



Applications of Fluorescent Makers

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Abstract

Fluorescent bio-markers study opens up new era in biological sciences. Bio-markers are sensors or detectors indicating these verity or presence of diseases, physiological state of anorganism. Bio-markers are highly region specific which recognizes infected cells. Body temperature itself act as a bio-marker in the case offever and cholesterol value is for coronary and vascular diseases. In this article we present various types of markers as measurable indicator for genetic disorders focusing on progress of disease, effectiveness of drugs, disease prevent ion and drug target identification for drug response.

Keywords: Bio-markers; Disease-markers; Fluorescent-markers; Green fluorescent protein; Markers.

1. INTRODUCTION

Markers or sensors or detectors helps in the detection of presence of disease and the physiological state of an organism. It has high applications in biological studies like genomic studies, cancer studies and dementia studies, in other way a characteristics that is measured and evaluated as an indicator of normal biological or pharmacological responses to a therapeutic field (Roger *et al.* 2008). Biomarkers can be any chemical substance, non-bio material such as age, physical quantity like temperature, pressure which act as sensor or detector. Efficiency of markers depends on its regio-specificity for reorganization and diagnization of infected cells. Any substance that can introduce into an organism to evaluate health aspects andfunctions of organs can also be termed as markers. Rubidium chloride is a bio marker used to examine the perfusion of heart muscle.

2. MARKERS IN BIO-MEDICAL FIELD

Markers having high application in biomedical field are mostly used in living organisms. Mainly two stages are there for the 1xidized1ryl1tion of markers they are:

Laboratory validation: Laboratory validation includes checking the sensitivity, specificity and reproducibility.

Clinical testing: After the laboratory validation it is applied to living organisms Fig.1.

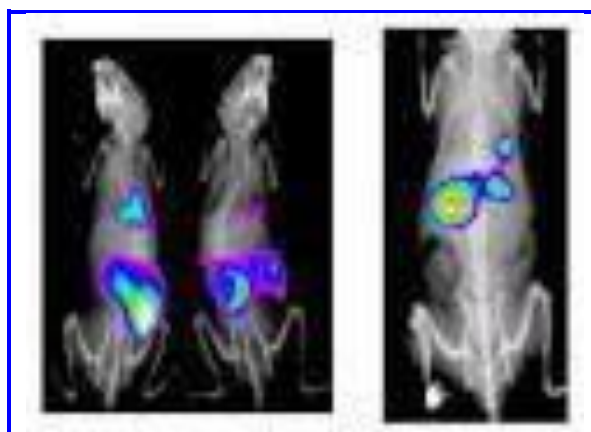


Fig. 1: Clinical validation of markers in Rat

Presently blood, saliva or urine are the most specific and sensitive biomarkers of human body. There are a number of applications in which biomarkers are used. Most of the applications are parent determination, genetic distance estimation,

determination twin zygosity and free martins, identification of disease carriers, gene mapping, and pre and post natal diagnosis of disease, anthropological and molecular evolution of studies (Roger et al. 2008).

The methods used to identify markers are Fluorescence, electrochemical, radioactive, infrared spectroscopy, ultraviolet spectroscopy almost all genetic related things highly depends the markers.

2.1 Fluorescent markers

Markers having fluorescent nature are known as 'fluorophore'. Fluorescent markers are having high sensitivity. They are produced on re-emitting of light under light excitation. Fluorescent molecules are used extensively as labels for bio molecules, substrates for enzyme, indicator for ions, stains for sub cellular domains and also to understand the gene expression and cell division in bio chemistry.

Fluorescent marker includes different type compounds including simple molecule to large proteins like Green Fluorescent Protein. Fluorophore, Green Fluorescent Protein (GFP) is auto fluorescent marker. Usually GFP is found in jelly fish (Aequoria victorial) having absorbing peak at 508 nm, minor at 475 nm and emission peak at 508 nm.



Fig. 2: Green Fluorescent Proteins.

A pseudo coloured image of the jelly fish Aequoriavictorial from which GFP was isolated. The pseudo colouring illustrates the diverse colour palettes (Fig.2) Fluorescent labelling is attaching fluorophore with another molecule like DNA, mRNA, which

selectively binds to the functional group Mass spectral data indicates molecular weight of the markers. Fluorescent may occur in red, blue or yellow colour. Sensitive electrochemical technique, square wave 17xidized17ry, cyclic 17xidized17ry are also used the techniques to identify markers. When fluorescent molecules introduces to a genome they tend to be a phototoxic and even cause death of cell. The reaction between super oxide and hydroethidine (HE) results the formation of two-electron 17xidized product ethidium (E+) which binds to Deoxy Ribonucleic

Acid (DNA) having enhancement of fluorescent (excitation 500-530 nm, emission 590-620). Xanthine or xanthine oxidise, endothelial nitric oxide, oxidizes HE to a fluorescent product (excitation 480 nm, emission 567 nm) (Jacek et al. 2008).

Markers used for disease detection are known as disease markers which help in the easy detection, prognosis, diagnosis, monitoring of therapy and so on. The analysis will help in survival and curing of diseases. Disease relating markers can be classified as:

Protein markers (GFP) which are specific to self-antigens

Hormonal markers which are used in type 1 diabetic patient.

Genetic markers such as BRCA1 mutation in breast cancer patients (Lalle et al.1994).

The introduction of markers in medicinal field will help in efficient surgical intervention, prediction of disease and drug treatment and monitoring. Usually discovery and detection of disease markers involves technologies like Enzyme Linked Immuno Sorbent Assay (ELISA) Or 2D gel plus, Edman degradation for protein markers, Reverse Transcription Polymerase Chain reactions (RTPC). Protein micro arrays consist of large number of different functional proteins identified mainly by mass spectroscopy for large scale short gun studies and resulting high through put parallel sequencing which includes RNA, DNA sequence (Nagalakshmi et al. 2008; Zhu et al. 2006; Wu et al. 2008). Fluorescently labelled microarrays are analysed using confocal laser scanner.

3. SUMMARY

Bio marker is one of the recent terminologies that people have adopted in various biological fields. The fluorescent bio markers are having high

importance in measuring the effectiveness of investigating drugs in definite drug. Bio markers are also used in predicting potential health risks of individuals.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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