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Identification of Virus Receptors

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Among different organisms, many similar but non-identical cellular molecules exist that show the same functions. Even in a single species, the expressed molecules are dependent on cell types. This is the case with virus receptors, which are cellular components involved in viral attachment to cells and invasion into cells for viral replication. Thus, viral infections show specificity with regards to host ranges, tissues, and cell types, indicating that the identification of virus receptors is useful for the molecular explanation of viral tropisms. Because target tissues or cell types of viruses are strongly associated with virus-induced diseases, the identification of virus receptors often leads to a more profound understanding of the associated diseases. Furthermore, the identification of virus receptors might aid the efficient development of countermeasures against the induced diseases.

The identification of virus receptors has been performed by various methods, which are roughly classified into three categories: (I) speculation based on knowledge obtained from experiments; (II) screening of libraries based on gain-of-function or loss-of-function criteria; and (III) identification of interactive cellular molecules by peptide sequencing or mass spectrometry. We have developed efficient, low-cost cellular cDNA library screening methods (classified into category II) to identify virus receptors. In the symposium, I would like to introduce the developed methods and also their applications.