

Critical Perspectives in Virology and Immunology

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Editorial

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Science and technology are essential for overcoming the future challenges and threats to humankind. In instance, one of the major global health issues in the current scenario is the virus infectious diseases. This serious issue will be tackled by executing the innovative ideas and technologies across a range of fields. Over the years, research field of virology in fusion with other research field has been evolved and lead to form innovative approaches to tackle the virus causing infectious diseases.

Technological innovations have led to a better understanding of molecular aspects of the control and prevention of viral infections with vaccines and antiviral agents and use of viral vectors in gene therapy. The approaches and techniques used are likely to include many disciplines, such as molecular biology, molecular genetics, biochemistry, biophysics, structural biology, cell biology, immunology, morphology, genetics and pathogenesis. In addition, progression made in molecular virology has developed new techniques such as deep sequencing of mixed populations found in respiratory secretions and gastrointestinal contents revealed the novel pathogenic and non-pathogenic virus families. In fact, the combination of sequence-based techniques with genomic and metagenomic analyses played the pivotal role in the identification of new polyomaviruses, marine viruses, and bacteriophages.

As technical advances drive the discovery of viral pathogens, we will acquire a better understanding of the pathogenesis of orphan infectious diseases and an increased understanding of how viral infections cause or modulate chronic diseases (e.g., autoimmune syndromes, cancers, cardiovascular disease, and neurological

illnesses). This new information will help to fill the lacunae of the role of viruses in infectious diseases, it will also highlight the interface between viral gene products and host defense mechanisms (i.e. cell autonomous defenses as well as innate and acquired immunity), and the forces that drive patterns of acute and persistent infections in plants and animals. The technical advances in systems biology will open avenues to systems microbiology. Viruses will be increasingly viewed not in isolation with their cellular or organismal hosts but in the real world of a microbial ecosystem where a single host is infected with a plethora of microbes, including many viruses. An understanding of the interactions between a host and several viral agents that simultaneously or sequentially infect it is likely to be informative in many ways.

Immunology in combination with virology involves the combined study and research of structural and functional aspects of virus and the immune response provoked by them. It also includes study and innovation of novel methods of stimulating or modifying the immune system to resist and fight against virus infections and development of vaccines and therapeutics against viral pathogens, and determines how viruses replicate and spread through basic and applied research. Vaccines are among the most cost-effective means of preventing infectious disease morbidity and mortality. However, recent progress in vaccine development has been irregular as the introduction of effective human papillomavirus and rotavirus vaccines yet faced many unsuccessful attempts to develop an HIV vaccine. Thus the combination of virology with immunology has the potential to grab the threat of virus infectious diseases.