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I am a translational virologist with over 18 years of research experience in identifying and characterizing emerging viral and microbial pathogens. My work bridges molecular virology, immunology, and public health with a commitment to innovative antiviral strategies. With hands-on experience in high-containment diagnostics (BSL-2+) and a proven track record in securing and leading multi-institutional research grants, my vision aligns with advancing novel drug delivery systems and therapeutic interventions for infectious diseases. My work directly intersects with some of the most promising areas in translational virology and public health innovation.

## Research Focus Areas

- Molecular profiling of emerging and re-emerging human viruses (including SARS-CoV-2, NPEVs, DENV, CHIKV, Cosaviruses, and Saffold virus)
- Immune-pathogenesis of viral diseases and host-virus interactions
- Application of metagenomics and next-generation sequencing for pathogen discovery
- Development of molecular assays for pathogen detection and surveillance
- One Health frameworks for zoonotic disease monitoring and early intervention

My laboratory's contributions to wastewater-based epidemiology, airborne viral detection, and enteric transmission studies have laid groundwork for devising targeted, site-specific drug delivery platforms and precision medicine approaches. The real-time PCR-based rapid detection methods and genotyping pipelines employed by our laboratory can support companion diagnostics for new drug formulations.

## Key Contributions and Expertise:

- My primary research interest involves developing enhanced therapeutic strategies against infectious viral pathogens.
- I have contributed to research on "Novel molecular approaches to combat vectors and vector-borne viruses," with a specific emphasis on RNA interference (RNAi) mechanisms. Additionally, my work on "Gene Silencing: A Novel Approach and Suppression of HIV-1 Gene," highlights expertise in gene-silencing techniques as a therapeutic modality.
- My work on Drug Design and Methodology title” In-silico approach of structure based drug designing," demonstrates familiarity with methods relevant to the initial phases of drug development.

## Selected Publications Reflecting Relevant Expertise:

- Novel molecular approaches to combat vectors and vector-borne viruses: Special focus on RNA interference (RNAi) mechanisms. Acta Tropica. 2022.
- Gene Silencing: A Novel Approach and Suppression of HIV-1 Gene. Journal of Molecular Genetic Medicine. 2019.
- In silico analysis and molecular characterization of Influenza A (H1N1) pdm09 virus circulating and causing major outbreaks in central India, 2009-2019. Iran J Microbiol. 2020.
- Scientific rationale for hemagglutinin (ha) based diagnostic and vaccine development for influenza viruses. IJAR. 2023.
- In-silico approach of structure based drug designing against COMP proteins is involved in pathogenesis of Osteoarthritis. International Conference on Impact of Environment on WOMEN's Health. 2017.