Title	Seeing is believing; tracking metalloproteins by fluorescent probe in vivo and in vitro
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Citation	The 12th EuroAsia Conference on Chemical Sciences (EuAsC2S-12), Corfu, Greece, 16-21 April 2012.
Issued Date	2012
URL	http://hdl.handle.net/10722/165124
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Seeing is Believing: Tracking Metalloproteins by Fluorescent probe *in vivo* and *in vitro*

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Extensive genome research has shown that around 1/4 to 1/3 proteins are metalloproteins (or metal-binding proteins) with various metal ions incorporated with proteins for either structural or functional purposes. Thus, metalloproteomics/metallomics are developed to investigate the molecular mechanism of metal-related biological processes and the entirety of metal/metalloid species within a cell or tissue type[1]. Fluorescence labeling is probably the best method in view of its capability in providing rapid and sensitive identification in living biological systems. In spite of the development of fluorescent proteins, synthetic small-molecule fluorescence agents have been utilized to identify specific targets in cells, while metal-chelation methodology has been extensively applied to the study of metal-oriented biological process[2]. Although different types of metal-responsive sensors have been developed to label cellular metals[3], tracking of metal-binding proteins in living cells by fluorescence is still highly anticipated.

In this work, novel fluorescent probe was designed to label metalloproteins both *in vivo* and *in vitro*. The protein partners of several metal ions such as Ni^{2+} (Histidine-rich proteins in particular), Bi^{3+}, Cr^{3+} have been identified by the agent. The fluorescent agent exhibited "turn-on" response to the targets in SDS-PAGE, and its excellent permeability enabled "lighting up" of targeted proteins in living cells, providing valuable information on metalloprotein spatial distribution in biology.

Acknowledgments: This work was supported by the General Research Fund, the NSFC/RGC Joint Research Scheme and the Research Grants Council of Hong Kong (HKU7038/08P, HKU7049/09P and N_HKU75209), and the University of Hong Kong

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