

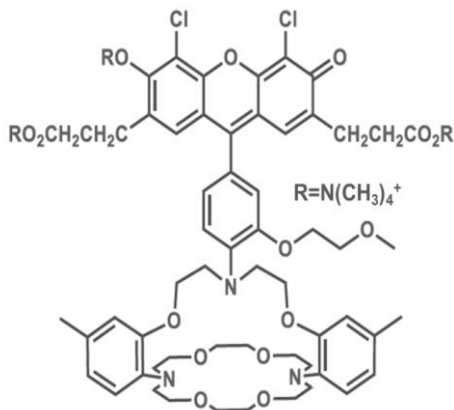
IPG-4 TMA⁺ Salt

05/21

ALTERNATE NAMES: Potassium (K⁺) indicator; IPG-4 membrane impermeable; IPG-4 tetramethylammonium TMA⁺ Salt; Fluorescent Potassium K⁺ indicator

CATALOG #: B3145-5PK 5 x 50 µg
B3145-500 500 µg

STRUCTURE:



MOLECULAR WEIGHT: 1336

APPEARANCE: Red orange powder

PURITY: ≥ 90%

SOLUBILITY: Soluble in water

DESCRIPTION: IPG-4 is a yellow-green fluorescent, intracellular potassium (K⁺) indicator with Ex/Em: 525 nm/545 nm and a high-sensitivity to detect small changes in K⁺ concentration. It is a small, synthetic fluorochrome which incorporates a K⁺-binding moiety. When K⁺ binds, the quenching is relieved and the fluorescence dramatically increases. IPG-4 has a higher affinity (K_d = 7 mM) than IPG-1 (Cat. Nos. B3140, B3141; K_d = 50 mM) and IPG-2 (Cat. Nos. B3142, B3143; K_d = 18 mM).

IPG-4 TMA⁺ salt is a membrane impermeable form of IPG-4 that can be used in lipid membrane-free systems, liposomes, or can be introduced into cells by electroporation, microinjection or other methods. IPG-4 has been used as a sensor for extracellular K⁺.

STORAGE TEMPERATURE: -20 °C. Store in the dark. Product is light sensitive. Protect from air. Store under desiccating conditions.

HANDLING: Do not take internally. Wear gloves and mask when handling the product! Avoid contact by all modes of exposure.

PROTOCOL:

Titration protocol for measuring potassium concentrations in solution:

1. Calibrate IPG-4 salt by dissolving the dye in TRIS or HEPES buffer with various concentrations of KCl. Use a concentration of ~2.5 µM IPG-4 and a concentration range between 0-150 mM KCl. For calibration, use a buffer formulation that is similar to the experimental conditions, as the performance of the dye can be impacted by other salts and/or proteins.
2. There will be an increase in the fluorescence of the solution, when the amount of KCl in the solution increases.
3. Read the fluorescence using a plate reader or fluorimeter (Excitation/Emission: 525 nm/545 nm).

- REFERENCES:**
1. Humphries, J., Xiong, L., Liu, J., et al. Species-Independent Attraction to Biofilms through Electrical Signaling. *Cell*. 12;168(1-2):200-209.e12 (2017).
 2. Wellbourne-Wood, J., Rimmele, T.S., Chatton, J.Y. Imaging extracellular potassium dynamics in brain tissue using a potassium-sensitive nanosensor. *Neurophotonics*. 4(1):015002 (2017).
 3. Kilic, K., Karatas, H., Dönmez-Demir, B., et al. Inadequate brain glycogen or sleep increases spreading depression susceptibility. *Ann Neurol*. 83(1):61-73 (2018).
 4. Prindle, A., Liu, J., Asally, M. et al. Ion channels enable electrical communication in bacterial communities. *Nature* 527, 59–63 (2015).

5. Rana, P.S., Gibbons, B.A., Vereninov, A.A., et al. Calibration and characterization of intracellular Asante Potassium Green probes, APG-2 and APG-4. *Anal Biochem.* 15;567:8-13 (2019).
6. Ong, S.T., Ng, A.S., Ng, X.R., et al. Extracellular K⁺ dampens T cell functions: implications for immune suppression in the tumor microenvironment. *Bioelectricity*, 1(3), 169-179 (2019).

RELATED PRODUCTS:

IPG-1 TMA⁺ Salt (Cat. No. B3141)
IPG-1 AM (Cat. No. B3140)
ING-2 TMA⁺ Salt (Cat. No. B3138)
IPG-2 TMA⁺ Salt (Cat. No. B3143)
IPG-2 AM (Cat. No. B3142)

DISCLAIMER:

FOR RESEARCH USE ONLY! Not to be used on humans.