



Title of Project : Molecular basis of host cell competency in virus infection

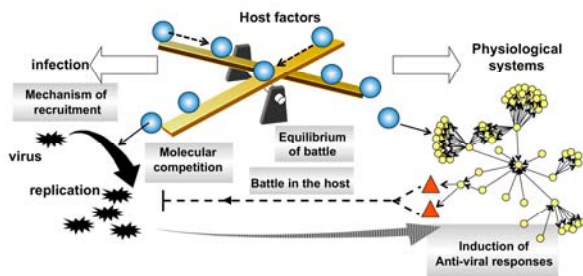
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【Purpose of the Research Project】

Viruses hijack and recruit various host factors for their replication processes. Thus, the virus proliferation depends on the availability of host factors and the compatibility of viral factors to their cognate host factors in species- and cell type-specific manners. Although cells induce anti-viral host defense systems in response to virus infection, the mechanism and the level of anti-viral state also vary in different species and cell types. Therefore, viral replication and pathogenicity are the consequence of the competition between viruses and host defense systems.

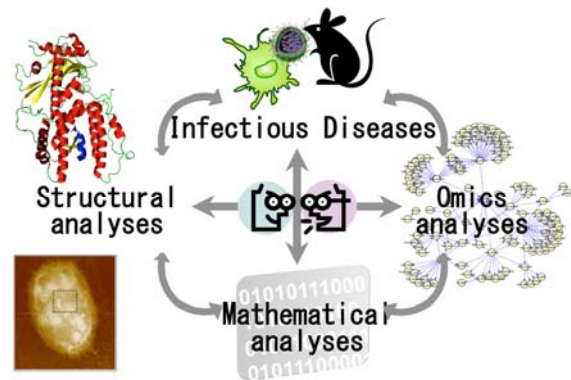
This project focuses to define the molecular basis of this competition in viral replication and pathogenicity as a concept of “host cell competency”. The aim of our study is to clarify the molecular mechanisms of virus-host interaction and viral adaptation, that is, host range specificity and tissue- and cell type-specificity in virus infection.



【Content of the Research Project】

We will focus our studies on (1) competition between virus and host in cells, (2) competition between virus and host in animal bodies, and (3) consequence of the virus-host interaction and competition. By studying the interaction between viral and host factors, the competition mechanism between virus replication and anti-viral defense systems will be revealed. This will be accomplished by structural biology, omics analyses, and mathematical analyses in addition to virological techniques.

【Expected Research Achievements and Scientific Significance】



We expect to discover a new paradigm of “host cell competency” to forward the understanding of the molecular basis of viral pathogenesis, viral evolution, and viral adaptation to host. We also expect to develop new methods and concepts through collaboration with the experts in structural biology, omics analyses, and mathematical analyses. The outcome of this project may establish general principles on viral infection based on results obtained from mathematical modeling. Our project will make a greater contribution to control viral infection and facilitate development of viral vectors.

【Key Words】

Host cell competency: the ability of permitting viral replication by supplying host factors and the ability of inducing anti-viral host defense system.

【Term of Project】 FY2012-2016

【Budget Allocation】 1,024,100 Thousand Yen

【Homepage Address and Other Contact Information】

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