



GenomeAlberta



GenomeCanada



TMIC

The **Metabolomics** Innovation Center

James J. Harynuk¹ and Anne Hicks²

Rapid **M**etabolomics-based Viral **I**nfection **ID**entification

RaM-VIID

Current (genetic and antibody-mediated) testing relies on capturing viral molecules

Pain points:

- 1. Time** – 1-2 days, current back up 4-6 days
- 2. Expertise** – Trained sampling and lab technicians
- 3. Resources** – Swabs, lab supplies running low
- 4. Invasiveness** – Nasopharyngeal swab or blood
- 5. False negatives** – Sufficient viral particles needed
- 6. Not adaptable**– Highly specific to each pathogen
- 7. Little to no prognostic utility** – Yes/No

**CoVID 19 will circulate for
months**

**2nd and 3rd waves are
expected**

To return to normal life we **need**:

- Rapid (minutes) screening
 - Local, airports, borders
 - Essential service workers
 - Healthcare, first responders
 - Supply chain
- Rapidly and broadly deployable technology
 - Minimal training, low-cost, massive scale-up
- Bias towards false positives

Needs:

To return to normal life we **want**:

- Ability to **detect emerging infections**
- **Adaptable** platform

Emerging paradigm:

Breath is the answer

- **Easy**, non-invasive sample collection
- **Rapid**, detailed analytic capacity
- **Low cost**, simple, broadly deployable
- Harnesses **machine learning/AI**
- **Prognostic potential**
- Rich data reflecting systemic metabolism has **expansion potential**
 - Emerging pathogens
 - Acute health management
 - Chronic disease management

Proposal:

3 months

Sample collection
Complex analytics
Prototype system

6 months

Local system
validation

Canada-wide
testing

1 year

Local high
throughput
system

Massive
scale-up
potential

International
expansion

Timeline and Budget

Proposal

- Novel viral screening technology
 - Rapid deployment in <1 year
 - Rich spin-off potential

Key deliverable

- Prototype system(s) targeting
 - 1st gen (this project): <5-min, 250 tests/unit/day
 - 2nd gen (year 2-3): \$5 testing, ~2,000 tests/unit/day

Budget

- Investment \$1.6M
- Existing in-kind contribution \$0.6M already secured

When can we start?

Now

**Don't want to miss opportunity – infected people
and their breath samples are available now**

We are Canada's national metabolomics platform

Based at Ualberta, TMIC has nodes at UVic, UCalgary, McMaster, McGill

Status: We are there for your research teams

- 1-2 days startup for COVID-19 related service

We offer: Targeted and untargeted metabolomics analyses through multiple platforms including

- LC-MS/MS
- GC×GC-TOFMS
- NMR
- CE-MS



Contact Info

James.Harynuk@ualberta.ca

for questions regarding RaM-VIID (technical) or TMIC

Anne.Hicks@ualberta.ca

for questions regarding RaM-VIID (clinical) or Alberta Respiratory Centre