

The Response of Adaptive Mechanism of Fluorescent Proteins from Coral Species and Target Cell Properties on Signalling Capacity as Biosensor

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Abstract : Fluorescent proteins (FPs) have become very popular since green fluorescent protein discovered from crystal jellyfish. It is known that Anthozoa species have a wide range of chromophore organisms, and the initial crystal structure for non-fluorescent chromophores obtained from the reef-building coral has been determined. There are also differently coloured pigments in non-bioluminescent Anthozoa zooxanthellate and azooxanthellate which are frequently members of the GFP-like protein family. The development of fluorescent proteins (FPs) and their applications is an outstanding example of basic science leading to practical biotechnological and medical applications. Fluorescent proteins have several applications in science and are used as important indicators in molecular biology and cell-based research. With rising interest in cell biology, FPs have used as biosensor indicators and probes in pharmacology and cell biology. Using fluorescent proteins in genetically encoded metabolite sensors has many advantages than chemical probes for metabolites such as easily introduced into any cell or organism in any sub-cellular localization and giving chance to fixing to fluoresce of different colours or characteristics. There are different factors effects to signalling mechanism when they used as a biosensor. While there are wide ranges of research have been done on the significance and applications of fluorescent proteins, the cell signalling response of FPs and target cell are less well understood. In this study, it was aimed to clarify the response of adaptive mechanisms of coral species such as pH, temperature and symbiotic relationship and target cells properties on the signalling capacity. Corals are a rich natural source of fluorescent proteins that change with environmental conditions such as light, heat stress and injury. Adaptation mechanism of coral species to these types of environmental variations is important factor due to FPs properties have affected by this mechanism. Since fluorescent proteins obtained from nature, their own ecological property like the symbiotic relationship is observed very commonly in coral species and living conditions have the impact on FPs efficiency. Target cell properties also have an effect on signalling and visualization. The dynamicity of detector that used for reading fluorescence and the level of background fluorescence are key parameters for the quality of the fluorescent signal. Among the factors, it can be concluded that coral species adaptive characteristics have the strongest effect on FPs signalling capacity.

Keywords : biosensor, cell biology, environmental conditions, fluorescent protein, sea anemone

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