

# Fluorescent Probes for Cancer Stem Cell-Specific Visualization

We are looking to out-license the technology for its commercialization.

**Useful for the simple and rapid detection of cancer stem cells present in various types of cancer by detecting both ALDH1A1 and ALDH1A3**

◆Background

Cancer tissues contain cancer stem cells (CSCs) that exhibit resistance to anticancer drugs and metastasis. It is known that ALDH1A1 (1A1) and ALDH1A3 (1A3), which are aldehyde dehydrogenases, are expressed as biomarkers in CSCs. However, the currently available probes are unable to sensitively distinguish 1A3, making it difficult to detect CSCs in various cancers and to evaluate CSCs in metastatic cancers. Therefore, the development of probes that can sensitively respond to both 1A1 and 1A3 has been highly sought after.

◆Description and Advantages

The research team has developed a fluorescent probe that responds with high sensitivity to both 1A1 and 1A3. This allows for the distinction of expression differences between 1A1 and 1A3, enabling the easy detection of various CSCs.

- Useful for analyzing the primary site analysis of metastatic cancer
- Applicable for various types of CSCs due to the probe's responsiveness to 1A3
- Relatively easy synthesis process

◆Development Status

- Confirmed the luminescence intensity within CSCs (Fig.1)
- High emission intensity was observed when co-stained with green fluorescent probe
- Relatively easy to synthesize in a few short steps.

◆Applications

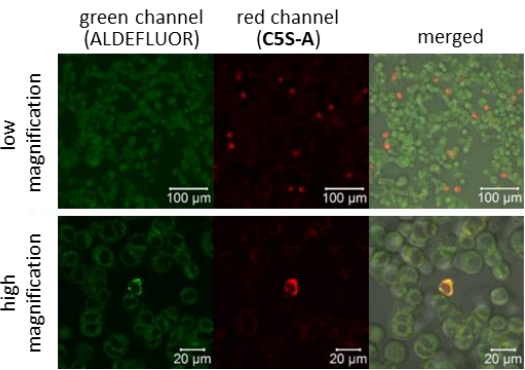
- Reagents
- In-vitro diagnostics

◆Offer

- Patent License
- Option for License
- Collaborative Research
- MTA for sample testing

|            | 1A1-<br>responsiveness | 1A3-<br>responsiveness | Fluorescent<br>mechanism | Emission<br>wavelength | Features                                                          |
|------------|------------------------|------------------------|--------------------------|------------------------|-------------------------------------------------------------------|
| Aldefluor  | ✓ ✓                    | ✓ ✓                    | Always-on                | 512nm<br>(green)       | Only for use in cell sorting<br>(Not for microscopic observation) |
| AldeRed588 | no info                | no info                | Always-on                | 599nm<br>(orange)      | Only for use in cell sorting<br>(Not for microscopic observation) |
| ALDeSense  | ✓ ✓                    | -                      | Turn-on                  | 516nm<br>(green)       | Suitable for evaluation using microscopy and in-vivo              |
| C5S-A      | ✓ ✓                    | ✓                      | Turn-on                  | 666nm<br>(red)         | Suitable for microscopic observation                              |
| C7S-A      | ✓ ✓                    | ✓                      | Turn-on                  | 773nm<br>(NIR)         | Suitable for microscopic observation and in-vivo imaging          |
| New probe  | ✓ ✓                    | ✓ ✓                    | Turn-on                  | 662nm<br>(red)         | Suitable for microscopic observation and in-vivo imaging          |

Table 1: Comparison with currently available fluorescent probes



**Fig 1: CLSM images when Aldefluor and C5S-A were applied to pancreatic cancer cells (SUIT-2) containing CSCs with high ALDH1A1 activity**

From the overlapping of emission from Aldefluor (green) and C5S-A (red), it has been confirmed that C5S-A functions as a probe capable of detecting cancer stem cells (CSCs) in cancer cells. We have also demonstrated that using this new probe instead of C5S-A resulted in 3 to 4 times better contrast in the detection of cancer stem cells compared to C5S-A.

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