**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*, *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 and cytoplasm,\(^7,8\) and to develop detection systems for proteolytic activity in cells.\(^9\)

**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**

5. Jones, H. E., et al., Direct measurement of free Ca\(^{2+}\) shows different regulation of Ca\(^{2+}\) between the periplasm and the cytosol of *Escherichia coli*. Cell Calcium, **32**(4), 183-192 (2002).

