

## Cy5 tyramide

Catalog number: 11066  
Unit size: 1 mg

Component	Storage	Amount (Cat No. 11066)
Cy5 tyramide	Freeze (< -15 °C), Minimize light exposure	1 vial (1 mg)

### OVERVIEW

For many immunohistochemical (IHC) applications, the traditional enzymatic amplification procedures are sufficient for achieving adequate antigen detection. However, several factors limit the sensitivity and utility of these procedures. Tyramide signal amplification (TSA) has proven to be a particularly versatile and powerful enzyme amplification technique with improved assay sensitivity. TSA is based on the ability of HRP, in the presence of low concentrations of hydrogen peroxide, to convert labeled tyramine-containing substrate into an oxidized, highly reactive free radical that can covalently bind to tyrosine residues at or near the HRP. To achieve maximal IHC detection, tyramine is pre-labeled with a fluorophore. The signal amplification conferred by the turnover of multiple tyramide substrates per peroxidase label translates ultrasensitive detection of low-abundance targets and the use of smaller amounts of antibodies and hybridization probes. In immunohistochemical applications, sensitivity enhancements derived from TSA method allow primary antibody dilutions to be increased to reduce nonspecific background signals, and can overcome weak immunolabeling caused by suboptimal fixation procedures or low levels of target expression. Cy5 tyramide contains the bright Cy5 that can be readily detected with the standard Cy5 filter set.

### AT A GLANCE

#### Protocol Summary

1. Fix/permeabilize/block cells or tissue
2. Add primary antibody in blocking buffer
3. Add HRP-conjugated secondary antibody
4. Prepare tyramide working solution and apply in cells or tissue for 5-10 minutes at room temperature

### KEY PARAMETERS

#### Fluorescence microscope

Emission	Cy5 filter set
Excitation	Cy5 filter set
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*

#### Tyramide stock solution (1000X)

Add an appropriate amount of DMSO to make a 1-5 mM tyramide stock solution.

**Note:** Make single-use aliquots and store unused 1000X stock solution at < -15 °C, protected from light. Avoid repeat freeze-thaw cycles.

### PREPARATION OF WORKING SOLUTION

#### Tyramide working solution (1X)

Add 1 µL of the tyramide stock solution into 1 mL of a buffer of your choice containing 0.003% H<sub>2</sub>O<sub>2</sub>.

**Note:** For optimal performance, use Tris Buffer, pH=7.4.

**Note:** The tyramide working solution should be used immediately and made fresh on the day of use. Avoid direct exposure to light.

#### Secondary antibody-HRP working solution

Make an appropriate concentration of secondary antibody-HRP working solution per the manufacturer's recommendations.

### SAMPLE EXPERIMENTAL PROTOCOL

This protocol is applicable for both cells and tissues staining.

#### Cell fixation and permeabilization

1. Fix the cells or tissue with 3.7% formaldehyde or paraformaldehyde, in PBS at room temperature for 20 minutes.
2. Rinse the cells or tissue with PBS twice.
3. Permeabilize the cells with 0.1% Triton X-100 solution for 1-5 minutes at room temperature.
4. Rinse the cells or tissue with PBS twice.

#### Tissue fixation, deparaffinization and rehydration

Deparaffinize and dehydrate the tissue according to the standard IHC protocols. Perform antigen retrieval with the preferred specific solution/protocol as needed. A protocol can be found at:

<https://www.aatbio.com/resources/guides/paraffin-embedded-tissue-immunohistochemistry-protocol.html>

#### Peroxidase labeling

1. **Optional:** Quench endogenous peroxidase activity by incubating cell or tissue sample in a peroxidase quenching solution (such as 3% hydrogen peroxide) for 10 minutes. Rinse with PBS twice at room temperature.
2. **Optional:** If using HRP-conjugated streptavidin, it is advisable to block endogenous biotins with biotin blocking buffer.
3. Block with preferred blocking solution (such as PBS with 1% BSA) for 30 minutes at 4 °C.
4. Remove the blocking solution and add the primary antibody diluted in the recommended antibody diluent for 60 minutes at room temperature or overnight at 4°C.
5. Wash with PBS three times for 5 minutes each.
6. Apply 100 µL of the secondary antibody-HRP working solution to each sample and incubate for 60 minutes at room temperature.

**Note:** Incubation time and concentration can be varied depending

on the signal intensity.

7. Wash with PBS three times for 5 minutes each.

### Tyramide labeling

1. Prepare and apply 100 µL of the tyramide working solution to each sample and incubate for 5-10 minutes at room temperature.

**Note:** If you observe a non-specific signal, you can shorten the incubation time with the tyramide reagent. You should optimize the incubation period using positive and negative control samples at various incubation time points. Or you can use a lower concentration of the tyramide reagent in the working solution.

2. Rinse with PBS three times.

### Counterstain and fluorescence imaging

1. Counterstain the cell or tissue samples as needed. AAT provides a series of nucleus counterstain reagents as listed in Table 1. Follow the instructions provided with the reagents.

2. Mount the coverslip using a mounting medium with anti-fading properties.

**Note:** To ensure optimal results, it is recommended to use either RediUse™ microscope mounting solution (Cat. 20009) or FluoroQuest™ TSA/PSA Antifade Mounting Medium \*Optimized for Tyramide and Styramide Imaging\* (Cat. 44890) instead of Vectashield® mounting media. There are instances where Vectashield® mounting media may not be suitable for certain TSA/PSA conjugates.

3. Use the appropriate filter set to visualize the signal from the tyramide labeling.

**Figure 1.** Chemical structure for Cy5 tyramide.

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**Table 1.** Products recommended for nucleus counterstain.

Cat#	Product Name	Ex/Em (nm)
17548	Nuclear Blue™ DCS1	350/461
17550	Nuclear Green™ DCS1	503/526
17551	Nuclear Orange™ DCS1	528/576
17552	Nuclear Red™ DCS1	642/660

#### EXAMPLE DATA ANALYSIS AND FIGURES

