

# Detection of hypochlorous acid fluctuation via a selective fluorescent probe in ALI cell models and ALI mice models

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Acute lung injury (ALI) is a diffuse inflammatory damage in pulmonary caused by excessive ROS breaking the coordination of normal physiological structures and functions. Hypochlorous acid (HOCl), one of the ROS, is a hopeful biological marker for inflammation-related diseases. Therefore, excessive generation of HOCl might be a significant reason for oxidative injury of ALI. Herein, we developed a probe BCy-HOCl for detecting HOCl in living cells and in vivo. The probe contains two moieties: a dimethylthiocarbamate group as response unit and a benzoindocyanine fluorophore as the fluorescence modulator. Treatment of benzoindocyanine fluorophore with dimethylthiocarbamoyl chloride afforded probe BCy-HOCl in good yield. With high selectivity and sensitivity, BCy-HOCl displays specific fluorescence enhancement to HOCl.

By monitoring HOCl in living cells, the potential of the BCy-HOCl as a HOCl biosensor was demonstrated. Furthermore, BCy-HOCl is utilized to measure HOCl in two types of ALI cell models, as well as for real-time tracking the HOCl fluctuation in two corresponding ALI animal models. H&E coloring and fluorescence imaging of lung tissue of ALI mice are obtained to observe the lung damage and changes of HOCl. With the help of BCy-HOCl, we certify that HOCl level increased with the severity of ALI. The potential correlation between HOCl level and the degrees of ALI are indicated. Our researches provide the evidence that HOCl may be a vital factor in process of ALI. BCy-HOCl provides a promising tool for better detection of the physiological and pathological HOCl level in cells and in vivo.