Data Sheet

LuminiCell Tracker™ NIR-Cell Labeling Kit

SCT017

Pack Size: 1 Kit

Store at 2-8 °C

FOR RESEARCH USE ONLY
Not for use in diagnostic procedures. Not for human or animal consumption.

Background

Long-term noninvasive cell tracking by fluorescent probes and quantum dots is of increasing significance to life science and biomedical engineering. Current methods used to fluorescently tag cells have been limited by short signal duration, high background autofluorescence or complex and time-consuming molecular cloning manipulations using fluorescent proteins such as GFP.

LuminiCell Tracker™ Kits are biocompatible organic fluorescent nanoparticles based on Aggregation Induced Emission (AIEdot) technology. Aggregation-induced emission (AIE) molecules emit fluorescence differently than other popular fluorophores such as fluorescent proteins: propeller-shaped AIE fluorogens are non-emissive in solutions but become highly fluorescent upon aggregate formation. As a consequence, the LuminiCell Tracker™ Kit has very high fluorescence intensities with minimal signal quenching, allowing live cell fluorescent tagging for up to 10 days *in vitro* and 21 days *in vivo*. Such properties make these unique trackers optimal candidates for long interval live cell bioimaging experiments.

LuminiCell Tracker™ NIR-Cell Labeling Kit (SCT017) contains highly emissive fluorescent organic nanoparticles, designed for rapid labeling of live cells with biocompatibility. These particles can be readily taken up by diverse cell types, often within one hour. Once within cells, these particles demonstrate bright fluorescence with remarkable photostability. and emit durable signal for multiple cell generations with negligible cytotoxicity.

Labelled cells can be monitored using a variety of fluorescence techniques such as confocal microscopy, multiphoton microscopy and flow cytometry.

Novel aggregation-induced emission (AIE) particles have unique properties. Unlike conventional molecular dyes which may be hindered by aggregation-induced quenching, AIE molecules are loaded and encapsulated in the core of nanoparticles, resulting in high fluorescence intensities with minimal signal quenching, and unique spectral attributes.

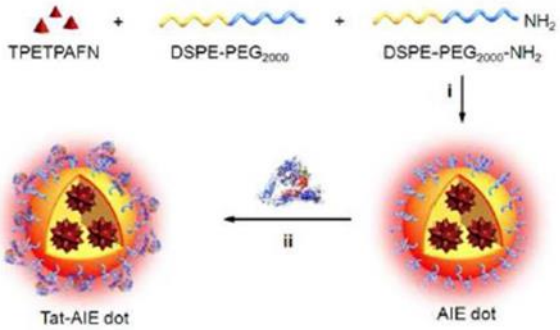

Figure 1. Fabrication of LuminiCell Tracker™ nanoparticles includes encapsulation of the TPETPAFN AIE molecules within a DSPE-PEG200 outer shell with attached cell permeable TAT sequences.

Spectral Properties

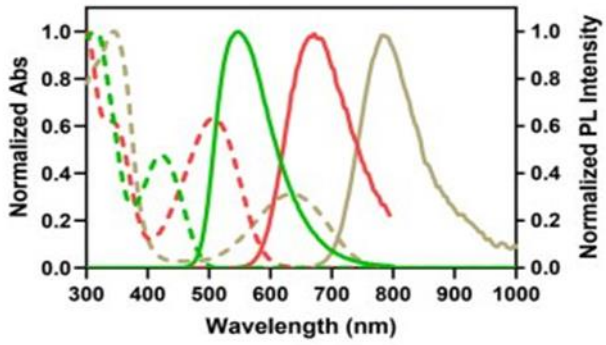

Figure 2. Excitation (dashed) and emission (solid) spectra of LuminiCell Tracker™ 540 (green), 670 (red) and NIR-810 (gold).

Catalogue Number	Product name	Excitation max λ	Emission max λ
SCT010	LuminiCell Tracker™ 540 Cell labelling kit	423 nm	540 nm
SCT011	LuminiCell Tracker™ 670 Cell Labelling Kit	510 nm	670 nm
SCT017	LuminiCell Tracker™ NIR Cell Labeling Kit	635 nm	810 nm

Storage and Handling

Store at 2-8 °C upon receipt. Do not freeze.

Note: Some particulates may form as a result of nanoparticle aggregation during transport. To get particulates back in solution, sonicate the vial containing LuminiCell Tracker™ reagent three times for 1 minute each before use.

Representative Data

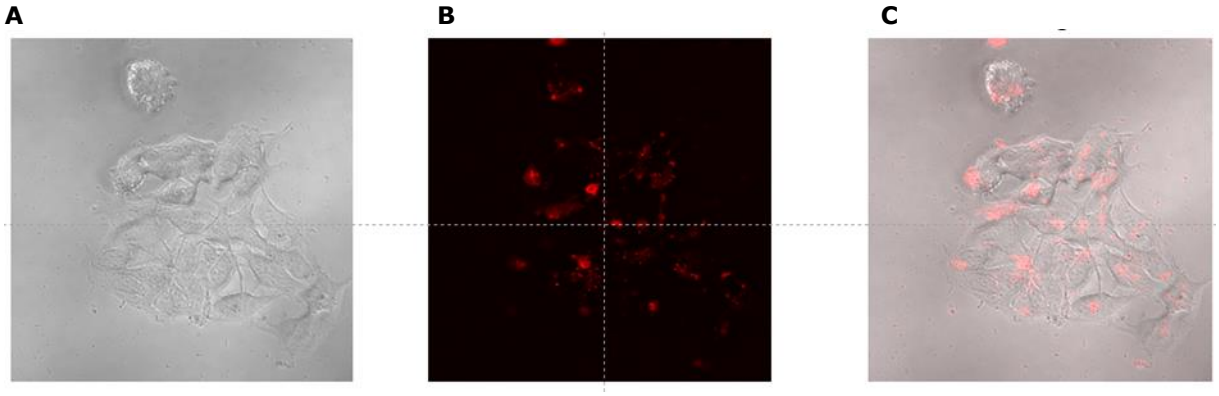

Figure 2. (**A**) HCI-EC-23 endometrial cancer cells were incubated with 2 nM LuminiCell Tracker™ reagent (SCT017) for 4 hours before being imaged. (**B**) Red, LuminiCell Tracker™ reagent (SCT017). (**C**) fluorescence merged with brightfield.

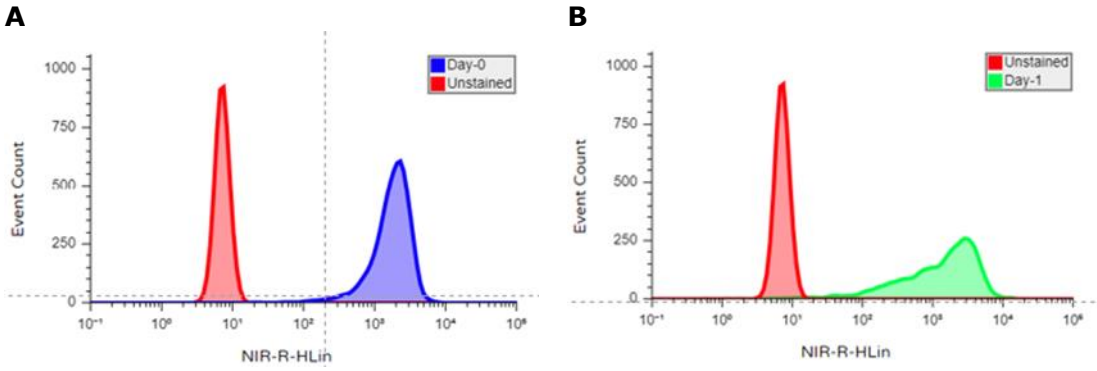

Figure 3. Jurkat cells were stained with 2 nM LuminiCell Tracker™ reagent (SCT017) at 37 °C for 4 hours. Following incubation, some cells were collected, washed, and immediately analyzed by flow cytometry. Remaining cells were seeded into separate T25 flasks to enable continued culture and growth. A 1:2 dilution of the suspension culture was used for Day-1 flow cytometry analysis. (**A**) Day 0 NIR fluorescence (blue peak). (**B**) Day 1 fluorescence (green peak). Red peak, unstained cells.

Protocols

Labeling Adherent Cells

1. Culture cells in an 8-well Millicell® EZ slide (PEZGS0816) in a 5% CO_2 incubator at 37 °C.
2. When cells reach 80% confluence, remove the medium and wash cells once with 1X PBS.
3. Prepare the labeling solution working concentration by diluting the stock LuminiCell Tracker™ reagent using fresh growth medium.

   Note: The working concentration is typically in the range of 2-10 nM depending on cell type and/or application requirements. The appropriate working concentration must be determined by the end user.
4. Add 0.2-0.4 mL of labeling solution into each well. For cells cultured on coverslips, pipet ~0.15 mL of labeling solution onto the cells grown on coverslips placed in a petri dish.
5. Incubate cells in a 5% CO_2 incubator at 37 °C for ~1 hour.

   Note: Longer incubation (4-12 hours) can be used to achieve higher uptake efficiency depending on applications.
6. Gently wash the cells twice with growth medium.

7. Visualize the labeled cells using any suitable fluorescence microscope or flow cytometry with compatible lasers/filters (refer to Spectral Characteristics for excitation and emission maxima of LuminiCell Tracker™ reagents).

   For fixed cell imaging, replace step 6 above with the following example protocol:

   - Wash cells twice with 1X PBS and fix cells in 75% alcohol or 3.7% formaldehyde in PBS for 15 min.
   - Wash cells twice after fixation prior to fluorescence imaging.

   For flow cytometry or applications that require cell detachment: Allow cells to recover in fresh growth medium for at 2 hours before detaching cells for flow cytometry or other applications.

Labeling Cells in Suspension

1. Prepare labeling solution at 2 nM working concentration by diluting the stock LuminiCell Tracker™ reagent using fresh growth medium.

   Note: The working concentration is typically in the range of 2-10 nM depending on the cell type and/or application requirement. The appropriate working concentration must be determined by the end user.
2. Add 0.2-0.4 mL of labeling solution to a tube.
3. Add $1x10^6$ cells from a cell suspension (vol ~0.1 mL) in growth medium into the tube containing the labeling solution.
4. Incubate cells in a 5% CO_2 incubator at 37 °C for ≥ 1 hour.
5. Gently wash cells twice with growth medium.
6. Visualize the labeled cells using any suitable fluorescence microscope preferred by the user or use flow cytometry with compatible lasers/filters (refer to Spectral Characteristics for excitation and emission maxima of LuminiCell Tracker™ reagents).

References

1. Liu B, Tang BZ et al. Photostable fluorescent organic dots with aggregation-induced emission (AIE dots) for noninvasive long-term cell tracing. Sci Rep. 2013;3:1150.
2. Kang Y et al. Long-Term Tracking Mesenchymal Stem Cell Differentiation with Photostable Fluorescent Nanoparticles. ACS Appl Mater Interfaces. 2016 May 18;8(19):11925-33.

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