Assay for Determining Relative Redox Changes in Living Cells

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Technology description

Brief Description of the Technology

The current invention is a peptide construct that has been modified by fluorophores to monitor redox changes in live cells. The extent of fluorescence is dependent on the cellular GSH/GSSG ratio and is measured using a simple fluorescent plate reader. The technology has been validated with known redox active compounds.

Changes in redox signaling have a documented role in the pathogenesis of large number of diseases such as cardiomyopathy, cardiovascular disease, neurodegenerative disorders, and cancer. Reductive stress has recently been linked to the pathogenesis of protein aggregation myopathy. Currently there is no ameliorating therapy for this disease. Conversely, the tool would also allow rapid identification of novel cytotoxic drugs that generate oxidative stress with potential applications in cancer treatment.

Value Proposition

Commercially available methods for determining the cellular glutathione redox state are enzymatic-based and require extraction of glutathione from nonliving cells. Thiol reacting fluorophore, monochlorobimane, penetrates living cells but does not accurately represent cellular reduction potential. This invention provides a novel, simple cost effective reagent that can be added to living cells for homogenous, high-throughput measurement of glutathione redox state changes. The tool may also have extended applications in localizing redox changes in vivo by imaging techniques.

Institution

The University of Utah

Inventors

Ivor Benjamin
Professor and Chief
Cardiology
Shayne Squires
Assistant Professor
Cardiology

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com