Life Science Academy

JAN 2016 STUDENT PRODUCED NEWSLETTER

We are a 4-year dual credit program for area high school students interested in science and human health. Students graduate with 16 college credits from OCTC.

Owensboro Community & Technical College

Owensboro Health

PROJECT LEAD THE WAY PLTW

COMMUNITY CAMPUS PROGRAM OF DISCOVER COLLEGE

Exploring the Next Academic Step

On our first college visit, we went to the University of Kentucky. Students got an in-depth look at the nursing, pharmacy, and physiology departments. Most students thought seeing the UK Medical Center was their favorite part. They also got to see the normal daily life of college students and had lunch at a new UK restaurant called, The 90. Our next trip was to Western Kentucky University. We met with the Pre-Med advisers, Pre-Vet advisers, the Associate Dean of Ogden College, and the Head of Biology. There was an opportunity to learn more about the Honors College & Scholar Development and to ask them questions about requirements for getting accepted while eating lunch with WKU faculty.

Most recently, students visited the University of Louisville. The students got to visit the main campus and learn about life at the university. Before visiting the nursing school and seeing the high tech training mannequins, they had a tour of a normal dorm room.

LSA students are looking forward to more valuable college trips next year!

-Will Boultinghouse, Satya Moolani, Aman Singh & Jamison Watson

Our New Research Partnership

Dr. Chandra Emani, assistant professor of plant molecular biology at WKU-Owensboro, is conducting research on the medical benefits of various plants and the use of bioinformatics (the application of computer technology to the management of biological information) to determine the origins of various genes in the human genome.

In his lab at the Center for Business and Research, Dr.Emani explained his work to us and taught all of us so much more! He taught us about applying science to daily life, and showing us that learning is an ongoing process that can be pursued as a career.

One project we are conducting with Dr. Emani, is a project we hope to present in Frankfort on the origins of asthma. Using PubMed, a biomedical database maintained by the National Center for Biotechnology Information, we identified the sequence of Interleukin 13, a gene known to be associated asthma. Students used BLASTs (basic local alignment search tools) and algorithms to compare DNA sequences, taxonomy reports and resulting relationship trees to create a diagram of the gene in various species. We found evidence that Interleukin 13 may have originated in the platypus! Understanding the history of Interleukin 13 may aid in developing successful treatments for asthma.

--Christiane Canant, Annie Miller, Rose Millay, Gracie Hobbs & Collena Damin

2015 Christmas Campaign with World Vision

Every year we participate in a Christmas Campaign to give back to those less fortunate during the Holiday Season. For Christmas this year, our classes have teamed up with World Vision, a humanitarian organization dedicated to working with children, families, and their communities worldwide to reach their full potential by tackling the root cause of poverty and injustice. Working through World Vision, we raised more than $1,200.00 to purchase needed goods for families in the developing world! Gifts included: 15 partial shares of sewing machines with training, 18 soccer balls, 20 sets of $300 worth of school supplies and 33 ducks for food and breeding for profit. These gifts have the potential to help lift families out of poverty! Our giving tree with donation cards is pictured above.

-Neil Towery, Hannah Payne & Jenna Jones

What Do We Want to Be?

Being a part of LSA introduces students to many different career choices in the biomedical field, through experiments, field trips and guest speakers. Most of us have discovered what our future holds by taking interest in one of the many experiments we complete.

LSA students want to be: pediatricians, neurosurgeons, veterinarians, medical examiners, oncologists, nurse practitioners, psychiatrist, physical therapist, forensic DNA analysts, pharmacists, orthodontists, dentists, athletic trainers, cardiologists, therapists, addiction counselors, forensic anthropologists and biologists.

As you can see, the LSA opens up a path to many promising careers. Not only do we learn about science, but we learn about what our futures will hold. LSA is an opportunity unlike any other that will help students figure out what their career goals are and how to achieve those goals.

-Georgia McCrady & Maya Givens

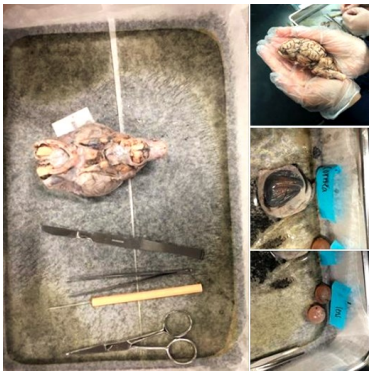
Favorite Labs & Experiments

When you walk into your first day of class at the LSA, what do you expect? Perhaps to go over a syllabus and class expectations? Instead, you find a crime scene "dying" to be investigated. During your freshman course, you will learn many aspects and methods of investigation, experimentation, research, and health as you discover, little by little, the story of what happened to Anna Garcia.

Our favorite lab in the freshman course, Principles of Biomedical Science, was DNA extraction. We extracted the DNA from our saliva and from a strawberry by putting samples in the centrifuge, and then pouring alcohol on top of that to extract our DNA. This lab was entertaining and it taught us how scientists get DNA from different samples.

In the sophomore course, Human

Body Systems, our favorite labs are the dissections! We've done a sheep brain and a cow's eye dissection.



Junior students in Medical Interventions studied how specific antibiotics are effective at preventing the growth of certain strains of bacteria. We studied the problems associated with multi-drug resistance as well as the mechanisms that allow bacteria to gain new drug resistance. One of the coolest labs we've done in the senior Biomedical Innovation course was the forensic autopsy. Students worked as medical examiners, using the same procedures as for human autopsies, to determine the cause of death of piglets that had been donated to scientific research and died of unknown causes.

-Grace Bush, Gracie Cart , Samantha Klee, Brooklyn Knight, Mallory Richards & Keely Shocklee

Proud to Serve our Community

The Life Science Academy is proud of our community service. That's why every year we participate in a Community Service Learning Project. Last year's project was the Wendell Foster's Campus Ambassador Program. Together we raised $1,510 in t-shirt sales for the organization, and obtained 1,033 signatures to the No R-Word pledges.

Aside from raising money and awareness, students themselves volunteered at Wendell Foster's Campus (photo above). After a quick tour of the facilities these young adults got to work. Students gardened, played games, preformed experiments, and chatted with residents of the campus, enjoying every second spent there. The residents and students enjoyed their time together so much that many students went back to volunteer over the summer!

Students were also involved in our community-wide Vision 2065 Initiative (pictured below). Working with the Health Subgroup we brainstormed ideas that would improve our community's health by the year 2065. We worked in the focus areas of physical, mental and social health. After this, we came up

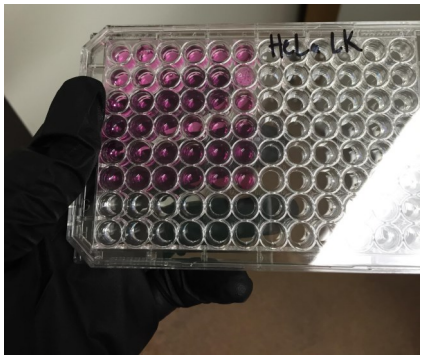
with a master report of the goals we would like to see in our future community. We then concluded and submitted our report to the Owensboro Chamber of Commerce.

We also participated in a partnership with the Owensboro Museum of Science and History to implement a series of short workshops for kids in order to introduce them to the wonders of the STEM fields (pictured above). The workshops included *Have a Heart, Who Done It?, Eye Can See You, and The Zombie Apocalypse.* All of the activities were very engaging, and were met with a great deal of enthusiasm. Using pre and post-quizzes, we also observed a really successful retention rate among the kids that attended. Overall, a fantastic partnership with the Museum and the Owensboro community!

-Alexis Beyke, Lily Harvey, Lucy Kurtz & Ibraheem Murtaza

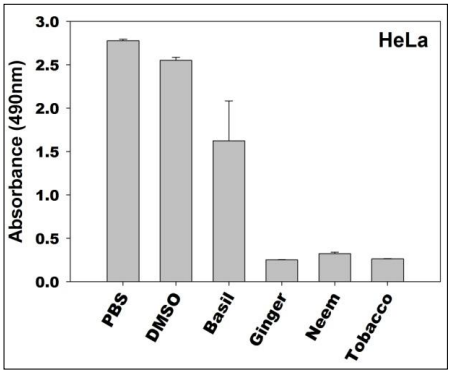
Cancer Research with the OCRP

Over the summer, LSA students participated in cancer research with Dr. Wilkerson of OCRP (Owensboro Cancer Research Program) and Dr. Emani of WKU-O. Students worked with



HeLa cells (pictured above), also known as human cervical cells. We looked at the effects of plant extracts on the growth of the cancer cells. Students learned how to *passage* cancer cells which involves washing the cells, transferring them to a new plate, and adding new media (cell food).

Students also visited Dr. Emani's lab and saw how to prepare plant extracts. Then, we prepared different plant extracts of ginger, neem, tobacco, and basil and then added the extracts to the cancer cells. At the end, the plant extracts did reduce the amount of cell growth especially ginger (figure at right). Students also came up with an experiment called the "hanging drop" to test if the plant extracts had an effect on the growth of tumors. LSA students had a wonderful time researching with Dr. Wilkerson and learned many new skills in the lab.



The research study students worked on was presented at a WKU research conference this fall. Students have also entered a competition to present their findings at the state capitol in February.

-Neil Madadi, Ibraheem Murtaza, Cameron Buckman, Riliegh Owens & Halle Lindsey

New Capstone Course: Biomedical Innovation

In this capstone course, LSA seniors are applying their knowledge and skills to answer questions or solve problems related to the biomedical sciences. Students design innovative solutions for the health challenges of the 21st century as they work through progressively challenging open-ended problems.

In Problem 1, students researched ways to increase the effectiveness of an Emergency Department. Ideas included, increasing the efficacy of current bacterial detection devices, re-routing less severe cases to an on-site clinic, improving the use of electronic medical records and physician communication and increasing the use of lean engineering. Students presented this research to a meeting of Emergency Department staff at Owensboro Health (pictured below).

In problem 2, students investigated various aspects of human physiology. Research included:

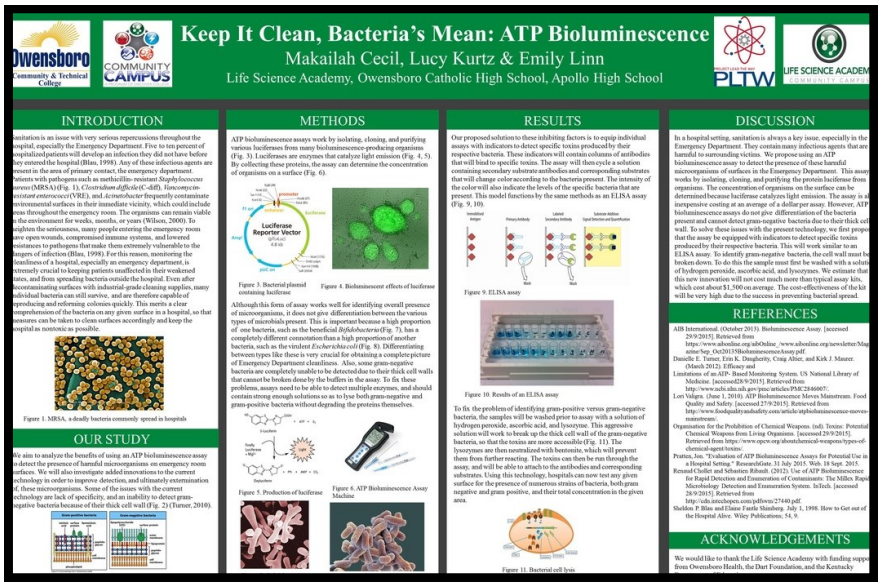
- Do Health Articles Really Make a Difference in People's Diets?
- Is that Starbucks Coffee Affecting Your Vitals?
- Do Video Games Improve Reaction Time?
- Fountain of Youth or Just More Gray Hairs? Residual Stem Cells and Pregnancy
- Protect Your Blind Side or Suffer the Consequences: Concussions and Students GPAs
- Color Me Happy: A Heart Rate and Blood Pressure Study
- Trumpet Therapy for Asthmatics? Lung Capacity and Wind Instruments

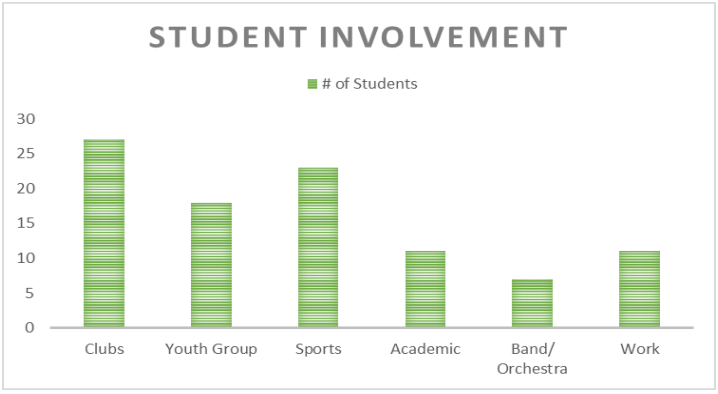
Students have entered a research competition to present these research projects to our state legislators in Frankfort in February.

We are currently working on our third problem in forensic science, complaint autopsies on piglets who died of unknown causes.

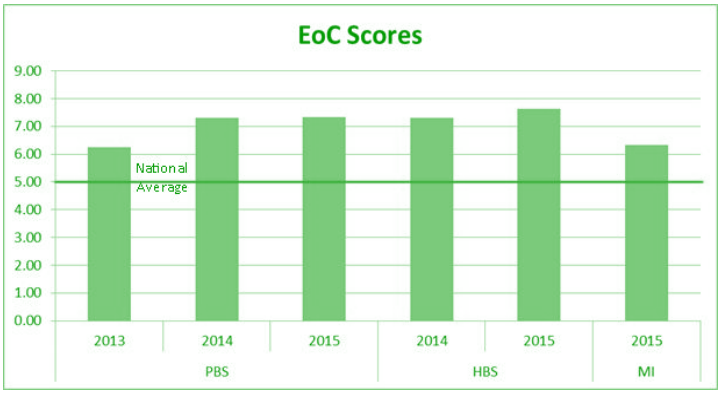
Looking ahead we will research environmental quality, bacterial plasmids and antibiotic resistance.

All of our research is available viewing at www.lifescienceacademy.net/bi. One of our scientific posters is pictured below.





LSA students continue their involvement in lots of other activities! -Jacob Howard, Nikita Gupta, Marie McClary & Kaylee Meador



Our assessment scores are in the top 25% nationally! -Katarina Mayer, Savana Canary, Isaac Nalley, Danielle Dixon & Caitlin Sullivan

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