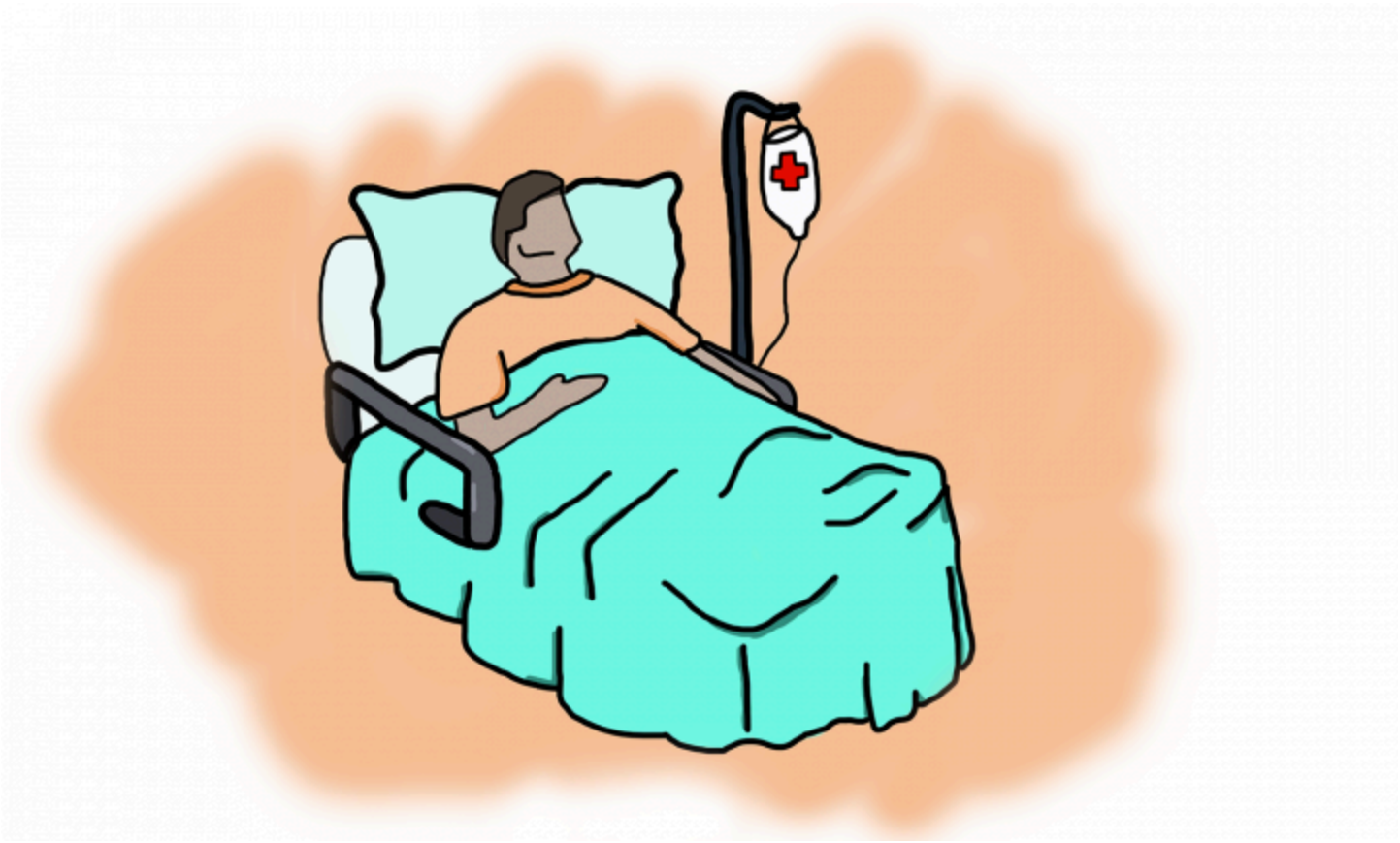
The Michigan Daily

RESEARCH

‘U’ researcher leads team nearing universal flu vaccine

by Michal Ruprecht
June 19, 2019



Earlier this month, a team of scientists **published** a study in Nature Medicine journal that could lead researchers closer to a universal vaccine for influenza, commonly known as the flu. Principal investigators include Aubree Gordon, University of Michigan assistant professor of epidemiology at the School of Public Health, and Florian Krammer, professor of microbiology at the Icahn School of Medicine at Mount Sinai.

Krammer said the team found that a region of the flu virus is conserved from strain to strain that could provide protection for the human immune system. The conserved region is called the membrane proximal stalk and it's part of the hemagglutinin, which has a head section that changes frequently.

When stalk antibodies bind to this region, the virus is neutralized by blocking fusion of viral and endosomal membranes, which inhibits development of the HA. There are multiple mechanisms involved in the pathway and the researchers still don't know which mechanism is most important for protection in humans.

"The head changes all the time. That's why we have to get the flu shot every year because there's so much variation … That the antibodies that recognize this year's flu shot usually don't recognize next year's," Krammer said. "If you want a vaccine that gives protection for a long time, you can't target the head, but targeting the stalk might be an option."

The eight-month observational study relied on data from a **cohort** in Nicaragua. Krammer said the lab developed specialized assays, known as an investigative procedure, to conduct analysis of the samples from the cohort. One of the assays his lab used is called an enzyme-linked immunosorbent assay, which was a binding assay used to determine antibody titers or concentrations.

Krammer said the binding assay could be done quickly and easily standardized, which could allow studies in the future to use the same assay.

In an email to The Daily, Fatima Amanat, a graduate student at ISMMS, one of the researchers on the project, said the team's research is important because the flu is easily transmitted.

"Translational research is extremely essential," Amanat said. "Research that allows us to take what we learn from small animal models and understand immune response in humans is very important nowadays."

Krammer said his study could lead to a universal flu vaccine—a vaccine that could provide better and longer-lasting protection against multiple subtypes of the virus. The National Institute of Allergy and Infectious Diseases outlined the importance of creating a universal influenza vaccine in a **paper** last July. Krammer added the study was partially funded by NIAID.

Amanat agrees with Krammer and said the study will provide an outline for other scientists that plan to test new vaccines.

"Influenza virus is a huge public health burden and despite having annual vaccination, influenza virus can cause widespread disease," Amanat said. "It is great to now finally have a vaccine strategy in place that targets the stalk domain of HA and provides protection in humans."

Krammer said another benefit to a universal flu vaccine would mean greater accessibility for a larger group of people. He said other diseases like measles and smallpox have higher vaccination rates than the flu, with it becoming universal, this might lead more people to consider vaccination.

"There's people who are really anti-vaccination and I don't think they're easy to convince to get vaccinated," Krammer said. "For the flu vaccine, I think for a lot of people the fact that you have to get it every year … it's a lot of effort. You have to go to the doctor's office and a lot of people have to actually pay for the vaccine … (a universal flu vaccine) would make a huge difference."

Krammer mentioned there are universal influenza vaccines in clinical trials that aim to induce HA stalk antibodies.

“The current study suggests that these antibodies are protective, which means that the findings validate the concept of a stalk-based universal influenza virus vaccine,” Krammer said.

Krammer said the team has demonstrated how stalk antibodies correlate with protection against H1N1 flu infection, but he would like to look at two other common influenza types in humans, including H3N2 and influenza B. He added he will collaborate with Gordon on another **study** that recently received funding from NIAID.

Amanat added she hopes to continue conducting follow-up studies with Krammer.

“Studies that will further enable us to understand immune response in humans are very crucial,” Amanat said.

The Daily reached out to Gordon, but received no response.