

## Editorial Highlights on Molecular Mechanisms of Viruses (Special Issue)

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### Editorial Note

The Journal of Medical Microbiology and Diagnosis commemorates its decade long publication service in the field of Microbiology. With a successful International publications record, the journal has already begun compilation of the fifth issue in the 9th volume. In addition to the regular issues the journal has been publishing special issues, supplements and conference proceedings from time to time. In general, the journal covers all including Bacteriology, Clinical and Medical Diagnostics, Parasitology, Bacterial Infections. With good citation record, the journal is included in indexing databases conferring wide geographical outreach, such as Index Copernicus, Open J Gate, CAS Source Index along with simultaneous port-production digital media promotion policy. Ever since its inception in the year 2012 the journal has been consistently producing quality articles sourced from all across the world. The journal holds impeccable record of regular bimonthly issue release frequency with publication time lines.

To gain access to the cell interior, animal viruses attach to host-cell receptors. Advances in our understanding of how viral entry proteins interact with their host-cell receptors and undergo conformational changes that lead to entry offer unprecedented opportunities for the development of novel therapeutics and vaccines. Probably the first observation of specific attachment of a virus to a cell was made at the start of the twentieth century by d'Herelle<sup>1</sup>. He cultured Shigella and observed occasional clear spots — lysed bacteria — in a lawn of bacterial growth on a solid agar medium which he called plaques. The viruses that had lysed Shigella were named bacteriophages. Using co-sedimentation experiments, he showed that the attachment of the virus to the host cell is the first step in infection, and that attachment only occurred when the virus was mixed with bacteria that were susceptible to the virus. This early study showed that the host range of a virus was determined by the attachment step. A century later, we are beginning to understand the details of an increasing number of virus–receptor interactions at the atomic level.

Both non-enveloped and enveloped viruses share the same main steps and routes of virus entry — which begin with attachment to cell-surface receptors and end with the delivery of the viral genome to the cell cytoplasm. After binding to receptors — which can be proteins, carbohydrates or lipids — viruses use two main routes to enter the cell — the endocytic and non-endocytic routes. The endocytic route is usually by transport in clathrin-coated vesicles or pits, but non-clathrin-coated pits, macropinocytosis or caveolae are also used. Some viruses can induce internalization by endocytosis — for example, simian virus 40 (SV40), which induces local actin polymerization and dynamin recruitment at the site of entry.

Viral replication is dependent on a host; with their small genomes, viruses need to hijack host cellular machinery to complete their life cycle. The coevolution of intimate virus-host relationships has led to many viruses being able to successfully propagate without a significant detrimental effect to the host. However, in some instances, viral infection causes disease. The molecular mechanisms underlying virus-associated disease were the focus of an Advanced Summer School in Africa held in Hermanus, South Africa, from 6 to 14 March 2010.

Assembled in the coastal town of Hermanus were 45 participants, primarily PhD students and postdocs from less developed countries, and 18 speakers, leaders in their respective fields, from around the world (Fig. 1). The school, the second of its kind in Africa was sponsored by the International Union of Biochemistry and Molecular Biology (IUBMB), the Federation of European Biochemical Societies (FEBS), the Federation of African Societies of Biochemistry and Molecular Biology, the United Nations Educational Scientific and Cultural Organization, and the International Centre for Genetic Engineering and Biotechnology (ICGEB).

## References

1. Clark B Dube S, and Marcker, K. "Specific codon-anticodon interaction of an initiator-tRNA fragment. *Nature*" : 484–485.
2. McLaughlin-Drubin . "Viruses associated with human cancer". *Biochim. Biophys. Acta.* (2008):127–150.