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The K-INBRE Newsletter

K-INBRIEF

Kansas IDeA Network of Biomedical Research Excellence

Fall 2004 Volume 3 Issue 2

The opportunity to DISCOVER

Joseph Chapes
Editor

Carrie Norris (Photo Submitted)

Somewhere in a lab at the University of Texas Southwestern Medical School is a graduate student named Carrie Norris who got there with her education, positive personality and a little help from an organization called K-BRIN.

Norris is currently working under Dr. Matt Porteus in a lab whose focus is gene targeting using zinc-finger nucleases, but one year ago, she was an undergraduate at Kansas State University deciding whether she should become a graduate student. Her experience with K-BRIN helped her in her decision.

"K-BRIN offered me the opportunity to discover what I otherwise would have missed. I never even considered grad school because I just figured it wasn't for me," she said. "When I started doing research, though, I realized that my ignorance was why I felt that way. Research is great for me because I like to problem solve and challenge myself."

While doing research, she showed she had the talent to continue to do research. Dr. Keith Woods, Senior Research Associate, who worked with Norris while she was at KSU, noticed this.

"Some of the qualities she exhibited were the ability to listen and pay attention to detail. After she became familiar with her project, she showed a promising capability of thinking through some of the problems she encountered," Woods said. "It takes someone with a great deal of perseverance and a little stubbornness to

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Questions and comments can be sent to jchapes@ksu.edu.

Carrie Norris

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succeed. Carrie has showed such qualities in the relatively short time that I have known her."

Norris, with her experience in searching for a graduate school, has several suggestions for undergraduates searching for a school to continue their education.

"Sometimes people make the mistake of trying to get into 'the best' school instead of trying to get into the school that may be right for them. My suggestion is to try to decide what you want to work on before you go shopping for a grad school," she said. "Also, try to decide how you want to approach the problem (biochemistry, genetics, biophysics, molecular biology). Don't forget to look at the individual labs as opposed to the school in its entirety."

There are also differences between expectations for graduate students compared to undergraduates.

"Classes and grades are not that important. The only thing anybody really cares about is the quantity and quality of work you're doing in the lab," Norris said. "It feels more like a job; you aren't going to get points docked for cutting class, but you may miss out on something that was taught that day (of class) resulting in your work struggling somewhere down the road."

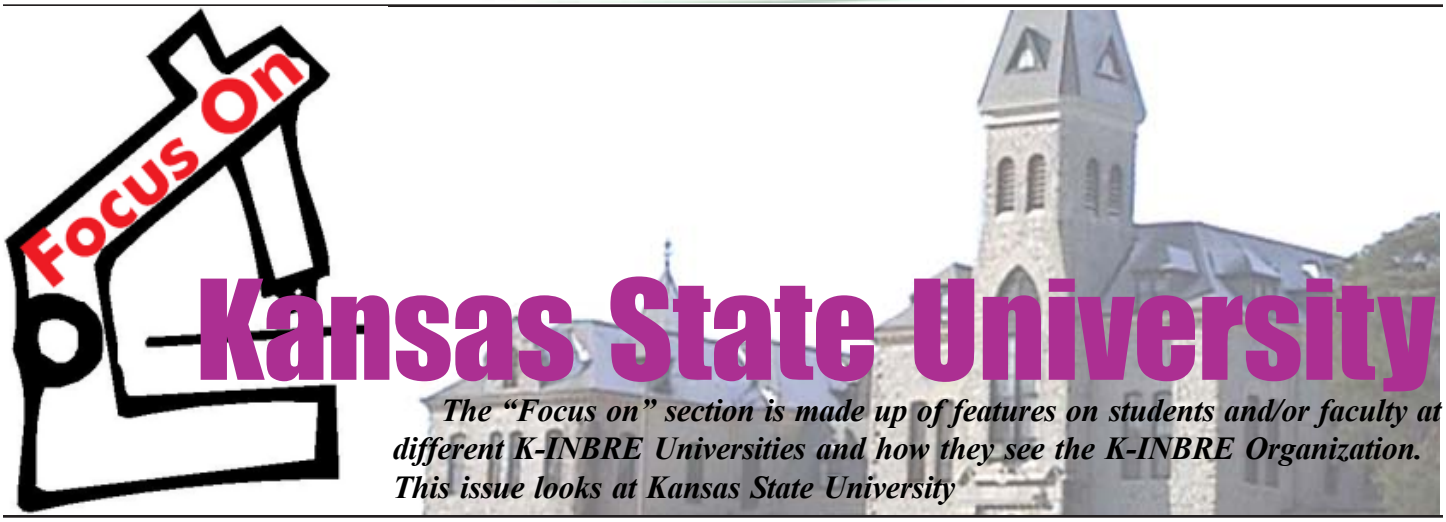
In the end, Norris is thankful for her experience she received from K-BRIN.

K-BRIN changed my life. Without the experience Dr. Keith Chapes, Dr. Larry Williams and Dr. Steve Upton provided me, I wouldn't be as happy and blessed as I feel everyday. Thank you for the possibilities."

Advice from Carrie Norris to undergraduates considering going on to graduate school:

1: GET IN A LAB! "This is essential so you can figure out if research is for you, to familiarize yourself with techniques, and it's a must for most grad schools."

2: READ PAPERS! "This is hard at first, but crucial to understanding how science works. You'll also find out really quick what you find fascinating and what you find excruciating."



Kansas State University

The "Focus on" section is made up of features on students and/or faculty at different K-INBRE Universities and how they see the K-INBRE Organization. This issue looks at Kansas State University

Kajsa Affolter, Student

Mentors: Drs. Rollie Clem and Sue Brown

What is your current project?

"To begin understanding the regulation of apoptosis in the flour beetle, Tribolium castaneum, I have conducted a genetic screen for cell death patterns that exist in the wildtype beetles. I am now working towards the establishment of mutants for genes that are believed to be directly associated with the process of apoptosis."

Kajsa Affolter (Photo Submitted)

What got you interested in research?

"The trajectory of my life has been molded by science. This has risen from both an educational standpoint and compassionate perspective. As I experienced my grandfather's prolonged illness and death first hand, several years ago, my emotions found their way to the surface accompanied by questions surrounding the mysteries and intricacies of life. At this point, I found my unrelenting passion for science, and, since then, have continued to make inquiries and challenge my thought process through various types of laboratory research."

What kind of research would you like to receive training in?
How will this experience help you in the future?

" My current research project involves two subjects that are of great interest to me, genetics and apoptosis. I would like to expand my knowledge of these topics, enabling myself to work with more complex human conditions. Although the future holds infinite possibilities, I hope my experience with K-BRIN can possibly help me attain a career in biomedical research."

John Anderson, Student

Mentor: Dr. Helmut Hirt

What is your current project?

"Right now I have approximately 120 isolates of varying species of enterococcus that were taken from bison at the Konza Prairie. I have been working on characterizing these for certain virulence factors. Areas of interest include: antibiotic resistance, presence of a hemolysin gene, and presence of a protease gene. This should be a very healthy population, so it is interesting to determine where the bacteria are getting their virulence factors from (i.e. are they on a plasmid, is the plasmid mobile?)."

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Focus on Kansas State University

John Anderson (Photo Submitted)

How does your mentor help you?

"Dr. Hirt does a very good job of providing guidance. He will usually give me a set of instructions or goals and then give me quite a bit of freedom in how I go about accomplishing them. I like working for him because he gives me freedom to learn at the cost of making mistakes sometimes, yet he is always willing to help me when I get stumped and don't know where to go."

How has K-BRIN/K-INBRE helped you to expand your scientific knowledge and experience?

"K-BRIN has allowed me to have the experience of working in a lab; this experience has greatly expanded my scientific knowledge. I have learned a huge amount by working in the lab, probably almost as much as I have learned by sitting in a classroom. And I find it easier to retain what I learn in the lab because it is more hands on and practical. I have also learned a lot of research techniques that I never would have had the opportunity to learn in a classroom."

Shawna Frazier, Student

Mentor: Dr. John Tomich

What is your current project?

"My current project involves the interaction of selectively modified channel-forming peptides with cell membrane and synthetic bilayers, in relation to defects in epithelial chloride ion transport, a major factor in cystic fibrosis. Goals of my project are based on determining hydrogen bonding contributions to permeation rates and anion selectivity of a synthetic Cl^- channel by introducing a series of amino acid substitutions at the narrowest point in the pore."

What got you interested in scientific research?

"My curiosity in understanding how things work is what first got me interested in scientific research. For me, the chemistry of life makes perfect sense, and the ability to manipulate that chemistry in attempts to improve the quality of life is what I find fascinating."

How has K-BRIN/K-INBRE helped you to expand your scientific knowledge and experience?

"My K-BRIN experience has provided me with a strong foundation of laboratory techniques and experimental design in a formal research laboratory. I have been able to explore my own interests and abilities in scientific research, which has led to the decision to pursue an M.S. also in Biochemistry."

Shawna Frazier (Photo Submitted)

ANNOUNCEMENTS

Faculty Scholar Awards

This fall, six individuals were named K-INBRE Faculty Scholars. They included the following:

-Nancy Brooker, Ph.D. (PSU)
-Dennis Grauer, Ph.D. (KU-L)
-Michael Herman, Ph.D. (KSU)
-John Kelly, Ph.D. (KU-L)
-Warren Nothnick, Ph.D., H.C.L.D. (KUMC)
-Gregory Vanden Heuvel, Ph.D. (KUMC)

Left to right, K-INBRE Director stands with Drs. Warren Nothnick and Gregory Vanden Heuval during the KUMC Faculty Research Day on November 18, 2004. Nothnick and Heuval were both Faculty Scholar awardees from KUMC. (Photo by Marti Miller)

Faculty Scholars received an award of $10,000 to be used at their discretion in their research programs. Congratulations to all of the awardees.

Dr. John Kelly, right, was awarded the Faculty Scholar award from KU-L. (Photo by Nicole Madril)

Bledsoe places second in Poster Competition

Student Amber Bledsoe at an earlier KSU Poster event.

KSU student and K-INBRE Scholar Amber Bledsoe's project poster placed second at the University of Iowa Undergraduate Scientific Poster Competition.

Her project title was "Reduction in apomorphine-evoked rotations in hemi-parkinsonian rats by human cord matrix cells."

The competiton featured 31 students from the University of Minnesota, KSU, Luther College, Dordt College, University of Northern Iowa, Iowa State University and the University of Iowa.

When students' eyes glaze over:

Robin R. Patterson
Contibuting Writer

Before you read this article, do a "quick and dirty" experiment. Walk down the hall in any academic building at the university and pause by each classroom. What do you observe? Are students sitting quietly in chairs listening to a lecture given by a professor who is standing behind a podium? Are students actively engaged in group discussion or hands-on activities? Is the professor flashing Powerpoint slides while students take notes? Are student groups giving presentations or demonstrations? Tally your results. Did you see more passive classrooms than active classrooms? If so, your quick experiment would validate the current situation in college classrooms around the country. Despite a growing body of research that indicates the overall quality of teaching and learning is improved when active learning techniques are employed, most teaching in the halls of higher education remains a process of transmission – pouring knowledge into empty vessels.

Robin R. Patterson has been teaching biological science (microbiology, general bio, anatomy & physiology and medical lab procedures) at the Butler County Community College, Pennsylvania, for 14 years. She has BS is in Medical Technology MT(ASCP) certification, MS is in Microbiology & Immunology and an Ed.D. in Educational Leadership. Patterson was the 2003 recipient of the Butler County Community College Outstanding Faculty Scholar Award. She was the Former Chair of the American Society for Microbiology Education Division (Division W) and former chair of the ASM Committee for Pre-college Education. She also was an ASM Waksman Foundation for Microbiology Lecturer.

There is no debate that well-delivered lectures are valuable but it should be remembered that the thinking required while attending a lecture is low level and that the attention span of a typical college is no longer than twenty minutes.

Active learning isn't a new idea; indeed, learning is naturally an active process. As instructors, we simply have to design instruction that compels our students to think, act, write, and speak. Active learning puts the responsibility of learning on the learner, compelling him to tap into his own personal learning styles to understand the concepts. The teacher's responsibility lies in making use of strategies that actively engage students in the learning process at the appropriate time.

As a veteran biology professor who has been both the "sage on the stage" and the "guide on the side," I wouldn't recommend abandoning your lectures. Undoubtedly they are well-crafted and entertaining (mine certainly were!). Instead, divide your classroom time into three shorter lecture segments and plan two active learning segments that will revive the students' attention when it is flagging. Here are some suggestions for easy activities that can be employed any time the students' eyes start to glaze over.

Listing and Grouping

Students are asked to take out a piece of paper and make a list of ten _____. (Note – ALWAYS ask for a finite number for the list)

The lists are collected or written on the board and students are asked to collate the information under appropriate headings

Think/Pair/Share

Students are asked to think about a question and record their thoughts. They then pair with a nearby student and share their thoughts, often adding to the information. Finally the class shares their ideas.

Active learning suggestions for instructors to get students to think, write and speak

One-minute papers

Students can be asked to write for a minute about a concept they understand, a question they have, or a summary of lecture material to that point.

Note-checking pairs

After 15 minutes of lecture, students pair and complete a task with their notes (summarize the three main points, solve a problem, check the accuracy of information, or choose one idea that will appear on a test)

Venn diagramming and other graphic organizers

Students are asked to organize information according to categories (differences and similarities, etc.). These are very powerful learning tools. Some great examples can be seen at http://www.eduplace.com/graphicorganizer/

Once you feel comfortable incorporating these activities into a lecture, why not step aside and become the "guide on the side"? Here are a few activities that take a little more planning and more time to implement but generally they meet with enthusiasm by the students.

Want Ads

Want Ads can be provided for students to decipher or students can write Want Ads to illustrate concepts they have learned.

Here is an example of a Want Ad for Boiling Water written by one of my General Microbiology students during the section on Microbial Control.

Can you handle the heat? Entry level opening for a decontaminator that can reach and maintain 100°C. Sterilization experience not required. Should be available at any time and for all shifts but may work either from home or the clinic. Most shifts require 30 minutes of work. Experience with disinfecting utensils, baby toys, and drinking water a must. Must be willing to kill non-sporeforming pathogens, including the tubercle bacillus and staphylococci.

Concept or Mind mapping

Free-form thinking and linking of concepts leads to a better understanding of the material. Provide groups with large sheets of paper or board space and have them create concept maps. Post-it notes can also be used on a wall. A good follow-up is to have other groups visit the concept map and add to it. For ideas, see http://www.graphic.org/concept.html and http://www.mind-map.com/EN/

Implications wheel

A graphic organizer developed by Joel Barker for corporate strategic decision- making, the Implications Wheel can easily be adapted for education. Brainstorming about implications of actions lets students conceptualize first, second, and even third order implications. This is great for discussing ethical issues and organizing pros and cons. You can get an idea of the format for this graphic organizer by visiting http://www.implicationswheel.com/index.php or http://www.janedurant.com/implications%20wheel.htm

Static Modeling

Models can be made of found materials (junk from home), modeling clay or building toys. Ask student groups to prepare models and share them with the class. Keep these models if possible and use them in future lectures. (Toobers and Zots are GREAT for biology; see http://www.constructiontoys.com/zitnz.html or try ebay).

Dynamic Modeling

Basically this is making models that move. The models that students devise do not have to be complicated and can involve classroom chairs and other students. One of my student groups modeled tight junctions between cells by taking off their belts and fastening them around two students standing back-to-back.

Jigsawing

Each student in a group is given a task at which they become "expert". The student then shares his/her expertise with the other group members. In order to make this worthwhile, it is necessary to make the expert responsible for the others' understanding of the material.

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ANNOUCING

THE THIRD ANNUAL

K-BRIN/K-INBRE STUDENT SYMPOSIUM

9:30 AM, Saturday, January 15, 2005
through Noon, Sunday, January 16, 2005
Student Union
University of Kansas
Lawrence, KS

To register, go to the K-INBRE Website, www.kumc.edu/kinbre,
or e-mail, hchapman@kumc.edu with questions.

Register Deadline: December 10, 2004.

Active Learning, Continued

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Role playing

Simple concepts such as membrane transport and DNA replication can be acted out by groups of students. This can get too time-consuming if the instructor is the "director" so make sure the students design the role plays!

The benefits to using these activities are many. For the student, critical thinking skills can be honed, information is more likely to be retained and transferred, motivation increases, and interpersonal skills can be improved. For the teacher, I believe the benefits are even greater. The energy that is created in an active classroom is palpable and infectious. Teaching this way is fun and a great way to prevent the proverbial "burn out".

If you would like a copy of a presentation that demonstrates these strategies or have any questions, please feel free to contact me at robinp@connecttime.net

Look in the next issue for more ideas on Active Learning!

Notice: stem cells for research

The Center for Gene Therapy at Tulane University is offering academic researchers standardized preparations of human, rat and mouse mesenchymal stem cells (MSCs) for nonclinical use. These adult stem cells, derived from the connective tissue framework of bone marrow, appear to have the capacity to differentiate into many cell types, including bone, cartilage and neurons.

Requests for cells should be directed to Peggi Wolfe, Center for Gene Therapy, Tulane University Health Sciences Center, phone: 504-988-7752; fax: 504-988-7710; e-mail: wolfe@tulane.edu.