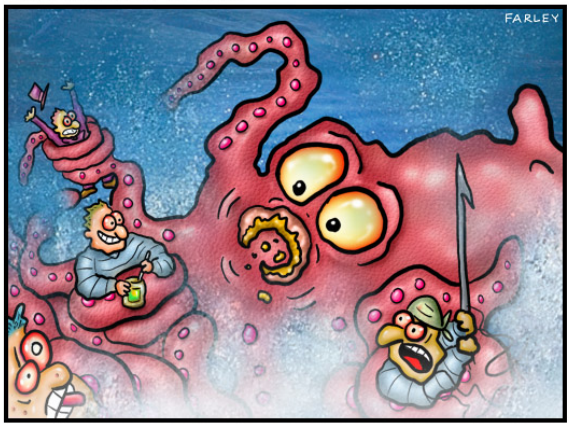
The misuse of medicinal leeches

DOCTOR FUN 24 Mar 98



Sea Cucumbers: the definitive party animals of the deep

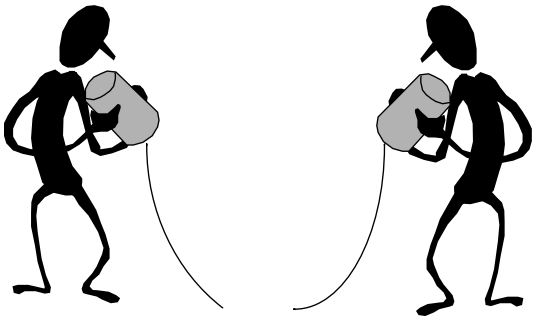
DOCTOR FUN



"Hey! Don't you know it's cruel to feed peanut butter to a giant squid?"

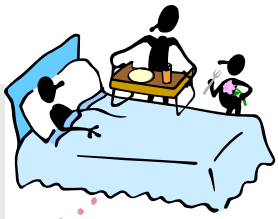
DOCTOR FUN 2 April 96

Tapeworm amusement parks



Did you hear about this?

- ΒΒΒ will host a Study Abroad as a Biology Major discussion on Tuesday, March 27th at noon in FJS.
- **Premeds who are applying to medical school** this summer, to be admitted into medical school in Fall 2008, need to notify the Premedical Advisory Committee before April 27, 2007.



- **RUN & EXPOSE YOURSELF** to the work of your fellow Biologists as they present their research at the 2007 Southwestern University Undergraduate Research and Creative Works Symposium on April 18th.
- **SENIORS** - look for information soon on the annual department picnic.

- **New Undergraduate Researchers Wanted:** Dr. Burks would like to recruit new students into the **Aquatic Ecology lab** to continue investigating the life history of applesnails. Lots of opportunities await (summer position, possible international travel, presentations and hopefully publication!) – email or talk to Dr. Burks!
- **Biology Seminar Series:**
  - **March 29** (Thursday): Scott McLean (Kinesiology): "The Bilateral Deficit : Challenges to Human Motor Control"
  - **April 2** (Monday) : Dr. Michael Domjan (UT Austin): "Modifications of sexual behavior by Pavlovian conditioning."
  - **April 5** (Thursday) : Abigail Youens and Brandon Boland-- capstone presentations
  - **April 12** (Thursday): Dr. Xianzhong Wang from IUPUI: CO_2 dynamics
  - **April 19** (Thursday): Dr. Allan Hook (St.Edward's University): "Behavioral Ecology of the sand wasp, *Bembecinus negletus* in central Texas"
  - **April 23** (Wednesday): Dr. David Hills (UT Austin): "The Discovery of Life on Earth".

- The pilot team of SMART (Science and Math Achiever Team) will host an open house of their inquiry projects on Monday, April 16th at 5 p.m. at Williams Elementary. Contact Dr. Burks (burksr@southwestern.edu) for info.
- **ANIMAL BEHAVIOR DAY AT SU** IS **APRIL 20TH!** AB majors will be discussing Animal Behavior with students from Williams Elementary. Events are planned from 3-5ish, contact Delia Shelton for information (sheltond@southwestern.edu).