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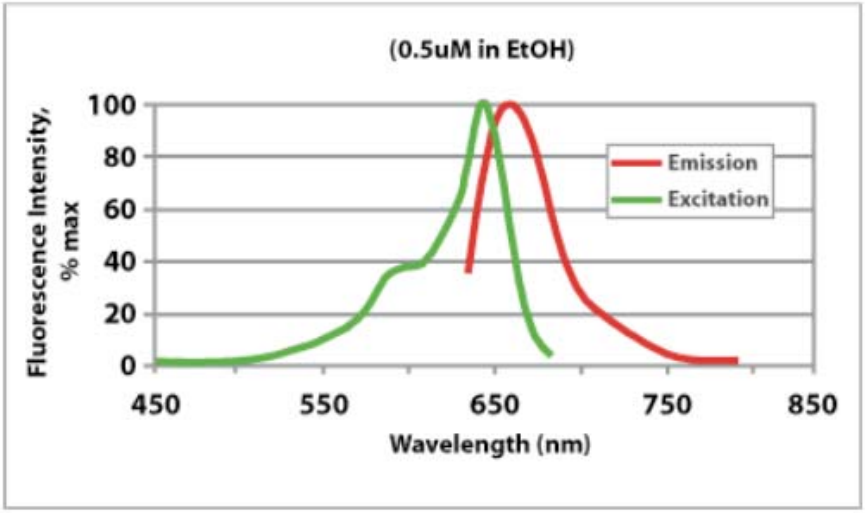
Catalog Number: FS-1001

Product Name: NeuroVue® Maroon Filter For Neuronal Tract Tracing

Product Description: 1 cm^2 nylon filter coated with the lipophilic far-red emitting dye, NeuroVue Maroon. Typical dye loading: 11-14nmoles/mm^2

Figure 1: Spectra of NeuroVue Maroon. (ex max = 647nm; em max = 667nm)



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

Applications: NeuroVue Maroon has been found to be useful for tracing neuronal connections in animal tissues fixed in formaldehyde (1, 2, 4-12, 14, 16-21, 23-25). Like other lipophilic tracers (13, 15), 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 (1, 2, 4-12, 14, 16-21, 23-25).

NeuroVue Maroon 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, 13, 22). NeuroVue Maroon fluoresces in the far red (Figure 1) and exhibits minimal bleed through into filter windows typically used for visible fluorescing lipophilic tracers such as DiA, DiI, NeuroVue Red (cat. # FS-1002), NeuroVue Orange (cat. # FS-1003) or NeuroVue Jade (cat. #. FS-1006), making it an excellent choice for multicolor neurotracing studies in sections and/or whole-mount preparations (1, 2, 4-12, 14, 16-21, 23-25)

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
Note: Due to its very long red fluorescence emission, most people cannot see NeuroVue Maroon emission by eye. Detection by camera will be more sensitive than with the unaided eye

   a) Confocal microscopy.
   Detection is most efficient using the 633nm or 647nm laser line for excitation and emission filter set at 650-710nm

   b) Epifluorescence microscopy:
   Standard filter sets potentially useful for NeuroVue Maroon excitation and emission include
   - Cy5 ®(Chroma # 31023): exciter D640/20x , dichroic 660DCLP, emitter D680/30
   - Cy5 ® longpass emission (Chroma #41024), exciter HQ620/60x , dichroic Q660LP, emitter HQ665LP

   Although suboptimal, success has also been reported using a standard Texas Red filter set to detect NeuroVue Maroon.

References:

1. Beisel, K.W., Wang-Lundberg, Y., Maklad, A. and Fritzsch, B. 2005. Development and evolution of the vestibular sensory apparatus of the mammalian ear. J Vestibular Research 15:225-241. ***NeuroVue Maroon*** *(previously PTIR271; see Hellard, Dev. Biol. 2004, below, for methods).*
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. 2003. Development of inner ear afferent connections: forming primary neurons and connecting them to the developing sensory epithelia. Brain Res Bull 60:423-433. ***NeuroVue Maroon*** *(previously PTIR271) and* ***NeuroVue Green*** *(previously PTIR281) were used in Figure 4a, 4c,and 4d;* ***NeuroVue Maroon*** *and PKH26 were used for cover image (B. Fritzsch, personal communication)*
5. Fritzsch B, Tessarollo L, Coppola E, Reichardt LF. 2004. Neurotrophins in the ear: their roles in sensory neuron survival and fiber guidance. Prog Brain Res 146:265-278. ***NeuroVue Maroon*** *(formerly PTIR271) and DiI were used in Figure 2 (B. Fritzsch, personal communication)*
6. 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***
7. 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)*

8. Fritzsch B, Pauley S, Matei V, Katz DM, Xiang M, Tessarollo L. 2005. Mutant mice reveal the molecular and cellular basis for specific sensory connections to inner ear epithelia and primary nuclei of the brain. Hear Res, 206: 52-63. ***NeuroVue Maroon*** *(previously PTIR271); see Hellard, Dev Biol 2004, below, for methods*)

9. 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)*

10. Gu C, Rodriguez ER, Reimert DV, Shu T, Fritzsch B, Richards LJ, Kolodkin AL, Ginty DD. 2003. Neuropilin-1 Conveys Semaphorin and VEGF Signaling during Neural and Cardiovascular Development. Dev Cell 5:45-57. ***NeuroVue Maroon*** *(formerly PTIR271) rather than PKH26 was used in Figure 3 (B. Fritzsch, personal communication)*

11. 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*)

12. Hellard D, Brosenitsch T, Fritzsch B, Katz DM. 2004. Cranial sensory neuron development in the absence of brain-derived neurotrophic factor in BDNF/Bax double null mice. Dev Biol 275:34-43. ***NeuroVue Maroon*** *(previously PTIR271)*)

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

14. 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).*

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

16. Maklad A, Fritzsch B, Hansen LA. 2004. Innervation of the maxillary vibrissae in mice as revealed by anterograde and retrograde tract tracing. Cell Tissue Res 315:167-180. ***NeuroVue Maroon*** *(previously PTIR271) was used for Figure 6 (B. Fritzsch, personal communication)*

17. Matei V, Pauley S, Kaing S, Rowitch D, Beisel KW, Morris K, Jones K, Fritzsch B. 2005. Smaller epithelia in Neurog1 null mice are related to earlier hair cell terminal mitosis. Dev Dyn, 234:633-650. ***NeuroVue Maroon*** *(previously PTIR271) was used for Figure 8 (B. Fritzsch, personal communication)*

18. Matei VA, Feng F, Pauley S, Beisel K, Nichols MG, Fritzsch B. 2006 Near infrared laser illumination transforms the fluorescence absorbing X-Gal reaction product BCI into a transparent, yet brightly fluorescent substance. Brain Res Bull. 70:33-43. ***NeuroVue Maroon*** *(previously PTIR271; see Fritzsch, Dev. Dyn. 2005, above, for methods)*

19. 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***

20. Pauley S, Wright TJ, Pirvola U, Ornitz D, Beisel K, Fritzsch B. 2003. Expression and function of FGF10 in mammalian inner ear development. Dev Dyn 227:203-215. ***NeuroVue Maroon*** *(formerly PTIR271) rather than DiI was used in Figure 7 (B. Fritzsch, personal communication)*

21. Pauley, S., Matei, V., Beisel, K.W., Fritzsch, B. 2005. Wiring the Ear to the Brain: the Molecular Basis of Neurosensory Development, Differentiation, and Survival. In: Development of the ear. Eds. M. Kelley and D. Wu, SHAR, Springer Verlag, 85-120. ***NeuroVue Maroon*** *(previously PTIR271) was used in Figure 4; see Tessarollo, J Neurosci 2004, below, for methods (B. Fritzsch, personal communication)*

22. 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 .
23. Tessarollo L, Coppola V, Fritzsch B. 2004. NTF3 replacement with brain-derived neurotrophic factor redirects vestibular nerve fibers to the cochlea. J Neurosci 24:2575-2584. ***NeuroVue Maroon*** *(previously PTIR271), NeuroVue Red (previously PTIR278*)
24. 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).*
25. Nichols DH, Pauley S, Jahan I, Beisel KW, Millen KJ and Fritzsch B. Lmx1a is required for segregation of sensory epithelia and normal ear histogenesis and morphogenesis.. Cell Tissue Res. Nov 5, 2008 [Epub ahead of print].