[S1-1] [11/28/2005(Mon) 09:30-10:00/ Guhmoongo Hall A]

Crystal Structure of Prophenoloxidase Activating Factor-II, a Clip Domain Family of Serine Protease

Nam-Chul Ha

College of Pharmacy, Pusan National University, Pusan, Korea

Clip-domain serine proteases are the essential components of extracellular signaling cascades in various biological processes, especially in embryonic development and the innate immune responses of invertebrates. They consist of a chymotrypsin-like serine protease domain and one or two clip domains at the N-terminus. Prophenoloxidase activating factor (PPAF)-II, which belongs to the non-catalytic clip-domain serine protease family, is indispensable for the generation of the active phenoloxidase leading to melanization, a major defense mechanism of insects. Here, the crystal structure of PPAF-II reveals that the clip domain adopts a novel fold containing a central cleft, which is distinct from the structures of defensins with a similar arrangement of cysteine residues. Ensuing studies demonstrated that PPAF-II forms a homo-oligomer upon cleavage by the upstream protease and that the clip domain of PPAF-II functions as a module for binding phenoloxidase through the central cleft, while the clip domain of a catalytically active easter-type serine protease plays an essential role in the rapid activation of its protease domain.