

## **Novel Fluorescent Probes for Labeling Proteins and Nucleic Acids**

### **Background**

Fluorescent probes or fluorophores are routinely used to detect and quantify biomolecules such as proteins and nucleic acids. There are several fluorophores available for labeling biomolecules. For example, thiol reactive probes such as BODIPY, fluorescein, Oregon Green, tetramethylrhodamine and Texas Red are used to selectively label proteins and peptides at thiol functional groups. However, their use is restricted to thiol containing biomolecules.

Coumarin derivatives have also been used as fluorophores when emission in the blue-green fluorescent region is desired. However, coumarin derivatives are insoluble in aqueous solutions and the fluorescence is quenched upon conjugation to proteins. Psoralens (furocoumarins) routinely used in cosmetics and in the treatment of skin disorders such as psoriasis and eczema can also be used to label DNA and RNA. Psoralens label DNA and RNA by intercalating into the double stranded structure and covalently binding to the pyrimidines. However, the fluorescence is quenched in reactions requiring prolonged use of the probe.

**The present technology describes various derivatives of dihydropsoresalen compounds that can be used to label both proteins and nucleic acids. These compounds can be used in reactions requiring intensely fluorescent signals in extended use.**

### **Description of the Technology**

The derivatives of dihydropsoresalen compounds described in this invention are thiol reactive and produce highly fluorescent products. Thus, dihydropsoresalen compounds and derivatives can be used to detect low abundance thiol-containing biomolecules such as proteins in biological samples.

In addition, it was shown that the fluorescent product generated during labeling a thiol-containing molecule, such as glutathione, contains the dihydropsoresalen compounds or the derivatives bound to the thiol group. This labeled reaction product retains the ability to intercalate into any nucleic acid. This property enables the use of these products to detect biomolecules that do not contain thiol groups such as nucleic acids. Thus, dihydropsoresalen compounds and derivatives can be used to detect very small quantities of both nucleic acids and proteins in biological samples. The feasibility of using dihydropsoresalen compounds and derivatives for labeling proteins and nucleic acids was demonstrated using BSA and glutathione.

### **Advantages**

- . •Can be used to label both proteins and nucleic acids.
- . •Can be used in applications requiring prolonged use of the fluorophores
- . •Can be used to detect low abundance biomolecules.

### **Applications**

- . •Labeling proteins and nucleic acids
- . •Clinical diagnostic assays
- . •Detection of thiol containing molecules

- . •Sequencing nucleic acids
- . •Quantitating thiol groups

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- Labeling antibodies

### **Patent Status**

- . •United States patent application filed.
- . •Application published on 01/29/2004 (Publication No.: US-2004-0018517 A1)

### **Licensing Opportunity**

- This technology is available for non-exclusive license.

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