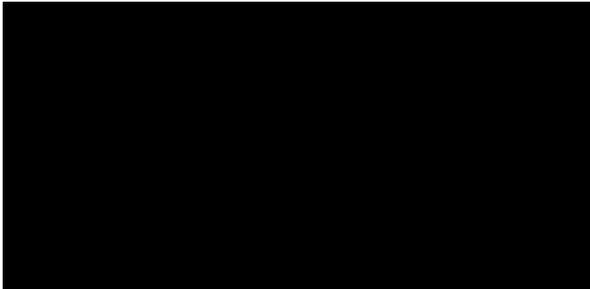


2 December 2020



### Response to your request for official information

Thank you for your request under the Official Information Act 1982 (the Act) to the Ministry of Health (the Ministry) on 4 November 2020 for:

*"Please supply the following information on Covid-19 from your files:*

- 1. An electron micrograph of the pure and fully characterised virus (SARS-CoV-2).*
- 2. The reference for the primary specialist peer reviewed paper which illustrated the virus and describes its full genetic information.*
- 3. The reference for the peer reviewed paper which provides unequivocal proof that Koch's 4 postulates have been satisfied."*

My responses to your questions are as follows.

- 1. An electron micrograph of the pure and fully characterised virus (SARS-CoV-2).*

This information is available at: [www.sciencealert.com/this-is-what-the-covid-19-virus-looks-like-under-electron-microscopes](http://www.sciencealert.com/this-is-what-the-covid-19-virus-looks-like-under-electron-microscopes).

- 2. The reference for the primary specialist peer reviewed paper which illustrated the virus and describes its full genetic information.*

The first primary specialist peer reviewed research paper regarding SARS-CoV-2, *A new coronavirus associated with human respiratory disease in China*, is available at:

<https://doi.org/10.1038/s41586-020-2008-3>.

- 3. The reference for the peer reviewed paper which provides unequivocal proof that Koch's 4 postulates have been satisfied.*

The following steps have been undertaken to provide assurance that SARS-CoV-2 is the virus that causes the severe respiratory illness known as COVID-19:

- i. The full genome of the virus was sequenced, enabling its accurate identification of the type of virus as a coronavirus. Its RNA genome provides a way to explore its evolutionary links to other coronaviruses.
- ii. The virus was cultured within a laboratory setting, confirming its ability to infect and replicate in human cells.

- iii. Cell culture studies demonstrated that the virus can cause damage to human cells (called the cytopathogenic effect or CPE).
- iv. The virus grown in culture is able to infect animals and cause disease.

Further information about studies into SARS-CoV-2 (with reference to Koch's postulates) is available at: [www.biorxiv.org/content/10.1101/2020.02.07.939389v3.full](http://www.biorxiv.org/content/10.1101/2020.02.07.939389v3.full).

The science behind the association of a specific micro-organism with a specific disease has evolved considerably since Robert Koch's postulates were published. There have been changes that have replaced the requirement for infectious agents to cause disease in healthy humans in order to prove causation. This includes changes to the concept of infectious diseases, the role that host immunity plays in the development of symptoms, and the revolution in laboratory testing and genome sequencing. Taken together, there is significant evidence, including Koch's postulates, that indicate the disease known as COVID-19 is caused by the virus SARS-CoV-2.

I trust this information fulfils your request. Under section 28(3) of the Act you have the right to ask the Ombudsman to review any decisions made under this request. The Ombudsman may be contacted by email at: [info@ombudsman.parliament.nz](mailto:info@ombudsman.parliament.nz) or by calling 0800 802 602.

Please note that this response, with your personal details removed, may be published on the Ministry website at: [www.health.govt.nz/about-ministry/information-releases/responses-official-information-act-requests](http://www.health.govt.nz/about-ministry/information-releases/responses-official-information-act-requests).

Yours sincerely



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**COVID-19 Health System Response**