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Measles Virus-induced Cytoskeletal Alterations and Their Biomechanical Consequences

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Measles virus (MeV) is a highly contagious paramyxovirus that disrupts cellular functions by compromising cytoskeletal integrity, prompting our investigation into its biomechanical impact on Vero cells, a well-established in vitro model derived from African green monkey kidney epithelial cells. Our study aimed to elucidate the mechanistic changes induced by MeV infection, and we employed atomic force microscopy (AFM) to perform force–distance and stress relaxation experiments, thereby quantifying key parameters such as Young's modulus and viscoelastic behavior to assess alterations in cell stiffness. Our results reveal a significant reduction in cell stiffness and prolonged stress relaxation times in infected cells, suggesting that MeV causes marked disruptions in the actin and microtubule networks. In conclusion, these findings offer valuable insights into the biomechanical alterations associated with MeV infection and highlight potential targets for therapeutic intervention to mitigate virus-induced cellular damage.