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Virginia Uses Genetic Technology to Combat COVID-19

State public health laboratory is one of the first in the nation to do this work

RICHMOND—Governor Ralph Northam today announced that the Department of General Services' (DGS) Division of Consolidated Laboratory Services (DCLS) is one of the first public health labs in the nation to use genetic technology to help public health officials better understand and track the scope of the COVID-19 pandemic to strengthen prevention and response efforts.

DCLS is using next-generation sequencing to genetically decode some Virginia samples that contain the novel coronavirus, SARS-CoV-2, which causes COVID-19. Looking at this genetic fingerprint can help public health officials track how the virus is changing and provide insights into how it is being transmitted.

"Advances in genetic sequencing allow us to track and analyze COVID-19 better than previous outbreaks," **said Governor Northam**. "This innovative technology, combined with the work of our public health laboratory and epidemiologists around the Commonwealth, will help us understand the virus, how it spreads, and how it may change. And that will give us more tools to fight it."

DCLS is working alongside the U.S. Centers for Disease Control and Prevention (CDC) and international public health and university partners using specialized lab equipment and computer software to piece together the genetic makeup of the virus found in COVID-19 patients. DCLS is working collaboratively to create a library that stores the information of not only the positive samples it identifies, but also those tested at private facilities, healthcare systems, and universities in Virginia.

Hidden in the genetic makeup of the virus are clues to its origin. Soon after the virus appeared in China, scientists used sequencing to tease out its genetic information and made that information available to the international public health community. As the virus travels from one person to another, it makes copies of itself and sometimes makes small genetic changes called mutations. Scientists can read these mutations like a road map, tracing how cases are related.

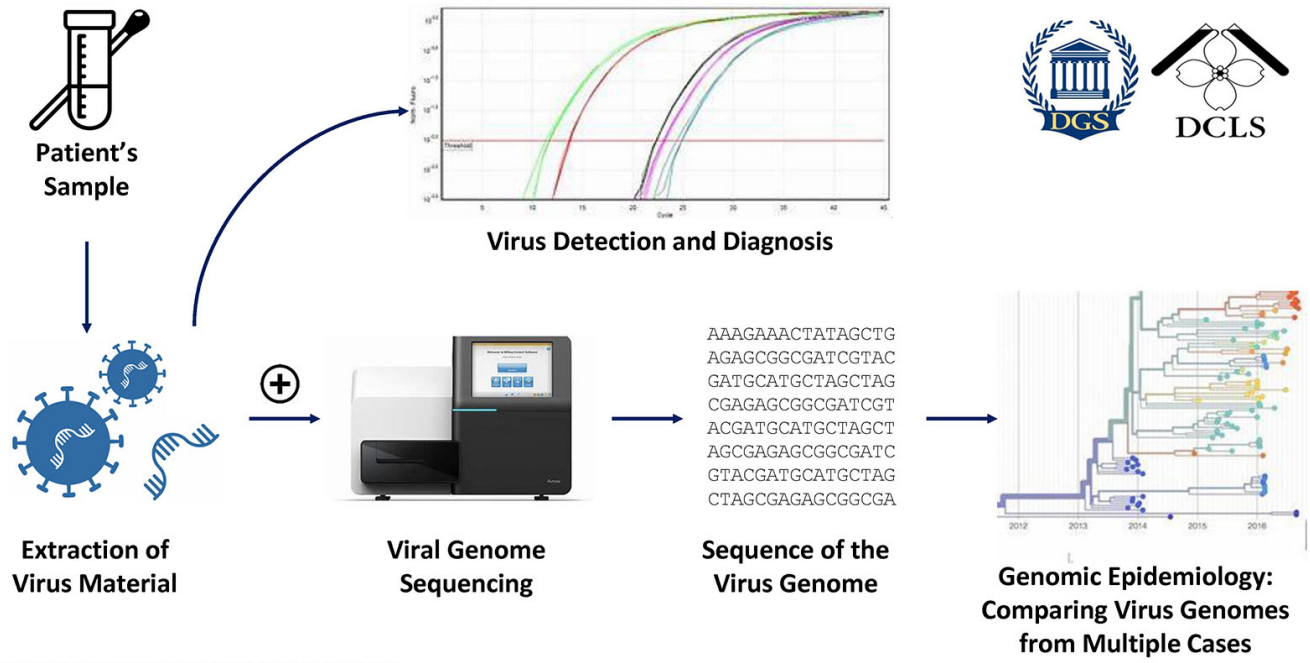
Next-generation sequencing generates enormous amounts of data, which is analyzed by specialized bioinformaticians at DCLS. The lab shares the data with public health officials and uploads it to GISAID, an online repository where genomic data it is openly available to epidemiologists and virologists around the globe. Nextstrain, an online resource for scientists to visually track the genomics of the virus, creates diagrams that favor family trees showing the evolutionary relationships between different samples collected throughout the world.

“This genetic fingerprint gives us tremendous insight into this novel virus, helping us understand where Virginia cases originated and how they are being transmitted in our communities,” **said DCLS Director Dr. Denise Toney**. “Providing this information in real-time is unbelievably valuable for public health officials as they determine how to reduce the impact of COVID-19 in our communities.”

In Virginia, the sequences uploaded so far show evidence of multiple introductions of the virus into Virginia communities, suggesting that the emergence of COVID-19 is due to multiple distinct events. This is suggested by looking at the similarity of the virus in Virginia to the virus sequences obtained from Asian and European patients. There is also clear indication of person-to-person spread within suspected COVID-19 outbreaks.

“Epidemiologists at the Virginia Department of Health can use these data during investigations of outbreaks in nursing homes and other settings to determine whether all of the cases originated from the same source or multiple sources,” **said Virginia State Epidemiologist Dr. Lilian Peake**.

For more information, visit the DGS website at dgs.virginia.gov (dgs.virginia.gov), including this Next-Generation Sequencing in Virginia (https://dgs.virginia.gov/globalassets/business-units/dcls/documents/hot-topic-and-updates/sequencing-at-dcls.pdf) document that explains more about how DCLS is using genetic technology to combat COVID-19 in Virginia.



Cotton Swab by Kid Kitaro; Virus by Laurie Shaull from the Noun Project

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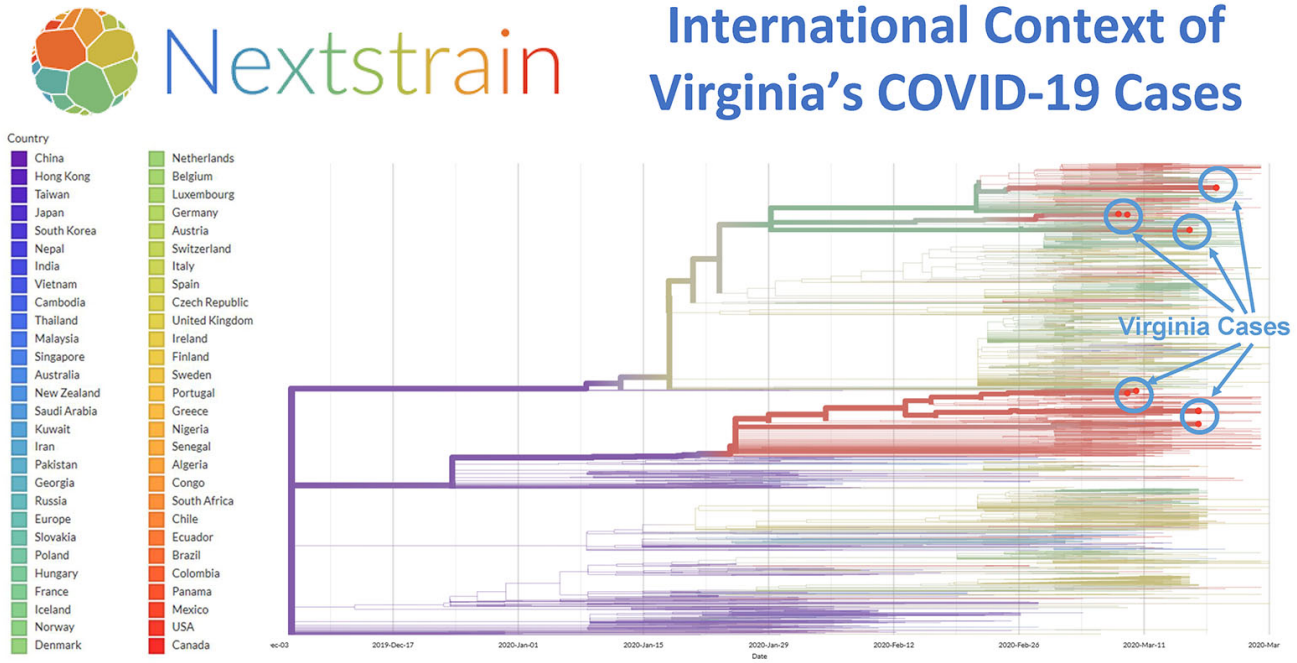

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