



**Leaders in Laboratory Medicine**

## **Homegrown Nanotechnology Enhances Alberta's Lab Testing for COVID-19**

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Alberta's provincial laboratory system has started using new made-in-Alberta technology for COVID-19 testing – creating jobs and providing a more secure supply of essential lab reagents needed to detect the disease in patients.

Edmonton-based Applied Quantum Materials Inc. (AQM) has reached an agreement with Alberta Health Services (AHS) to provide nucleic acid extraction kits to Alberta Precision Laboratories (APL) for use in the province-wide COVID-19 testing program. The kits are used to extract the genetic material from SARS CoV-2 – the virus that causes COVID-19 – a key step in identifying whether someone is infected.

The kits use AQM's proprietary MagDx™ technology, including magnetic silicon-based nanoparticles that were developed as part of Canada's 'Call to Action' to fight COVID-19. The agreement with AHS is AQM's first domestic supply contract, which strengthens Alberta's medical supply chain by making it less vulnerable to shortages from international lab suppliers.

“Recognizing the urgent need for high-quality, accurate testing to confront this pandemic, our team chose to apply our pioneering expertise in silicon-based nanotechnology to develop an efficient diagnostic test kit for viral nucleic acid extraction,” said Dr. David Antoniuk, AQM's Chief Executive Officer. “We are pleased to work with AHS and APL to strengthen the capacity of the Canadian health system to tackle this virus.”

“This made-in-Alberta solution is welcome news in our fight against COVID-19. To date, AHS and Alberta Precision Laboratories has processed more than three million tests. By utilizing homegrown, cutting-edge solutions, this agreement will help to safeguard our lab system from international supply shortages and ensure we continue to deliver tests to Albertans when they need them.” said Tyler Shandro, Minister of Health.

“Alberta has led Canada when it comes to testing. This made-in-Alberta solution does not require international suppliers and means Alberta will continue to be a global leader in testing. It is great to see innovative technologies being developed right here at home,” said Doug Schweitzer, Minister of Jobs, Economy and Innovation.

The foundation of Alberta's COVID-19 testing program is the polymerase chain reaction (PCR) process, which is used by testing programs around the world. The PCR process requires a steady supply of magnetic particles that are used in lab reagents to isolate the small amount of genetic material contained in each SARS Co-V2 virus. Securing a consistent supply of these reagents throughout the pandemic has been challenging, largely because Canada relies entirely on international vendors.

Dr. Stacey Hume, an Associate Professor of Medical Genetics at the University of Alberta, and a member of APL's molecular genetics team, recognized the need for a Canadian-sourced extraction reagent and reached out to AQM to initiate a fast-tracked collaboration.

"The supply of reagents needed to analyze COVID-19 tests can be slow or interrupted at times because of global demand," said Dr. Hume. "Although securing Canada's supply chain for this reagent was the ultimate goal, it is great to see that we have stimulated and diversified the Alberta economy at the same time," said Dr. Hume.

Working with medical-scientific staff at APL, as well as with Dr. Hume and her staff within the University of Alberta's Faculty of Medicine & Dentistry, AQM has demonstrated that the MagDx™ technology provides equivalent or superior sensitivity for SARS-CoV-2 than other commercial products that are currently in use. AQM's product is compatible with many automated extraction platforms used by Canadian health laboratories, and it can also be used in manual extraction methods that do not require costly infrastructure.

"Alberta's public lab system has a strong track record of collaborating with academia and local medical companies to develop and implement new technologies that improve healthcare for Albertans," said Dr. Carolyn O'Hara, interim Chief Medical Laboratory Officer for Alberta Precision Laboratories. "Working with AQM is a perfect example of how the private sector, university researchers and APL have come together to enhance Alberta's COVID-19 testing program and help ensure we are able to reliably meet the demand for tests now and in the future."

"This is the first made-in-Canada solution that does not rely on international suppliers for its essential components," said Dr. Antoniuk. "We have been supplying AQM products to labs and companies around the world, and we are very pleased to have this medical product used right here at home, providing new jobs for Albertans."

Development of AQM's nucleic acid testing products was also supported through advisory services and research and development funding from the National Research Council of Canada Industrial Research Assistance Program (NRC IRAP). Going forward, AQM will make use of the Business and Scale-up Program (BSP) offered by Western Diversification to expand production capacity.

### **About Applied Quantum Materials Inc. (AQM)**

AQM is a global leader in Group 14 (Carbon, Silicon and Germanium) nanomaterials design, synthesis, integration, and manufacturing with over 100 clients in 20 countries. AQM is a spin-off company originating out of the Department of Chemistry in the Faculty of Science at the

University of Alberta. AQM designs proprietary technology platforms to develop solutions for medical, semiconductor, clean energy and sensing applications and offers comprehensive expertise to enable researchers to develop solutions in silicon. We work with some of the world's leading semiconductor organizations, chemical companies and research organizations to develop and create next generation nanomaterials that will define the future.

#### Quick Facts:

- Nanomaterials describe materials of which one external dimension measures between 1 - 100 nanometres (nm). One nanometer is equal to one-billionth of a metre. For comparison, the width of a human hair is ~75,000 nm and the coronavirus is between 60 and 140 nm in size. Nanomaterials can occur naturally or produced purposefully through chemistry and engineering to perform a specialized function. These materials can have different physical and chemical properties as compared to their bulk-form counterparts.
- The two main types of nucleic acids are deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) which are essential for all forms of life. The SAR-CoV-2 virus contains small quantities of RNA that must be isolated, extracted and detected.
- Alberta Precision Laboratories is a wholly owned subsidiary of Alberta Health Services. APL has completed more than 3 million tests for COVID-19 on approximately 1.7 million people since the beginning of the pandemic.

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