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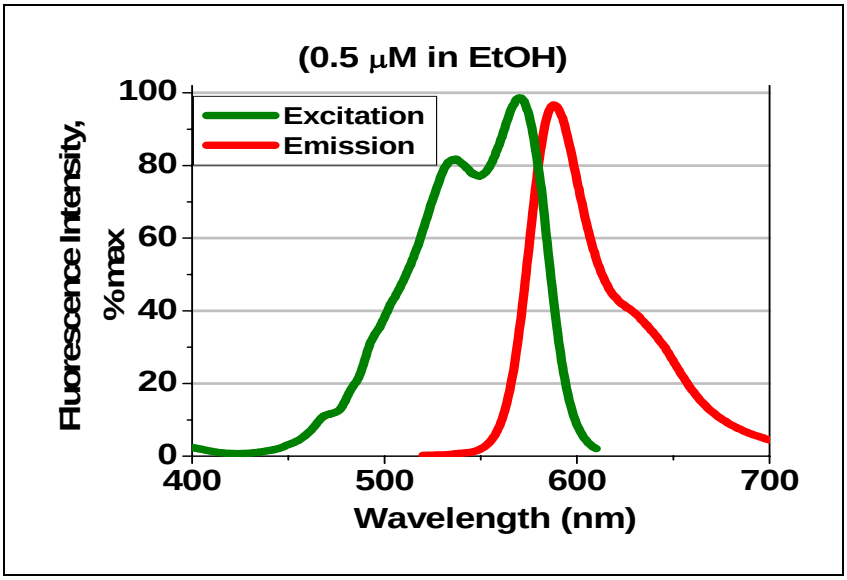
Catalog Number: FS-1007

Product Name: NeuroVue® Red Plus For Neuronal Tract Tracing Applications

Product Description: 1 cm^2 nylon filter coated with the lipophilic red emitting dye, NeuroVue Red. Typical dye loading: 18-21nmoles/mm^2.

Figure 1. Spectra of NeuroVue Red (ex max=567nm; em max=588nm)



Storage/Stability: Store in the dark at room temperature.

Applications:
The NeuroVue Red Plus filter has a higher dye loading than the standard NeuroVue Red filter (FS-1002) and can provide more extensive, bright, clean, and crisp neuron labeling with shorter diffusion times (1). NeuroVue Red has been found to be useful for tracing neuronal connections in animal tissues fixed in formaldehyde (2, 4-7, 9, 10,12, 14, 15). Like other lipophilic tracers (8, 11), it readily transfers into plasma membranes in fixed and/or live tissues and diffuses laterally within the membrane, eventually labeling the entire cell body as well as the finest axonal and dendritic branches, and allowing visualization of neuronal processes up to several millimeters distant from the point of dye insertion (2, 4-7, 9, 10, 12, 14, 15).

NeuroVue Red is provided in coated filter format because insertion of small dye coated filter segments has been shown to be a simple, reliable method for labeling well defined tissue regions, avoiding known artifacts associated with labeling via high pressure microinjection or insertion of dye crystals on a dissecting needle (3,

8, 13). NeuroVue Red fluoresces in the red (Figure 1) and exhibits minimal bleed through into filter windows typically used for green fluorescing lipophilic tracers such as NeuroVue Jade (cat # FS-1006) and far red fluorescing lipophilic tracers such as NeuroVue Maroon (cat # FS-1001) or NeuroVue Burgundy (cat # FS-1005), making it an excellent choice for multi-color neural tracing studies in sections and/or whole mount preparations (2, 4-7, 9, 10,,12, 14, 15). In addition, NeuroVue Red can be used in combination with NeuroVue Orange (cat # FS-1003) if spectral unmixing techniques are employed.

Additional Important Information

1) Filter segments of the desired size and shape can be cut using super fine Vannas scissors (one possible supplier is World Precision Instruments, Sarasota, FL, cat #500086) and inserted into the tissue at the site to be labeled. Protocol NT 001 may be downloaded for further details

2) Diffusion times vary depending on the biological system under study and must be determined empirically. See cited references and Protocol NT 001 for potentially important variables and possible starting conditions.

3) Detection of Labeled Cells

a) Confocal microscopy.
Detection is most efficient using the 543nm or 568nm laser line for excitation and emission filter set at 565-615nm.

b) Epifluorescence microscopy.:
Standard filter sets potentially useful for NeuroVue Red excitation and emission include:

- Chroma 41034 : Rhodamine X (or Alexa Fluor 568T) Exciter HQ570/20x , Dichroic Q585LP, Emitter HQ620/60m
- Chroma 31002 : TRITC (Rhodamine)/DiI/Cy3®, Exciter D540/25x , Dichroic 565DCLP , Emitter D605/55m
- Chroma 41002 : TRITC (Rhodamine)/DiI, Exciter HQ535/50x , Dichroic Q565LP Emitter HQ610/75m

References:

1. Personal communication, Karina Cramer laboratory, University of California, Irvine.

2. de Caprona MD, Beisel KW, Nichols DH, Fritzsch B. 2004. Partial behavioral compensation is revealed in balance tasked mutant mice lacking otoconia. Brain Res Bull 64:289-301. *Both **NeuroVue Maroon** (previously PTIR271) and **NeuroVue Red** (previously PTIR278) were used in Figure 8 (B. Fritzsch, personal communication).*

3. Fritzsch, B, Nichols DH, Echelard Y, McMahon AP. 1995. Development of midbrain and anterior hindbrain ocular motoneurons in normal and Wnt-1 knockout mice, J Neurobiol. 27:457-469.

4. Fritzsch B, Muirhead KA, Feng F, Gray BD, Ohlsson-Wilhelm BM. 2005. Diffusion and imaging properties of three new lipophilic tracers, NeuroVue Maroon, NeuroVue Red and NeuroVue Green and their use for double and triple labeling of neuronal profile. Brain Res Bull 66:249-258. ***NeuroVue Maroon, NeuroVue Red, NeuroVue Green***

5. Fritzsch B, Matei VA, Nichols DH, Bermingham N, Jones K, Beisel KW, Wang VY. 2005. Atoh1 null mutants show directed afferent fiber growth to undifferentiated ear sensory epithelia followed by incomplete fiber retention. Dev Dyn, 233: 570-583. ***NeuroVue Maroon** (previously PTIR271), **NeuroVue Red** (previously PTIR278)*

6. Fritzsch B, Jackson Lab Presentation, 2005:
http://www.biomedsci.creighton.edu/facilities/nccb/media/Jackson_lab_presentation.ppt
***NeuroVue Green** (previously PTIR281);**NeuroVue Red** (previously PTIR278);**NeuroVue Maroon** (previously PTIR271)*

7. Gurung B, Fritzsch B. 2004. Time course of embryonic midbrain and thalamic auditory connection development in mice as revealed by carbocyanine dye tracing. J Comp Neurol 479:309-327. ***NeuroVue Maroon*** *(previously PTIR271),* ***NeuroVue Red*** *(previously PTIR278*)

8. Honig M. DiI Labelling. 1993. Neuroscience Protocols 93-050-16-01-20

9. Hsieh CY, Cramer KS. 2006. Deafferentation Induces Novel Axonal Projections in the Auditory Brainstem After Hearing Onset. J Comp Neurol 497: 589-599 ***NeuroVue Red*** *was used for all figures except Figure 2D, for which both NeuroVue Red and DiI were used, and Figure 5A, for which DiI was used (K. Cramer, personal communication).*

10. Hsieh CY, Hong CT, Cramer KS. 2007. Deletion of EphA4 Enhances Deafferentiation-Induced Ipsilateral Sprouting in Auditory Brainstem Projections. J Comp Neurol 504: 508-518.

11. Köbbert C, Apps R, Bechmann I, Lanciego JL, Mey J, Thanos S. 2000. Current concepts of neuroanatomical tracing. Progress in Neurobiology 62: 327-351.

12. Morris JK, Maklad A, Hansen LA, Feng F, Sorensen C, Lee KF, Macklin WB, Fritzsch B. 2006. A disorganized innervation of the inner ear persists in the absence of ErbB2. Brain Res. 1091: 186-199 ***NeuroVue Maroon, NeuroVue Red***

13. Rosa-Molinar E, Proskocil BJ, Ettel M and Fritzsch B. 1999. Whole-mount procedures for simultaneous visualization of nerves, neurons, cartilage and bone. Brain Res. Protoc. 4, 115-123 .

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15. Zou D, Silvius D, Fritzsch B, Xu PX. 2004. Eya1 and Six1 are essential for early steps of sensory neurogenesis in mammalian cranial placodes. Development 131:5561-5572. ***NeuroVue Maroon*** *(previously PTIR271) and* ***NeuroVue Red*** *(previously PTIR278) were used for Figure 6, panels G-R (B. Fritzsch, personal communication).*