Crystal Structure of Novel Cyan-emitting Fluorescent Protein from *Acropara* Stony Coral

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Variants of green fluorescent protein (GFP) existing in different spectral features with blue, cyan and yellow-green emissions were originally generated from the bioluminescent jellyfish *Aequorea Victoria*. We have solved the crystal structure of a novel cyan-emitting fluorescent protein (CFP) from *Acropara* coral to a resolution of 2.0Å. The protein possesses a tyrosine residue in the chromophore, while enhanced CFP, one of mutants of *Aequorea* GFP, has tryptophan residue at this position. In our crystal structure, two protomers pack closely together to form a dimer. The protein fold is in the shape of a cylinder, comprising 11 strands of the β-barrel threaded by an α-helix running up the axis of the cylinder and short helical segments on the ends of the cylinder. The chromophore is attached inside the cylinders, and it is consistent with the formation of aromatic systems made up of Tyr70 with reduction of its C^{α} - C_{β} coupled with cyclization of the neighboring glutamine (Gln69) and glycine (Gly71) residues. The number of polar groups and structured water molecules are buried adjacent to the chromophore. Also, the structural identification of the dimer contacts may allow mutagenic control of the state of assembly of the protein.

Keywords: structural biology, fluorescence, structure and properties