University of Lethbridge News Release

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University of Lethbridge iGEM team gears up for Giant Jamboree with first-place finish at aGEM competition

*The iGEM team will showcase its presentation on Tuesday, Oct. 18, 2016 from 2-3 p.m. in D632. Media are welcome to attend.

The University of Lethbridge's International Genetically Engineered Machine (iGEM) team warmed up for the upcoming iGEM Giant Jamboree by taking first place in the collegiate division of the Alberta Genetically Engineered Machines (aGEM) competition in Calgary recently.

Using the aGEM event as a tune-up opportunity to hone its presentation for the Giant Jamboree in a mock competition setting, the U of L team placed first in the collegiate division and also received special awards in the areas of Human Practices and Demonstrated Knowledge. Second place in the collegiate division went to the host University of Calgary team.

"aGEM provides Alberta teams with a unique advantage as we are able to get meaningful feedback from judges who will be at the international competition in Boston," says Graeme Glaister, a fourth-year neuroscience student, who will be competing in his fourth iGEM contest.

The iGEM competition is a worldwide synthetic biology competition started by the Massachusetts Institute of Technology (MIT), and is now the main program at the iGEM Foundation. Competing for the past nine years, U of L teams have excelled on the world stage, leading all Canadian teams by winning eight gold medals for their innovative work. This year's competition takes place Oct. 27-31 in Boston, MA.

The project the U of L team is tackling involves creating an easy-to-use and cost-effective kit for the rapid detection and monitoring of newly emerging germs in ambulances and health-care facilities.

"I'm very excited about this project because it was really informed by the needs of the community," says Dr. Hans-Joachim Wieden, chemistry and biochemistry researcher, Alberta Innovates Technology Futures Strategic Chair in Bioengineering, and iGEM

supervisor. “When scientists and community members sit down to define a problem, it can result in a very productive collaboration. This iGEM team is demonstrating the ways that cutting-edge synthetic biology and fundamental biomolecular research can have a truly beneficial impact on our communities, particularly in the areas of health and medicine."

Lethbridge Fire and Emergency Medical Services contacted the U of L iGEM team to determine if their current cleaning practices were adequate. The team met with paramedics, surveyed them about areas of concern and participated in ride-alongs with emergency medical workers to better appreciate the situations faced daily by first responders. These steps helped shape the project and determine its scope, with the goal of determining if emergency medical vehicles are indeed reservoirs for pathogens.

"We are very excited to know more about what is found and how we can affect it,” says Ward Eggli, EMS Resource Officer with Lethbridge Fire and Emergence Services. “We are looking at other cleaning practices, just to determine best practice, once we find out the results. It would be nice to know if we can affect sick time with our own staff, to give some peace of mind to the wives and children we have at home, and to know that what we’re bringing home is minimized in some way.”

Using cutting-edge, in-house DNA sequencing technology to aid in identifying pathogens present in the emergency medical vehicles, the U of L team conducted experiments to identify different bacterial species present in each ambulance by investigating a region of DNA unique to each organism.

The results obtained from sequencing experiments allowed the team to develop novel antibodies which specifically recognize and bind to the surface of the identified bacterial organisms. These antibodies are then used in a test which generates a colour change in the event of bacterial identification. This test facilitates rapid and inexpensive detection of pathogens in emergency medical vehicles, and will enable targeted and purposeful sterilization of affected areas.

The novel antibodies being produced and used in this experiment are called single-domain antibodies (sdAb), which are much smaller than traditional antibodies, but with full antigen binding capabilities and increased stability. These antibodies can be synthesized without the use of animal hosts, allowing for lower production costs and less required infrastructure. The team is also constructing an online, searchable database of these single-domain antibodies which will streamline future research in this area, and may also allow the commercialization of sdAb production at the U of L.

The U of L iGEM team is composed of Keith Aiken, Taylor Sheahan, Graeme Glaister, Karin Otero, Suneet Kharey, Rhys Hakstol and Courtney McDermott. Dr. Andy Hudson and Dr. HJ Wieden serve as instructor and supervisor respectively.

To view online: http://www.uleth.ca/unews/article/u-l-igem-team-gears-boston-win-agem-competition

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