

Title: *Iron Sensing Fluorescent Probes*

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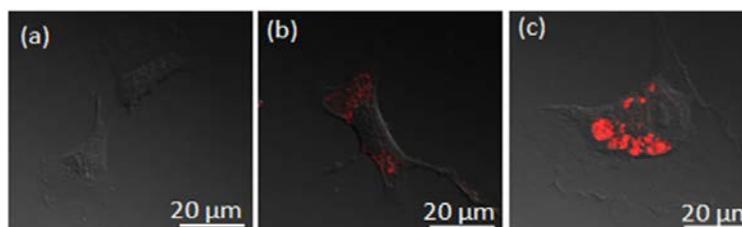
Applications: The invention comprises several novel chemical compounds that can detect either ferric (Fe^{3+}) or ferrous (Fe^{2+}) ions in living cells or tissues. In the absence of the targeted ion, these probes exhibit little to no fluorescent signal, but in the presence of the ion, detectable fluorescence is activated by the formation of a reversible coordination complex between the ion and the probe. Precise quantification of ion concentrations (either Fe^{3+} or Fe^{2+}) at the subcellular level can be achieved.

Benefits:

- Excellent reactivity and rapid fluorescent response to iron ions.
- High sensitivity allows monitoring of iron ions in real time in live cells.
- Excellent photostability.
- Absorb and emit at wavelengths not interfering with cellular pigments.

Technology Description: Iron, the most abundant essential transition metal in biological systems, plays crucial roles in many fundamental physiological processes. Iron dyshomeostasis, either deficiency or overload, is linked to various diseases, including anemia, atherosclerosis and other cardiovascular diseases, cancer, type 2 diabetes, and neurodegenerative diseases. Although iron is an essential element for the body, free iron ions (Fe^{2+} and Fe^{3+}) are toxic and damaging to cells, through catalysis of the production of reactive oxygen species (ROS) that cause harmful oxidative stress leading to cell damage. Existing methods of detecting iron all have drawbacks, with none being capable of providing cellular/subcellular resolution of iron ions in real time in living systems. The compounds of this invention can distinguish the oxidation states of iron and respond only to either Fe^{2+} or Fe^{3+} . The fluorescence is reversible, with rapid fluorescence responses that are capable of monitoring and quantifying iron ions in real time in living systems.

Patent Status: The invention is the subject of a pending U.S. provisional patent application. The compounds are novel and will be patentable as new compositions of matter.



Bovine aortic endothelial cells imaged with a compound of the invention, in (b) the absence or (c) presence of Fe^{3+} . Image (a) = control with no probe.

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