Respiratory syncytial virus (RSV) is an orthopneumovirus in the family Pneumoviridae. The fusion glycoprotein (F) is responsible for mediating viral entry and is the major antigenic target for RSV vaccine development. There are two major RSV subtypes, A and B, defined largely by genetic variation in the G glycoprotein.

Recent advances in defining the structure of F-specific NT-sensitive epitopes and the structure of the prefusion (pre-F) and postfusion (post-F) conformations of F have led to a better understanding of neutralizing mechanisms, the serological responses to natural RSV infection and vaccination, pathogenesis of disease, mechanisms of viral inactivation, and the importance of targeting pre-F surfaces with the vaccine antigen. The RSV program has also informed the development of improved vaccine antigens for other viruses that use class I fusion proteins like the coronavirus spike, influenza hemagglutinin, Ebola glycoprotein, HIV-1 gp160, and the F of other paramyxoviruses. The talk will review the structure and function of F, and describe the design, antigenicity, immunogenicity, and initial clinical data for the DS-Cav1 candidate RSV subunit vaccine based on a stabilized version of prefusion RSV F. In addition, antigen design strategies for coronaviruses and influenza will be reviewed.