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ProductInformation

Aequorin from jellyfish (*Aequorea* sp.)

Product Number **A 4140**
Storage Temperature -0 °C

Product Description

CAS Number: 50934-79-7
Molecular Weight: 21.7 kDa
pI: 4.2 - 4.9

Aequorin is one of a group of photoproteins isolated from marine coelenterates which emit blue light in the presence of Ca^{2+} ions. This bioluminescence is somewhat unique in that molecular oxygen is not required for light emission. The chromophore, coelenterazine,[1] is bound to aequorin and the binding of calcium triggers the oxidation of the chromophore, producing a photon of light with a wavelength of 470 nm. *In vivo*, many organisms have an associated green fluorescent protein which shifts the emission to higher wavelengths, making the color of the emitted light appear green.[2]

Aequorin from *Aequorea aequorea* has been purified to homogeneity and has been sequenced from cDNA cloning into various hosts. It is an 189 amino acid protein formed into a hydrophobic core region where coelenterazine is bound as what is believed to be a peroxidized form, since molecular oxygen is not required for light emission. Crystallography studies of the protein have elucidated 3 possible binding sites for Ca^{2+}, but only 1 of these is absolutely required for light output.[3]

Because of the high sensitivity which can be achieved in photon detection systems, aequorin has been extensively studied as a means of quantitation of cellular calcium in various biological systems. The advantages of such a system are high sensitivity, relative sensitivity for Ca^{2+}, ease of signal detection, and lack of toxicity in biological systems. However, these desirable properties are offset by several difficulties encountered in experimental design and data collection: scarcity of purified proteins, large molecular size, one-time reactivity, influence of experimental conditions on sensitivity, nonlinearity of the relation between Ca^{2+} concentration and light intensity, and limited speed of response in light intensity to changes in Ca^{2+} concentration.

In spite of these difficulties, aequorin has been shown to be an effective tool in analysis of Ca^{2+} concentrations and flux in biological systems. Measurements of Ca^{2+} in *Xenopus*[4], *E. coli*,[5] and mammalian cells[6] have demonstrated the utility of photometric measurement of Ca^{2+}. Molecular biology techniques have been used to develop aequorin fusion proteins for intracellular measurements and localization of Ca^{2+} in plasma membranes[7] and cytoplasm,[8,9] and to develop detection systems for proteolytic activity in cells.[10]

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This product is soluble in water (10 mg/ml), yielding a clear colorless solution.

References

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