



## Fluoro-Jade C (FJC) Ready-to-Dilute Staining Kit for identifying Degenerating Neurons

**Catalogue No.:** TR-100-FJ

**Description:** The causes and effects of neuronal degeneration are of major interest to a wide variety of neuroscientists. Paralleling this growing interest is an increasing number of methods applicable to the detection of neuronal degeneration. Fluoro-Jade® C stains all degenerating neurons regardless of specific insult or mechanism of cell death. Fluoro-Jade C exhibits the greatest signal to background ratio, as well as the highest resolution. This translates to a stain of maximal contrast and affinity for degenerating neurons. This makes it ideal for localising not only degenerating nerve cell bodies but also distal dendrites, axons and terminals. The dye is highly resistant to fading and is compatible with virtually all histological processing and staining protocols.

**Applications:** The Fluoro-Jade C 'Ready to Dilute' (RTD™) Staining Kit provides an easy to use assortment of Fluoro-Jade C, DAPI, sodium hydroxide and potassium permanganate in liquid form. Following our detailed protocol, Fluoro-Jade C labelled degenerating neurons are visualised with blue light excitation while DAPI counter stained cell nuclei are visualised with ultra-violet illumination. The Fluoro-Jade C Staining Kit can be used on all kinds of preserved tissues, including fresh-frozen, paraformaldehyde or formalin fixed, and formalin fixed, paraffin-embedded tissues.

**Comments:** MATERIALS PROVIDED

Sodium Hydroxide, Solution A (Dilute 1:10 prior to use) - 40 mL  
Potassium Permanganate, Solution B (Dilute 1:10 prior to use) - 40 mL  
Fluoro-Jade C, Solution C (Dilute 1:10 prior to use) - 40 mL  
DAPI, Solution D (Add to diluted Fluoro-Jade C) - 40 mL

### EQUIPMENT AND REAGENTS NEEDED

Gelatin coated microscope slides  
Staining dishes/Coplin jars  
Cover slips  
DPX mounting media  
Slide warmer  
Convection oven  
Distilled water  
Ethanol  
Xylene

### NUMBER OF SLIDES PROCESSED:

The actual number of slides processed by this kit will depend largely upon the vessel that is used to incubate the slides. If using a standard Coplin Jar, its capacity is 50 mL and typically holds 5 slides per jar. If using such a device, then 80-100 slides stained per 50 ml of working

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solution (or, 5 ml of stock solution) could be processed in one day. Note the diluted dye is NOT stable and will not store overnight. It is best to use freshly diluted dye each time an experimental batch is started.

Final working concentrations of FJC:0.0001%

Final working concentration of KMnO<sub>4</sub>: 0.06%

**Specificity:** Degenerating neurons, and neuronal degeneration. There is no specific staining in normal healthy brain.

**Cross-reactivity:** Note: Some researchers under some conditions report blood vessel staining with Fluoro Jade. This may be because Fluoro Jade is an analogue of eosin (which stains blood cells). In general, good perfusion and preparation of the tissue should help prevent blood vessel staining but it may not be possible to eliminate it entirely. In our experience it is generally possible to distinguish neuronal from blood vessels staining by eye.

**Form:** The reagents in the Fluoro Jade kit are all supplied in a liquid format and are ready-to-dilute.

**Appearance:** FJC visualization is accomplished using blue light or a 488nm Laser.

Excitation Peak: 495 nm

Emission Peak: 521 nm

Filter system for visualizing: Fluorescein/FITC

**Reconstitution:** Dilute solutions as directed in the protocol instructions. Sometimes small precipitates may be present in the stock or diluted solutions.

Complete mixing of the diluted solutions usually dissolves the precipitates. The precipitates, if not removed, do not usually cause any difficulties if the washing steps are followed as instructed. Optional: For entirely clean solutions Biosensis recommends filtering the diluted solution through ethanol and NaOH compatible syringe or vacuum filter devices prior to contact with tissue slides.

**Storage:** The unopened kit can be stored for up to 6 months at 2-8°C after the date of receipt. The kit and components should be stored protected from light. Diluted FJC dye solutions are not stable and should be used within 4 hours of making. The other diluted solutions can be reused and stored for up to 48 hours if refrigerated and protected from light. Best results require freshly diluted solutions. We recommend using aseptic techniques when handling the reagents to avoid bacterial growth and contamination.

The FJC Ready to dilute kit is shipped ambient and stable at room temperature during transport. Refrigerate upon arrival, do not freeze.

**Expiry Date:** Unopened kit 6 months at 2-8°C protected from light. See Storage instructions for working solutions recommendations.

**Specific References:** Fouda MA, El-Sayed SS, Abdel-Rahman AA (2018) "Restoration of Rostral Ventrolateral Medulla Cystathionine- $\gamma$ -Lyase Activity Underlies Moxonidine-Evoked Neuroprotection and Sympathoinhibition in Diabetic Rats." J Pharmacol Exp Ther. 364(2):170-8 Application: IF.

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## Fluoro-Jade C (FJC) Ready-to-Dilute Staining Kit for identifying Degenerating Neurons

Species: Rat

Huang YN, Yang LY, Greig NH, Wang YC, Lai CC, Wang JY (2018) "Neuroprotective effects of pifithrin- $\alpha$  against traumatic brain injury in the striatum through suppression of neuroinflammation, oxidative stress, autophagy, and apoptosis." *Sci Rep.* 8(1): 2368  
Application: IF. Species: Rat

Takechi R, Lam V, Brook E, Giles C, Fimognari N, Mooranian A, Al-Salami H, Coulson SH, Nesbit M, Mamo JCL (2017) "Blood-Brain Barrier Dysfunction Precedes Cognitive Decline and Neurodegeneration in Diabetic Insulin Resistant Mouse Model: An Implication for Causal Link." *Front Aging Neurosci.* 9:399  
Application: IF. Species: Mouse

Freitas-Andrade M, She J, Bechberger J, Naus CC, Sin WC (2017) "Acute connexin43 temporal and spatial expression in response to ischemic stroke." *J Cell Commun Signal.* [Epub ahead of print]  
Application: IF. Species: Mouse

Xie Z, Enkhjargal B, Wu L, Zhou K, Sun C, Hu X, Gospodarev V, Tang J, You C, Zhang JH (2017) "Exendin-4 attenuates neuronal death via GLP-1R/PI3K/Akt pathway in early brain injury after subarachnoid hemorrhage in rats." *Neuropharmacology.* 128:142-51  
Application: IF. Species: Rat

Khan D (2017) "The Relationship between Astrocytes, Inflammation and Epileptogenesis." PhD Thesis. Application: IF. Species: Mouse

Fan LF, He PY, Peng YC, Du QH, Ma YJ, Jin JX, Xu HZ, Li JR, Wang ZJ, Cao SL, Li T, Yan F, Gu C, Wang L, Chen G (2017) "Mdivi-1 ameliorates early brain injury after subarachnoid hemorrhage via the suppression of inflammation-related blood-brain barrier disruption and endoplasmic reticulum stress-based apoptosis." *Free Radic Biol Med.* [Epub ahead of print]  
Application: IF. Species: Rat

Moro C, Torres N, Arvanitakis K, Cullen K, Chabrol C, Agay D, Darlot F, Benabid AL, Mitrofanis J (2017) "No evidence for toxicity after long-term photobiomodulation in normal non-human primates." *Exp Brain Res.* [Epub ahead of print]  
Application: IF. Species: Primate

Fan R, Enkhjargal B, Camara R, Yan F, Gong L, ShengtaoYao, Tang J, Chen Y, Zhang JH (2017) "Critical role of EphA4 in early brain injury after subarachnoid hemorrhage in rat." *Exp Neurol.* 296:41-8  
Application: IF. Species: Rat

Nakajima M, Nito C, Sowa K, Suda S, Nishiyama Y, Nakamura-Takahashi A, Nitahara-Kasahara Y, Imagawa K, Hirato T, Ueda M, Kimura K, Okada T (2017) "Mesenchymal

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Stem Cells Overexpressing Interleukin-10 Promote Neuroprotection in Experimental Acute Ischemic Stroke." *Mol Ther Methods Clin Dev.* 6:102-11 Application: IF. Species: Human

Suzuki K, Yamada K, Fukuhara Y, Tsuji A, Shibata K, Wakamatsu N (2017) "High-dose thiamine prevents brain lesions and prolongs survival of Slc19a3-deficient mice." *PLoS One.* 12(6):e0180279 Application: IF. Species: Mouse

Kononenko NL, Claßen GA, Kuijpers M, Puchkov D, Maritzen T, Tempes A, Malik AR, Skalecka A, Bera S, Jaworski J, Haucke V (2017) "Retrograde transport of TrkB-containing autophagosomes via the adaptor AP-2 mediates neuronal complexity and prevents neurodegeneration." *Nat Commun.* 8:14819 Application: IF. Species: Mouse

Lian YD, Chen ZX, Zhu KR, Sun SY, Zhu LP (2017) "Effect of equipotent doses of bupivacaine and ropivacaine in high-fat diet fed neonatal rodent model." *Braz J Anesthesiol.* 67(2):131-8 Application: IF. Species: Rat

Mamo JCL, Lam V, Giles C, Coulson SH, Fimognari N, Mooradian A, Al-Salami H, Takechi R (2017) "Antihypertensive agents do not prevent blood-brain barrier dysfunction and cognitive deficits in dietary-induced obese mice." *Int J Obes (Lond).* [Epub ahead of print] Application: IF. Species: Mouse

Iwasa K, Yamamoto S, Yagishita S, Maruyama K, Yoshikawa K (2017) "Excitotoxicity-induced prostaglandin D2 production induces sustained microglial activation and delayed neuronal death." *J Lipid Res.* 58(4):649-55 Application: IF. Species: Rat

Xie Z, Huang L, Enkhjargal B, Reis C, Wan W, Tang J, Cheng Y, Zhang JH (2017) "Intranasal administration of recombinant Netrin-1 attenuates neuronal apoptosis by activating DCC/APPL-1/AKT signaling pathway after subarachnoid hemorrhage in rats." *Neuropharmacology.* <http://dx.doi.org/10.1016/j.neuropharm.2017.03.025> [In press] Application: IF. Species: Rat

Katayama Y, Inaba T, Nito C, Suda S, Ueda M (2016) "Neuroprotective effects of clarithromycin against neuronal damage in cerebral ischemia and in cultured neuronal cells after oxygen-glucose deprivation." *Life Sci.* PMID:27825902 [Epub ahead of print] Application: IF. Species: Rat

Yang LY, Greig NH, Huang YN, Hsieh TH, Tweedie D, Yu QS, Hoffer BJ, Luo Y, Kao YC, Wang JY (2016) "Post-traumatic administration of the p53 inactivator pifithrin- $\alpha$ ; oxygen analogue reduces hippocampal neuronal loss and improves cognitive deficits after experimental traumatic brain injury." *Neurobiol Dis.* PMID:27553877 [Epub ahead of print]

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Izumida H, Takagi H, Fujisawa H, Iwata N, Nakashima K, Takeuchi S, Iwama S, Namba T, Komatu Y, Kaibuchi K, Oiso Y, Arima H, Sugimur Y (2016) "NMDA receptor antagonist prevents cell death in the hippocampal dentate gyrus induced by hyponatremia accompanying adrenal insufficiency in rats." *Exp Neurol*. PMID:27527984 [Epub ahead of print] Application: IF. Species: Rat

Dixon BJ, Chen D, Zhang Y, Flores J, Malaguit J, Nowrangi D, Zhang JH, Tang J. (2016) "Intranasal Administration of Interferon Beta Attenuates Neuronal Apoptosis via the JAK1/STAT3/BCL-2 Pathway in a Rat Model of Neonatal Hypoxic-Ischemic Encephalopathy." *ASN Neuro*. PMID:27683877 8(5) Application: IF. Species: Rat

Wang JY, Huang YN, Chiu CC, Tweedie D, Luo W, Pick CG, Chou SY, Luo Y, Hoffer BJ, Greig NH, Wang JY (2016) "Pomalidomide mitigates neuronal loss, neuroinflammation, and behavioral impairments induced by traumatic brain injury in rat." *J Neuroinflammation*. PMID:27353053 13(1):168 Application: IF. Species: Rat

Wang G, Manaenko A, Shao A, Ou Y, Yang P, Budbazar E, Nowrangi D, Zhang JH, Tang J (2016) "Low-density lipoprotein receptor-related protein-1 facilitates heme scavenging after intracerebral hemorrhage in mice." *J Cereb Blood Flow Metab*. PMID:27317656 [Epub ahead of print] Application: IF. Species: Mouse

Safdaria BK, Siab TC, Wattchow DA, Smid SD (2016) "Effects of pro-inflammatory cytokines, lipopolysaccharide and COX-2 mediators on human colonic neuromuscular function and epithelial permeability." *Cytokine*. PMID:27177092 83:231-8 Application: IF. Species: Human

Lian YD, Chen ZX, Zhu KR, Sun SY, Zhu LP (2016) "Effect of equipotent doses of bupivacaine and ropivacaine in high-fat diet fed neonatal rodent model." *Brazilian Journal of Anesthesiology* [In Press] Application: IF. Species: Rat

Launay PS, Reboussin E, Liang H, Kessal K, Godefroy D, Rostene W, Sahel JA, Baudouin C, Parsadaniantz SM, Le Goazigo AR (2016) "Ocular inflammation induces trigeminal pain, peripheral and central neuroinflammatory mechanisms." *Neurobiology of Disease*. PMID:26747211 88:16-28 Application: IH. Species: Mouse

Khan D, Dupper A, Deshpande T, Graan PN, Steinhäuser C, Bedner P. (2016) "Experimental febrile seizures impair interastrocytic gap junction coupling in juvenile mice." *J Neurosci Res*. PMID:26931373 [Epub ahead of print] Application: IF. Species: Mouse

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## Fluoro-Jade C (FJC) Ready-to-Dilute Staining Kit for Identifying Degenerating Neurons

Bye N, Christie KJ, Turbic A, Basrai HS, Turnley AM (2016) "Rho kinase inhibition following traumatic brain injury in mice promotes functional improvement and acute neuron survival but has little effect on neurogenesis, glial responses or neuroinflammation." *Exp Neurol*. PMID:26896832 [Epub ahead of print] Application: IH. Species: Mouse

Bedner P, Dupper A, Hüttmann K, Müller J, Herde MK, Dublin P, Deshpande T, Schramm J, Häussler U, Haas CA, Henneberger C, Theis M, Steinhäuser C (2015) "Astrocyte uncoupling as a cause of human temporal lobe epilepsy." *Brain*. PMID:25765328 [Epub ahead of print] Application: IH 4%PFA, vibratome 40um sections. Species: Mouse

Ramesh G, Didier PJ, England JD, Santana-Gould L, Doyle-Meyers LA, Martin DS, Jacobs MB, Philipp MT (2015) "Inflammation in the Pathogenesis of Lyme Neuroborreliosis." *Am J Pathol*. PMID:25892509 [Epub ahead of print] Application: IH with Z-fixative, 5 micron sections. Species: Rhesus Monkey

Suda S, Ueda M, Nito C, Nishiyama Y, Okubo S, Abe A, Aoki J, Suzuki K, Sakamoto Y, Kimura K (2015) "Valproic acid ameliorates ischemic brain injury in hyperglycemic rats with permanent middle cerebral occlusion." *Brain Res*. PMID:25721785 1606:1-8 Application: IH. Species: Rat

Mayeux JP, Teng SX, Katz PS, Gilpin NW, Molina PE (2015) "Traumatic brain injury induces neuroinflammation and neuronal degeneration that is associated with escalated alcohol self-administration in rats." *Behav Brain Res*. PMID:25446758 279:22-30 Application: IH. Species: Rat

Yang LY, Chu YH, Tweedie D, Yu QS, Pick CG, Hoffer BJ, Greig NH, Wang JY (2015) "Post-trauma administration of the pifithrin- $\alpha$ ; oxygen analog improves histological and functional outcomes after experimental traumatic brain injury." *Exp Neurol*. PMID:25819102 269:56-66 Application: IH. Species: Rat

Ren YY, Zhang HQ, Duan SH, Wang SD (2015) "Influence of Dexmedetomidine on Toxicity of Intrathecal Ketamine on Neonatal Rat Spinal Function." *Tropical Journal of Pharmaceutical Research*. 14(3):469-77 Application: IH. Species: Rat

Iseli CE, Merwin WH 3rd, Klatt-Cromwell C, Hutson KA, Ewend MG, Adunka OF, Fitzpatrick DC, Buchman CA (2014) "Effect of Cochlear Nerve Electrocautery on the Adult Cochlear Nucleus." *Otol Neurotol*. PMID: 25280052 [Epub ahead of print] Application: IH(P)

Saito T, Nito C, Ueda M, Inaba T, Kamiya F, Muraga K, Katsura K, Katayama Y (2014) "Continuous oral administration of atorvastatin ameliorates brain damage after transient focal

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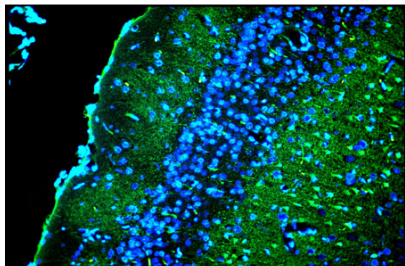
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ischemia in rats." Life Sci. PMID: 24333133 94(2):106-14 Application: IH. Species: Rat

Hayashida K, Sano M, Kamimura N, Yokota T, Suzuki M, Ohta S, Fukuda K, Hori S (2014) "Hydrogen inhalation during normoxic resuscitation improves neurological outcome in a rat model of cardiac arrest independently of targeted temperature management." Circulation. PMID: 25366995 130(24):2173-80 Application: IH. Species: Rat

**Reagent Kit protocol:** Please refer to our online product listing for current protocol/MSDS versions.

**MSDS:** Please refer to our online product listing for current protocol/MSDS versions.



Double exposure using combined blue and ultraviolet epi-fluorescent illumination of the superficial layers of the cingulate rat cortex exposed to kainic acid. Layer I contains conspicuous Fluoro-Jade C positive degenerating axon terminals. Layer II contains densely packed DAPI-positive viable granule cells. Layer III contains a mixture of Fluoro-Jade C positive degenerating pyramidal cells and DAPI-positive viable pyramidal cells. Photo is courtesy of Dr. Larry Schmued.

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