

***Viral Fusion Mechanisms* by Joe Bentz**

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The study of viral fusion is a relatively young science based on limited technology. Rapid progress in molecular biology, electron microscopy, and spectroscopy has not only stimulated interest in fusion mechanisms but also increased the potential for discovery. *Viral Fusion Mechanisms* is an excellent reference for beginning researchers. The book opens with four methodology chapters followed by 13 chapters on experimental systems and three chapters on kinetic and structural models. The methodology chapters provide information on cell and virus cultures, cryoelectron microscopy, nuclear magnetic resonance, and hydrophobic photolabeling techniques applied to viral fusion. Investigators can examine their individual needs through the comprehensive reference lists at the end of each chapter. The first section of the book uniformly comments on the strengths and weaknesses of individual procedures. The second section concentrates on the viruses themselves: influenza and the hemagglutinin-mediated fusion pathways, herpes simplex virus, HIV and CD4-induced changes related to fusion, Sendai virus and glycoprotein mobility, alpha viruses, Vaccinia, and vesicular stomatitis. Influenza comes first, the editor states, because "influenza virus fusion mechanism is the current paradigm for viral fusion mechanism." Each chapter begins with a brief description of the life cycle and epidemiology of the virus, then turns to a detailed description of what is known about

the fusion process. Authors generally discuss the shortcomings of their fusion models and often suggest new hypotheses and experiments to test new models. The last section correlates these biological data with theoretical models. Established multi-step fusion mechanisms are made to appear plausible, but there is no consensus. For all the detail, some new areas of virus research barely make it into the book. The electrophysiology of viral fusion, although still in a formative stage, offers an approach that is not well represented here. During infection, viruses can alter the electrical properties of the host cell membrane in the same way that, during fertilization, sperm alter the egg plasma membrane. This perspective offers opportunities for biophysicists and patch clampers not yet exploited. Neither is viral reconstitution fully explored nor the use of virosomes (viral "ghosts") to study viral fusion mechanisms. This volume, written by international experts, is nevertheless an excellent guide for the beginner as well as a good reference for the established investigator. It has a superb index and could be used as an aid to teaching. The book will, however, quickly become obsolete. As John Moore puts it in chapter 10: "After rereading this review in proof eight months after completion, it is already clear that some of our speculations are proving to be naive. This is a rapidly evolving area of research."