J. Craig Venter Institute contracted by the CDC to rapidly construct synthetic influenza genes

Genes will be used to help develop seasonal and pandemic vaccines, improving response time and vaccine efficacy

ROCKVILLE, MARYLAND, UNITED STATES, January 30, 2024 /EINPresswire.com/ -- J. Craig Venter Institute (JCVI), led by Sanjay Vashee, Ph.D., has been contracted by the Centers for Disease Control and Prevention (CDC) to rapidly build highly accurate influenza genes for use by the CDC to help design seasonal or pandemic flu vaccines. Using synthetic genomics techniques to build these genes reduces the overall time to develop flu vaccines. The base period for the contract is one year with an additional four option years.

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> *Sanjay Vashee, Ph.D., project principal investigator*

"Our team is excited to assemble flu genes—primarily HA and NA—to help the CDC in their effort to improve and expedite flu vaccine development. Constant mutations in the HA and NA genes make developing vaccines against the influenza A virus challenging. By reducing the vaccine development cycle, it is possible to better target the virus in circulation," stated Dr. Vashee, project principal investigator and director of JCVI's Rockville Campus.

The genes will be constructed from overlapping oligos and then assembled into expression plasmids using synthetic engineering approaches pioneered at JCVI and validated with Sanger Sequencing.

The underlying technology needed to construct the genes was developed at JCVI, including Gibson Assembly, the now widely used synthetic genomics technique for molecular DNA cloning, allowing easy assembly of DNA fragments.

In 2013, JCVI published a three-year study with collaborators in which they detailed new methods for rapidly generating influenza vaccine seeds using synthetic genomics tools and technologies. In a timed proof of concept, the team demonstrated that in just over four days they could accurately construct synthetic vaccine viruses for use in influenza vaccine development.

The synthetic genomics advancements used to develop influenza vaccine seeds are part of a larger JCVI synthetic genomics program. JCVI has been the nexus for many seminal advancements in synthetic genomics, starting with the synthesis of the complete bacteriophage phiX174 genome in 2003, the first synthesis of a bacterial genome, Mycoplasma genitalium, in 2008, the first cell driven by a synthetic chromosome, JCVI 1.0, in 2010, and the design and synthesis of a minimal genome, the model organism JCVI 3.0, in 2016. Each of these milestones required JCVI to develop new synthetic genomics technologies, which are now widely used in synthetic genomics work by labs worldwide.


Dr. Sanjay Vashee, professor in the Synthetic Biology Group

In addition to Dr. Vashee, Gene Tan, Ph.D., assistant professor of virology at JCVI and Norberto Gonzalez-Juarbe, Ph.D., associate professor in the infectious disease and genomic medicine group at JCVI will join as co-PIs.

About J. Craig Venter Institute
The J. Craig Venter Institute (JCVI) is a not-for-profit research institute in Rockville, Maryland and La Jolla, California dedicated to the advancement of the science of genomics; the understanding of its implications for society; and communication of those results to the scientific community, the public, and policymakers. Founded by J. Craig Venter, Ph.D., the JCVI is home to approximately 120 scientists and staff with expertise in human and evolutionary biology, genetics, bioinformatics/informatics, information technology, high-throughput DNA sequencing, genomic and environmental policy research, and public education in science and science policy. The JCVI is a 501(c)(3) organization. For additional information, please visit www.jcvi.org.

Matthew LaPointe
J. Craig Venter Institute
+1 301-795-7918
email us here

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