MitoDNA™ Red 710

Catalog number: 22689
Unit size: 1 mg

Component	Storage	Amount (Cat No. 22689)
MitoDNA™ Red 710	Freeze (< -15 °C), Minimize light exposure	1 mg

OVERVIEW

There are limited probes available that effectively detect mitochondrial DNA (mtDNA). Conventional fluorescent DNA probes, such as DAPI, Hoechst, or SYBR® Green, lack the specificity required for mitochondrial targeting and primarily stain nuclear DNA. MitoDNA™ Red 710 is a cell-permeable dye that selectively stains mtDNA in live cells, providing a method for dynamic imaging of mtDNA. This dye exhibits a large Stokes shift (Ex/Em = 510/710 nm), offering a high signal-to-noise ratio and enabling multiplex staining with other fluorescent probes. mtDNA is a small, circular DNA molecule located within the mitochondria in the cytoplasm. It supplements nuclear DNA and encodes 37 genes essential for mitochondrial and cellular functions. Mitochondria are responsible for ATP synthesis through oxidative phosphorylation and house the genetic information necessary for synthesizing key enzymes, transfer RNA (tRNA), and ribosomal RNA (rRNA). Mutations and disorders in mtDNA are implicated in a range of pathologies, including age-related hearing loss, diabetes, and organ dysfunctions in the brain, heart, and liver. Additionally, mtDNA mutations are associated with an elevated risk of various cancers, including lymphomas, leukemias, and tumors in the breast, intestines, liver, and kidneys.

AT A GLANCE

Important Note

Before using MitoDNA™ Red 710 for the first time, allow it to thaw at room temperature. Then, briefly centrifuge it to collect the dried pellet.

Protocol Summary

1. Prepare cells in a growth medium.
2. Stain cells with MitoDNA™ Red 710 working solution.
3. Incubate samples for 5 to 15 minutes at 37 °C.
4. Monitor fluorescence intensity at Ex/Em = 510/710 nm.

KEY PARAMETERS

Fluorescence microscope

Emission	710 nm
Excitation	510 nm
Recommended plate	Black wall/clear bottom

PREPARATION OF STOCK SOLUTIONS

Unless otherwise noted, all unused stock solutions should be divided into single-use aliquots and stored at -20 °C after preparation. Avoid repeated freeze-thaw cycles

MitoDNA™ Red 710 Stock Solution

1. Prepare a 5 to 10 mM MitoDNA™ Red 710 stock solution in DMSO. For example, add 290 µL of DMSO to the MitoDNA™ Red 710 vial to create a 10 mM stock solution.

   Note: Prepare a single aliquot of the unused MitoDNA™ Red 710 stock solution and store it at ≤ -20 ° C, protected from light. Avoid repeated freeze-thaw cycles.

PREPARATION OF WORKING SOLUTION

MitoDNA™ Red 710 Working Solution

1. Prepare a 5 to 10 µM working solution by diluting the MitoDNA™ Red 710 stock solution in Hanks' solution with 20 mM HEPES buffer (HHBS).

   Note: For optimal results, use this solution within a few hours of preparation.

   Note: Cover the working solution with foil or store it in a dark place to protect it from light.

SAMPLE EXPERIMENTAL PROTOCOL

1. Plate the cells in a 96-well plate with black walls and a clear bottom.
2. Remove the cell culture medium and add 100 µL of MitoDNA™ Red 710 working solution directly to the cells.
3. Incubate the cells at 37°C for 5-15 minutes, protected from light.

   Note: The concentration and incubation time of MitoDNA™ Red 710 may vary depending on the cell line. Test different concentrations to determine the optimal dose.

4. Remove the dye working solution and wash the cells twice with HHBS buffer.
5. Add HHBS buffer and analyze the cells using a fluorescence microscope with excitation/emission settings of 510/710 nm.

EXAMPLE DATA ANALYSIS AND FIGURES

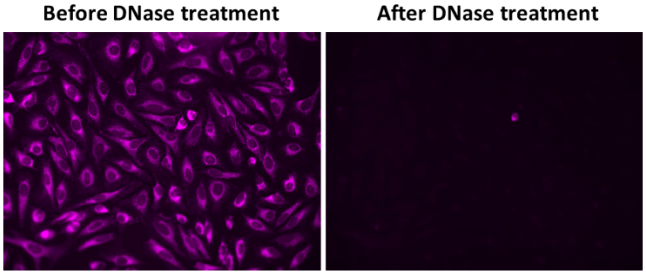

Figure 1. The fluorescence response of MitoDNA™ Red 710 (5 µM) was assessed in HeLa cells before and after DNase treatment (2

units/reaction) at 37°C for 1 hour. Fluorescence intensities were measured using a fluorescence microscope equipped with a Violet long-pass filter (450 nm emission long-pass filter).

DISCLAIMER

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