For the study of cancer or hypoxia

Hypoxia detection probe MAR

- Easily available for live-cell imaging
- As sensitive as pimonidazole
- Available for flow cytometry
- Available for the detection of hypoxia in tissue

Feature 1.

Easily available for live-cell imaging

Fig. 1. Fluorescent imaging of A549 cell under the various concentrations of oxygen. Fluorescence intensity increased as content of oxygen decreased. Pimonidazole is used to be generally used for the detection of hypoxia, but cell fixation and immunostaining are necessary. However, fluorescent live-cell imaging of hypoxia is available only by addition of MAR to the living cells.

Fig. 2. (Background image) Reduced reaction of MAR under hypoxia. Though MAR is non-fluorescent, reductive cleavage in the azo base of the probe occurs by the reductive enzyme under hypoxia, and 2Me RG is generated which makes bright green fluorescence.
**Feature 1.** (Continued) Easily available for live-cell imaging

Fig. 3. Response to hypoxia in vitro. 50 μM NADPH was introduced to 5 μM MAR in the existence of rat liver microsomes, under hypoxia or normoxia, MAR was reduced only under hypoxia and made fluorescence over 100 times brighter.

**Feature 2.** As sensitive as pimonidazole

Fig. 4. Fluorescent intensity in A549 cell under hypoxia, stained by MAR or pimonidazole. A549 cells were observed after stained by MAR or pimonidazole under the various concentrations of oxygen. While pimonidazole responded to the concentration of oxygen under the 1%, MAR responded to the oxygen concentration of about 5%.

**Feature 3.** Available for flow cytometry

Fig. 5. Analysis by the flow cytometry of A549 cell stained by MAR under hypoxia. A549 cells were analyzed by flow cytometry after the incubation for 6 hours under the various oxygen concentrations and stained by 1 mM MAR. Fluorescent intensity increased as the oxygen concentration decreased, indicating that the probe is available for flow cytometry.

**Application example** Available for the detection of hypoxia in tissue

Fig. 6. Imaging of retinal artery occlusion in rat. Retinal artery occlusion was occurred in rat retina by the laser irradiation and the fluorescent image was captured. Increase in the fluorescent intensity by MAR was observed specifically in the part of the retina in which occlusion and hypoxia were occurred. (Data were kindly offered by Prof. Toru Nakazawa, Dr. Yuii Tanaka and Dr. Satoshi Tsuda).

Reference

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