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Chadrad Communications, Inc.
226 Bordeaux St - Chadron, NE 69337
308-432-5545 fax 308-432-5601
E-mail: kcsr@chadrad.com

(Neb.)-Students Drawn To CSC To Search For Organisms

By: Chris Fankhauser Posted at: 01/25/2013 08:21 AM

Wendy Jamison and Jocelyn Utecht look for signs of the bacteriophage on an agar plate. (Photo by Justin Haag)

(Chadron)-Chadron State College students are often drawn to northwest Nebraska for its hunting opportunities. For a certain group of students on campus, however, a big buck or a tom turkey is not the object of their pursuits. Rather, they are hunting area soils for the elusive bacteriophage, or phage for short.

CSC is one of a limited number of institutions throughout the nation that is discovering the organisms hidden in the dirt through a special project of the Howard Hughes Medical Institute's Science Education Alliance. The program is commonly referred to by its abbreviation, SEA-PHAGES.

Phages are viruses that attack and infect specific bacteria, usually causing their demise. It is hoped that the research will lead to breakthroughs in health care.
The students spent the fall 2012 semester collecting soil and isolating the phages. After finding the phages, the students extract the DNA to be sequenced at one of several research centers across the country. This semester, the students will use digital files created by the research centers to analyze and annotate the genomes. The phages are extremely diverse. In fact, each newly identified life form is certain to be unique, allowing an opportunity for students to name it.

Organizers of the project say that many participating students report a new-found appreciation for science as a dynamic process rather than just facts gleaned from textbooks.

CSC student Jocelyn Utecht of Hastings agrees. "The most interesting part of the SEA-PHAGES program to me is that it made this biotechnology lab different from every other lab class I have taken so far," Utecht said. "This program allowed me to participate in actual research that is happening in the real world. The phages that were isolated and purified in this class will be put in a phage database where they will be used by the head scientist of the program in his research. It is cool to think that a phage that was isolated here at CSC could possibly be used to treat bacterial infections such as tuberculosis in the future."

HHMI provides training, research, laboratory materials and a variety of other support for the project. CSC science faculty member s Wendy Jamison and Lara Madison attended a training session at the HHMI facility in Ashburn, Va., during summer 2012 after being notified that the school had been selected for the project.

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“We have entered as associate members,” Jamison said. “Full members are fully funded by HHMI with most of their supplies covered. Associate members do not have the same level of financial support, but HHMI provides the training, the bacteria strain and a lot of resources for the collaboration.”

She said full members must teach the course to freshmen, but associate members have more flexibility. CSC is running the program with juniors and seniors in existing courses this year – biotechnology in the fall and genetics in the spring.

Utecht said the course can be challenging at times. “For me, I would say that the most challenging part was making sure the phage was pure. There are several tests that need to be completed to ensure that you have only isolated one phage and that the phage is pure,” she said. “The difficult part about this is that you need to avoid contamination, and these phages are easily contaminated. A simple thing such as touching the lid covering some of the utensils could cause a contamination.”

Jamison said she is pleased with the students’ response to their assignment. “The students have been extremely enthusiastic about this project. They got on board immediately and were excited to be doing novel research contributing to the greater scientific community,” she said. “I actually have several students from the fall that are coming in on their own time this spring to complete their portion of the project.”

She also said the students are learning valuable lessons about how science works in the “real world.” “Science doesn't work as planned a lot of the time. The students have often done labs that have a predictable outcome. While the end product was predictable -- isolation of an individual, unique phage in a large volume with DNA isolation -- the individual experiments to get there were not always predictable,” she said. “The students faced a lot of different, unexpected outcomes throughout, including contamination with non-desired bacteria, improperly made media, experiments that just plain didn't work the first time.”

Utecht said she is confident the program is helping her reach her goals, not only for her education, but also for her future career. “My learning goals at CSC are generally focused around preparing me for pharmacy school next year. I am always looking for new experiences that will help me in my future schooling,” she said. “The SEA-PHAGES program allowed me to participate in research that could have a real impact on health care in the future, which is something that I have never done before. This program not only helped me expand my knowledge about bacteriophages and their characteristics, but also a little about techniques used in lab settings.”

—*Justin Haag, CSC Information Services*

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