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Filovirus Evolution, Molecular Classification, and Future Preparedness Against Hemorrhagic Fever Viruses

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Filoviruses, including Ebola virus and Marburg virus, remain among the most virulent pathogens known to infect humans, causing severe hemorrhagic fever with high case fatality rates and posing a continuous threat to global public health. Although considerable progress has been made in surveillance, diagnostics, and vaccine development, repeated outbreaks over the past decades have demonstrated the need for sustained international collaboration and enhanced preparedness strategies. This presentation explores recent advances in understanding the molecular evolution, taxonomy, and ecological diversity of filoviruses, highlighting how genomic sequencing technologies have transformed our ability to identify novel viral species, monitor transmission pathways, and investigate outbreak dynamics.

The presentation will discuss the genetic diversity of filoviruses, mechanisms of viral replication, host adaptation, and immune evasion strategies that contribute to disease severity. Particular emphasis will be placed on advances in virus classification and nomenclature, which facilitate standardized communication among researchers, clinicians, and public health agencies worldwide. Recent progress in the development of monoclonal antibody therapies, antiviral agents, and next-generation vaccine candidates will also be reviewed, together with the challenges associated with evaluating these countermeasures during outbreak settings.

Biography

Jens H. Kuhn is a virologist at the National Institute of Allergy and Infectious Diseases (NIAID), USA. His research focuses on filoviruses, viral taxonomy, and emerging infectious diseases. He is internationally recognized for his contributions to the classification and molecular characterization of Ebola and Marburg viruses and has authored numerous scientific publications on viral evolution, biosafety, and outbreak preparedness. He is a frequent invited speaker at international conferences and actively contributes to global initiatives that strengthen virology research and public health preparedness.