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Author: Kandasamy Ponnuvel Vediappen Padmini Rajendran Sribalan



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A new tetrazole based turn-on fluorescence chemosensor for Zn²⁺ ions and its application in bioimaging

Kandasamy Ponnuvel, Vediappen Padmini* and Rajendran Sribalan

Department of Organic Chemistry, School of Chemistry,

Madurai Kamaraj University, Madurai-625021, Tamilnadu, India.

E-mail: *padimini_tamilenthi@yahoo.co.in*

Abstract

A new turn-on fluorescent quinolone tetrazole based chemosensor (QT-1) is designed and synthesized which shows high sensitivity and selectivity for Zn²⁺ ions in aqueous acetonitrile solution. QT-1 probe easily distinguishes Zn²⁺ ions from Cd²⁺ ions. Job's plot analysis suggested that the binding of QT-1 and Zn²⁺ ions is probably a 1:1 stoichiometry. Thus QT-1 can be employed for fluorescent imaging of Zn²⁺ ions in living cells.

Keywords: fluorescence, zinc, cell imaging, sensors, tetrazole

1. Introduction

Zinc is an essential trace element and the second most abundant metal in the human body [1-3]. It plays vital role as an antioxidant [4-5], catalysis, apoptosis, signal transduction, gene expression, neurotransmission, DNA binding [6], metabolism of cells, and metalloenzyme regulation. The wide range of functions may be due to its role as a cofactor for more than 300 enzymes and a large number of zinc finger proteins [7-9]. Zinc and its derivatives are widely used in various industries such as electroplating, rubber, dye, wood preservatives, ointments, batteries, paint, and pharmaceuticals [10]. There is still a need for rational design

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