

H. Sato LAB.

[The Battle between Virus and Cells]



Department of Mechanical and Biofunctional Systems

Molecular Virology

<https://www.kailab.iis.u-tokyo.ac.jp>

Morbillivirus

Measles virus (The cause of measles virus in humans)
Canine distemper virus etc.

Causes serious and fatal symptoms when infected

Aiming to elucidate the understanding of the battle between virus vs cells

Morbillivirus proteins are multifunctional.
Why does the Mobilivirus show a completely different post-infection response depending on the host cell types?

Lymphoid cells

No response

Suppression of interferon production
Cell cycle arrest

Use of cells as a **vehicle** to carry the virus itself throughout the body

Epithelial cells

State of Battle with Virus!!

Various antiviral responses

Comprehensive downregulation of housekeeping genes

Change in Gene expression

Gene	Lymphoid cells (6h)	Lymphoid cells (24h)	Epithelial cells (6h)	Epithelial cells (24h)
Interferon-related genes	Low	Low	High	High
Housekeeping genes	High	High	Low	Low

Activation of interferon production

GC box housekeeping gene, E box housekeeping gene

Development of recombinant bivalent vaccine

Leishmaniasis

- Caused by Leishmania protozoan
- Infected 12 million people in 88 countries
- Vectored by sandflies
- Dogs are also a reservoir animal.
- Epidemiological studies have shown that a decrease in local canine leishmania also reduces human leishmania.

Canine distemper virus vaccine strain

Generate **Recombinant virus** carrying the Leishmania antigen gene

Vaccinate dogs with Recombinant virus

Challenge Leishmania protozoans to dogs

Leishmania Protozoan Challenge Experiment

Non vaccination

Leishmania forms ulcers.

Vaccination of recombinant virus

Significantly reduced ulcers

Recombinant virus is effective!