

Product information: SiR-DNA (SC007)

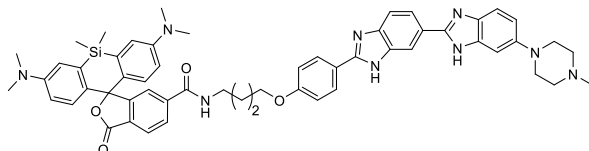
Live Cell Fluorogenic DNA Labelling Probe

Introduction

SiR-DNA is based on the fluorophore silicon rhodamine (SiR) and the DNA minor groove binder bisbenzimidazole (Hoechst). SiR-DNA allows the labelling of DNA in live cells with high specificity and low background¹⁾. The key features of SiR-DNA are i) far-red absorption and emission wavelengths, ii) cell permeability, iii) fluorogenic character and iv) compatibility with superresolution microscopy (STED & SIM). The unprecedented combination of those properties in a single probe put SiR-DNA at the leading edge of excellence.

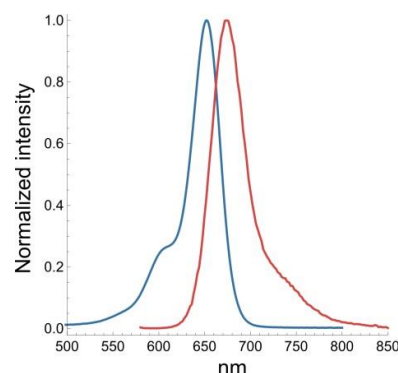
Physical properties

λ_{Abs}	652 nm
λ_{Em}	674 nm
ϵ_{max}	$1.0 \cdot 10^5 \text{ mol}^{-1} \cdot \text{cm}^{-1}$
MW	950.2 g/mol
MF	$\text{C}_{56}\text{H}_{59}\text{N}_9\text{O}_4\text{Si}$



Storage & Handling

Store the compound below -20°C upon receipt. Prepare solutions of the compound using anhydrous DMSO. Keep solutions of the compound below -20°C after use. Vials should be allowed to warm to room temperature before opening. When stored properly, the compound should be stable for several months. Note: DMSO solutions should be handled with particular caution as DMSO is known to facilitate the entry of organic molecules into tissues. Dispose of these reagents in compliance with all pertaining local regulations.



Labelling Protocol

Note: This protocol was optimized using human fibroblast cells adhering to coverslips and has been confirmed in other common cell lines. Recommendations for experimental protocols should be used as a starting point, and optimal labelling conditions for each cell type should be determined empirically. SiR-DNA is based on the DNA minor groove binding molecule bisbenzimidazole. It can therefore modify DNA metabolism in living cells. Mitotic duration and chromosome missegregation remained unchanged at concentrations up to $10 \mu\text{M}$ SiR-DNA. However, an independent study¹⁾ using Cyclin B1 and γH2AX reporter assays recommended to use concentrations equal or below **250 nM SiR-DNA if long term (>12h) imaging experiments are planned**. For all other purposes, using $1\text{--}3 \mu\text{M}$ SiR-DNA for staining is recommended.

Prepare 1 mM stock solution. Dissolve the content of the vial of SiR-DNA in $50 \mu\text{L}$ of anhydrous DMSO to make a 1 mM stock solution. This solution should be stored at -20°C or below. **Do not divide the solution into small aliquots**, they will decay faster and the compound is not altered by multiple freeze-thaw cycles. When stored properly, this stock solution should be stable for three months or more. If the concentration of the stock solution needs to be accurately determined, dilute $1 \mu\text{L}$ of 1 mM stock solution in $99 \mu\text{L}$ of **PBS containing 0.2 % SDS**. After 15 minutes at room temperature, measure the absorbance at 652 nm. Calculate the concentration using the extinction coefficient given above.

Prepare staining solution. Dilute SiR-DNA to the desired concentration in cell culture medium (e.g. DMEM + 10% fetal bovine serum) and vortex briefly. Since staining efficiency can depend on the cell line, it is recommended to stain cells with $3 \mu\text{M}$ at the first attempt to quickly obtain a strong staining and then reduce the SiR-DNA concentration in further experiments until an optimal staining is achieved (see labelling concentration & incubation time table below). **Some cell lines might express high levels of efflux pumps and be less efficiently stained by SiR-DNA. The addition of $1\text{--}10 \mu\text{M}$ verapamil, a broad spectrum efflux pump inhibitor, in the staining solution usually greatly improves the staining (for more information, see <http://spirochrome.com/verapamil/>). Use only freshly made staining solution and do not use it multiple times.**

As an efflux pump inhibitor and calcium channel inhibitor, Verapamil can have side effects on live samples.

Cell preparation and staining. Grow cells on coverslips, glass bottom dish or glass bottom multi-well plates as usual. When cells have reached the desired density, replace the culture medium by the **staining solution** ensuring that all the cells are covered

with solution. Place the cells in the incubator at 37°C in a humidified atmosphere containing 5% CO₂ and observe the following table to determine labelling time as a function of probe concentration:

probe concentration (nM)	suggested labelling time (h)*
> 1000	0.5 – 1
500	2 – 4
200	4 – 6
< 100	6 – 12

* these labelling times were determined for human fibroblasts and may differ depending on the cell line used.

Note: SiR-DNA stains DNA in paraformaldehyde (PFA) and methanol fixed cells.

Cell imaging. Imaging of SiR-DNA is best performed using standard Cy5 settings. After labelling, the live cells can be immediately imaged without the need for washing steps. Optionally, a simple washing step consisting of replacing once the labelling solution by fresh culture medium which does not contain the probe may improve the signal to noise ratio. **If time lapse imaging is performed, it is recommended to keep the concentration of probe equal or below 1 µM in the imaging medium during the whole experiment to get a constant signal and to avoid interference of the probe with DNA metabolism. If cells were washed before imaging, the staining will last for a few hours. Please note that SiR-DNA may be excited by 360-390 nm light and produce some fluorescence at ca. 450 nm due to fluorescence of the DNA binding moiety of the probe.**

References:

1. Sen, Onur, Adrian T. Saurin, and Jonathan MG Higgins.; *Scientific reports* 8.1 (2018): 7898.

Spirochrome products are high-quality reagents and materials intended for research purposes only. These products must be used by, or directly under the supervision of a technically qualified individual experienced in handling potentially hazardous chemicals. Please read the Material Safety Data Sheet provided for each product; other regulatory considerations may apply. Spirochrome products and product applications are covered by patents and patents pending.

Limited Use Label License: For research use only. Not intended for any animal or human therapeutic or diagnostic use. The purchase of this product conveys to the buyer the non-transferable right to use the purchased amount of the product and components of the product in research conducted by the buyer (whether the buyer is an academic or for-profit entity). The buyer cannot sell or otherwise transfer (a) this product (b) its components or (c) materials made using this product or its components to a third party or otherwise use this product or its components or materials made using this product or its components for Commercial Purposes. The buyer may transfer information or materials made through the use of this product to a scientific collaborator, provided that such transfer is not for any Commercial Purpose, and that such collaborator agrees in writing (a) to not transfer such materials to any third party, and (b) to use such transferred materials and/or information solely for research and not for Commercial Purposes. Commercial Purposes means any activity by a party for consideration and may include, but is not limited to: (1) use of the product or its components in manufacturing; (2) use of the product or its components to provide a service, information, or data; (3) use of the product or its components for therapeutic, diagnostic or prophylactic purposes; or (4) resale of the product or its components, whether or not such product or its components are resold for use in research. Spirochrome will not assert a claim against the buyer of infringement of the above patents based upon the manufacture, use or sale of a therapeutic, clinical diagnostic, vaccine or prophylactic product developed in research by the buyer in which this product or its components was employed, provided that neither this product nor any of its components was used in the manufacture of such product. If the purchaser is not willing to accept the limitations of this limited use statement, Spirochrome is willing to accept return of the unused product with a full refund. For information on purchasing a license to this product for purposes other than research, contact Spirochrome: Spirochrome AG, Postfach 213, 8620 Stein am Rhein, Switzerland, Email: info@spirochrome.com