

Beta Link

Beta links are motifs in [[proteins]] and [[polypeptides]] consisting of 5 amino acid residues. They are characterized by an overlap of a G1 type [[beta bulge]] and a type II [[beta turn]], in which the 3rd and 4th amino acids of the beta-turn are also the bulged-out side of the beta bulge [1,2].

G1 beta bulges (beta bulges with a [[glycine]] as the first residue of the bulged-out side) typically occur in one of two composite situations, either within a [[beta bulge loop]], or as a component of a beta link[2].

They commonly occur at the corners or ends of antiparallel beta sheets in proteins and polypeptides. The beta turn is situated perpendicular to the beta-sheet such that the beta link often acts as a join between the beta-sheet and another secondary structure element; sometimes the beta link connects opposite strands at the end of a single beta-barrel [3].

In serine proteases the eponymous serine is situated within a well-conserved beta link. The serine occurs at residue 2 of the type II beta-turn (with the oxyanion hole or [[nest (protein structure)]] at residues 0, 1 and 2). The beta link may provide a hydrogen bonded framework to assist the serine to adopt the correct conformation for catalysis. Some “serine proteases” have a cysteine in place of the serine, performing the same catalytic function, and the beta link is conserved in these proteins too [3].

1. Richardson JS, Getzoff ED, Richardson DC (1978). Proc. Natl Acad. Sci. USA, 75, 2574–2578.
2. Leader DP (2021) Identification and characterization of two classes of G1 β -bulge. Acta Cryst. D77, 217–223
3. Leader DP (2021) The β -link motif in protein architecture. Acta Cryst. D77, 1040–104.