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Next-Generation Vaccine Platforms for Emerging Infectious Diseases

Volker Gerdtz

Vaccine and Infectious Disease Organization (VIDO), University of Saskatchewan, Canada

The increasing emergence of novel viral pathogens and the rapid spread of infectious diseases have underscored the critical need for innovative vaccine technologies capable of responding quickly to global public health emergencies. Traditional vaccine development often requires years of research and clinical evaluation, making the development of flexible and rapidly deployable vaccine platforms a global priority. This presentation explores recent advances in next-generation vaccine technologies, including recombinant protein vaccines, viral vector-based vaccines, messenger RNA (mRNA) platforms, DNA vaccines, and nanoparticle-based delivery systems. These innovative approaches have transformed modern vaccinology by significantly reducing vaccine development timelines while improving safety, efficacy, and scalability.

The session will examine the immunological principles underlying effective vaccine design, with particular emphasis on strategies that stimulate robust humoral and cellular immune responses. In addition, the presentation will review recent experiences from the COVID-19 pandemic, illustrating how international scientific collaboration, rapid clinical evaluation, and regulatory innovation accelerated vaccine development at an unprecedented pace. Finally, future perspectives on universal vaccine development, artificial intelligence-assisted antigen discovery, precision vaccinology, and pandemic preparedness will be discussed.

Biography

Volker Gerdtz is Director and CEO of the Vaccine and Infectious Disease Organization (VIDO) at the University of Saskatchewan, Canada. He is an internationally recognized expert in vaccine immunology, adjuvant research, and translational vaccine development. His research focuses on developing innovative vaccine platforms and immunization strategies for emerging infectious diseases affecting both humans and animals. He has led numerous collaborative research initiatives and continues to advance next-generation vaccine technologies that strengthen global pandemic preparedness and infectious disease prevention.