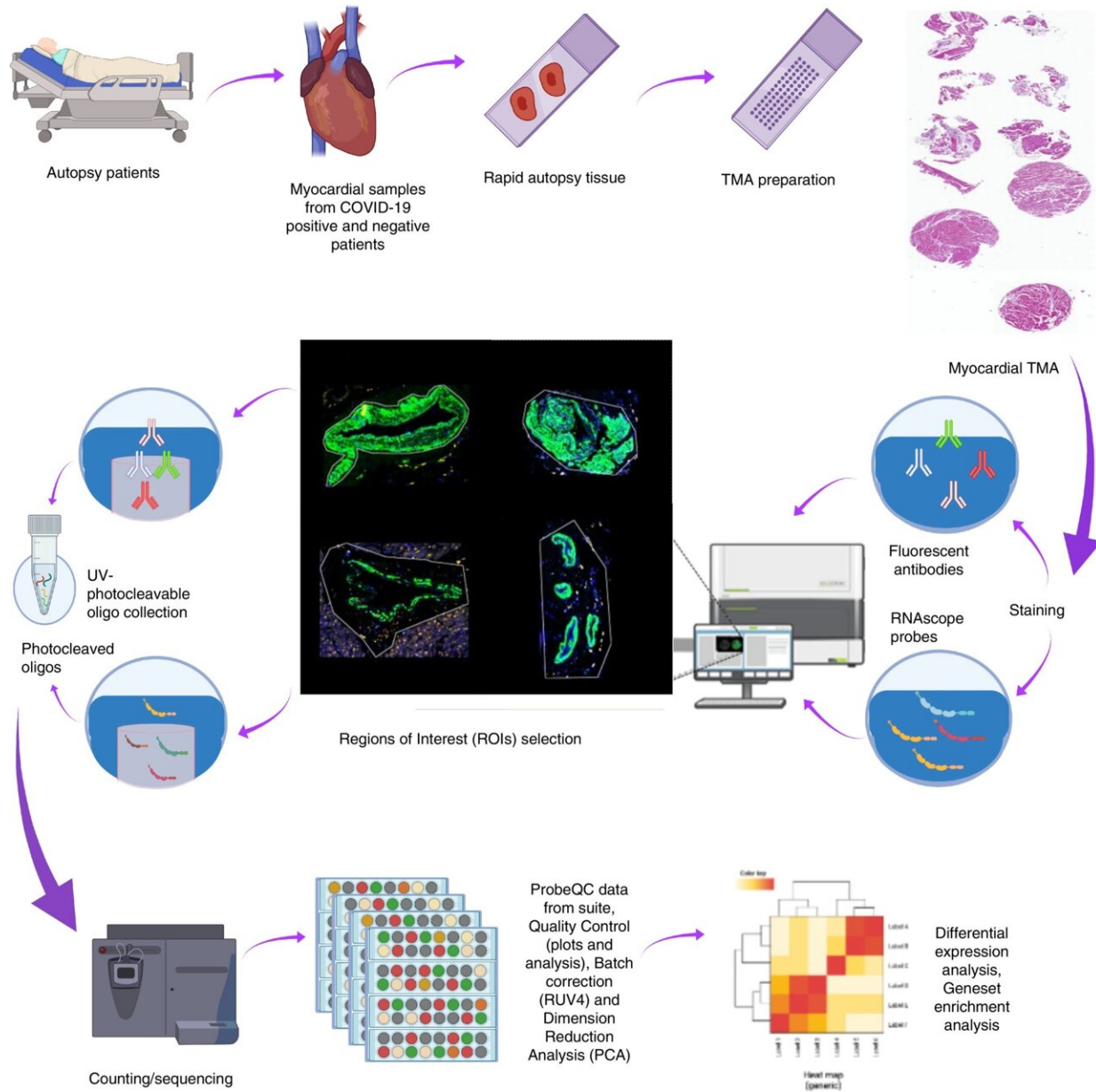


Study reveals how COVID damages the heart

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Study schema. Cardiac tissues were collected from COVID-19 and pH1N1

patients at rapid autopsy. Samples were prepared onto tissue microarrays and profiled using targeted spatial transcriptomics (Immune Atlas Panel; NanoString technologies). Myocardial, blood vessels and mixed populations were captured using "region of interest (ROI)" selection strategies to liberate the transcript data. These data were counted by next generation sequencing to obtain digital expression counts per ROI. Credit: *Immunology* (2022). DOI: 10.1111/imm.13577

University of Queensland researchers have discovered how COVID-19 damages the heart, opening the door to future treatments.

This initial study—featuring a small cohort—found COVID-19 damaged the DNA in cardiac tissue, which wasn't detected in influenza samples.

UQ Diamantina Institute researcher Dr. Arutha Kulasinghe said the team found while COVID-19 and influenza are both severe respiratory viruses, they appeared to affect cardiac tissue very differently.

"In comparison to the 2009 flu pandemic, COVID has led to more severe and long-term [cardiovascular disease](#) but what was causing that at a [molecular level](#) wasn't known," Dr. Kulasinghe said.

"During our study, we couldn't detect viral particles in the cardiac tissues of COVID-19 patients, but what we found was tissue changes associated with DNA damage and repair.

"DNA damage and repair mechanisms foster [genomic instability](#) and are related to [chronic diseases](#) such as diabetes, cancer, atherosclerosis and neurodegenerative disorders, so understanding why this is happening in COVID-19 patients is important."

Data associated with the impact of COVID on the heart has previously

been limited to blood biomarkers and physiological measurement, as obtaining heart biopsy samples is invasive.

This study was able to get deeper insights using actual cardiac tissues collected during autopsies from seven COVID patients from Brazil, two people who died from influenza and six control patients.

UQ's Professor John Fraser, who established the international COVID-19 Critical Care Consortium, said the findings provided insights into how COVID-19 impacted the body compared to other respiratory viruses.

"When we looked at the influenza cardiac tissue samples, we identified that it caused excess inflammation," Professor Fraser said. "Whereas we found COVID-19 attacked the heart's DNA—probably directly and not just as a knock-on from inflammation.

"Our study has highlighted that the two viruses appear to affect [cardiac tissue](#) very differently, which we want to get a better understand of in larger cohort studies.

"What we have categorically shown is that COVID is not 'just like the flu.' This study helps us understand how COVID-19 affects that heart, and that is the first step in working out what treatments might be best to repair that [heart](#)."

More information: Arutha Kulasinghe et al, Transcriptomic profiling of cardiac tissues from SARS-CoV -2 patients identifies DNA damage, *Immunology* (2022). [DOI: 10.1111/imm.13577](https://doi.org/10.1111/imm.13577)

Provided by University of Queensland

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