nanopath

Rapid, Microscale Enrichment and Identification for Disease Diagnosis

Significance & Technology

Nanopath has developed a platform for rapid, point-of-care biomarker purification and characterization from a patient sample. Our technology was originally developed at Dartmouth as part of our PhDs, and is using advances in bioengineering and nanotechnology to reduce noise and improve signal in diagnostic systems. This allows for an integrated system that takes a complex patient sample, isolates key biomarkers, and analyses them without the need for lengthy clinical workflows. We believe that this **new diagnostic paradigm has applications to a range of disease indications** including bloodstream infections, cancer liquid biopsy, urinary tract infections, respiratory infections, and wound infections.

INTEGRATED SINGLE CHIP & WORKFLOW

Our entire technology will be integrated onto a single chip and clinical workflow

ELIMINATE NUCLEIC ACID AMPLIFICATION

We use ultrasensitive optical detection that eliminates the need for PCR or sequencing

SIMULTANEOUS MULTIPLEXING

Our approach allows improved accuracy through detection of multiple targets

COVID-19 Product & Market

Our initial proof-of-concept will be in COVID-19 enrichment and detection at the point of care given the regulatory incentives and interest in infectious disease diagnosis. Our platform integrates sample preparation and detection of SARS-CoV-2 genetic material on a single micro-chip. More specifically, our sample preparation method localizes virus over our novel, ultrasensitive RNA sensor, effectively **eliminating the need for nucleic acid amplification** and dramatically shortening time-to-result. Our approach also allows for the **simultaneous detection of other key targets**, such as influenza. Lastly, our platform has the ability to **detect single point mutations** in a nucleic acid sequence enable population-level disease tracking and surveillance.

Our product is a simple point-of-care assay cartridge coupled to a benchtop machine. The product workflow involves collection of sample, transfer to a liquid buffer, processing in a single use cartridge, and readout on a benchtop machine. The result is then communicated to the healthcare worker within minutes, and appropriate isolation, reporting, and supportive care measures are taken. We envision this product as a point-of-care screening platform for use at ports of entry, regional and community clinics, pharmacies, and drive-thru testing facilities. Our immediate goal is to rapidly collect proof-of-concept data, including capture and quantification of clinically relevant attenuated viral loads and sequence-specific RNA capture. After this, we plan to collaborate with a commercial partner for scale-up and patient sample testing to validate the device.

Team & Traction

We incorporated nanopathdx to commercialize laboratory advances at Dartmouth's Engineering School. The nanopathdx founding team of Dr. Amogha Tadimety, Ms. Alison Burklund, and Dr. John X.J. Zhang have worked together for over four years with a strong publication, patent filing, and research grant record. Ms. Tadimety and Ms. Burklund have developed components of the proposed platform for their PhD studies, and have commercial experience in consulting, biotechnology, and venture capital. Our clinical collaborators, Dr. Gregory Tsongalis and Dr. Ella Martin, are the two heads of the clinical diagnostics labs at DHMC and have combined decades of experience in both the state of the art and new diagnostic development.

We recently came in 2nd overall at the Rice Business Plan Competition, the largest student startup competition in the world. Our current funding round will allow us to meet FDA Emergency Use Authorization benchmarks and begin our path to securing a strategic partnership. The funding will cover personnel salaries, consumable and reagent expenses, required office and laboratory space, and contracting costs for hardware development. The work will be conducted at nanopathdx LLCs facilities in collaboration with Dartmouth College's Thayer School of Engineering and Dartmouth Hitchcock Medical Center.