InVivoSwiss

Hydrogen Perxide Imaging Agent

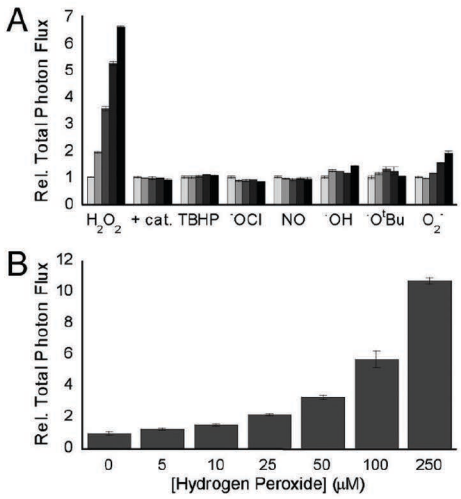
Caution: For Laboratory Use. A product for research purposes only

Caged Luciferin Imaging Agent

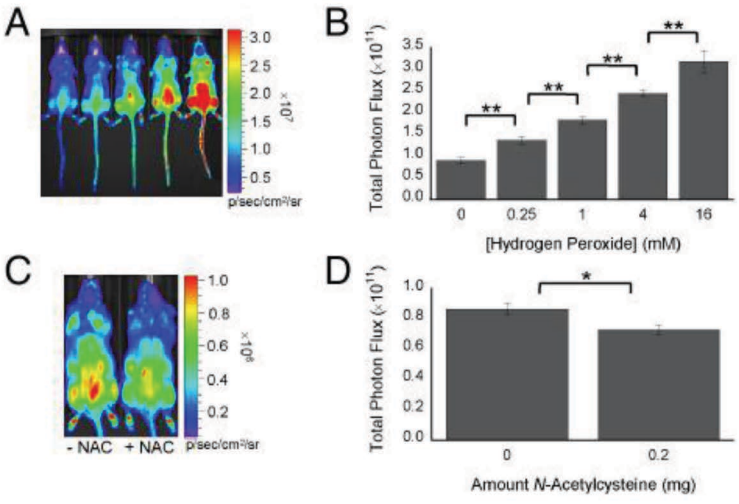
Technical information

Description:

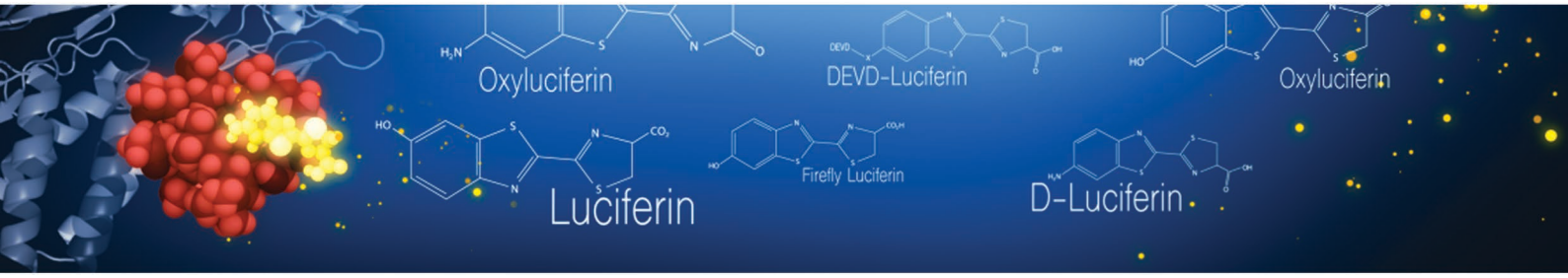
Hydrogen peroxide (H2O2) is a component of cell signaling pathways that are necessary for the growth, development, and fitness of living organisms. PeroxyTrace is a chemoselective bioluminescent probe for the real-time detection of H2O2 in cell culture and living animals. PeroxyTrace is a boronic acid-caged firefly luciferin molecule that selectively reacts with H2O2 to release firefly luciferin, which triggers a bioluminescent response in the presence of firefly luciferase. The high sensitivity and selectivity of PeroxyTrace(PTL} for H2O2, combined with the favorable properties of bioluminescence for in vivo imaging, afford a unique technology for real-time detection of basal levels of H2O2 generated in healthy, living mice.



Selective and concentration-dependent bioluminescent detection of H2O2 by PTL. (A) Total bioluminescent signal, integrated over 45 min, from PTL (5 μM) alone (light gray bars) or incubated with various ROS (100 μM) or H2O2 (100 μM) and catalase (0.4 mg/mL) for 5, 20, 40, or 60 min. Signals were normalized to signal from PTL in the absence of any ROS. (B) Total bioluminescent signal, integrated over 45 min, from 5 μM PTL incubated for 1 h with increasing concentrations of H2O2 (0–250 μM). Signals were normalized to signal from PTL in the absence of H2O2. To quantify free luciferin formation in A and B, 100 μg/mL luciferase in 50 mM Tris buffer with 10 mM MgCl2, 0.1 mM ZnCl2, and 2 mM ATP (pH 7.4) was added to the PTL plus ROS solutions.



Bioluminescent signal from PTL in FVB-luc+ mice. (A) Representative image (30 min postinjection) for mice injected with PTL (i.p., 0.5 μmol in 50 μL of 1:1 DMSO:PBS) immediately prior to injection of H2O2 (i.p., 0, 0.37, 1.5, 6, or 24 mM, left to right, in 100 μL of PBS). (B) Total photon flux, integrated over 1 h, for mice injected with PTL ± H2O2. H2O2 concentrations represent the H2O2 concentration in the i.p. cavity based on a total injection volume of 150 μL. Statistical analyses were performed with a two-tailed Student's t test. **P < 0.005 (n = 5) and error bars are ± SD. (C) Representative image (12 min postinjection) for mice injected with PTL (i.p., 0.5 μmol in 50 μL of 1:1 DMSO:PBS) immediately following NAC (i.p., 0 or 0.2 mg in 100 μL PBS). (D) Total photon flux, integrated over 1 h, for mice injected with PTL ± NAC.



Imaging and Applications:

- Imaging of hydrogen peroxide fluxes in cell culture and in living animals in vivo
- High sensitivity and low background to noise ratio
- Recommended imaging time is 10-60 min post injection of the probe
- Recommended dose is 0.5 uM per mouse injected i.p.

References:

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4. Miller EW, Chang CJ. Fluorescent probes for nitric oxide and hydrogen peroxide in cell signaling. Curr Opin Chem Biol. 2007;11:620–625. [PMC free article] [PubMed]

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