

Technical Specifications

Experiment Duration: 4 hours

Toxicity: NONE

Tau load (min): 5-10

Tau rundown (min): >160

Tau internalization (min): 165

$\Delta F/F_{max}$: 15-20

APD₅₀ Change Rate: 1.4 (5.3%/hr)

Quantum Yield: 0.3

Ex/Em Shift (nm): >190

Ex/Em Color: Re/Far Red-NIR

Comparison: QuasAr 30 min; di-4-ANEPPS 36 min; di-8-ANEPPS 1 hr; BERST1 1 hr; Fluo Volt 2 hr

QuasAr Low; di-4-ANEPPS low/medium; di-8-ANEPPS low; BERST1 low at low concentration; Fluo Volt medium/high

di-4-ANEPPS 4.8 min; di-8-ANEPPS 10-20 min; Fluo Volt 10-45 min

QuasAr 15 min; di-4-ANEPPS 15 min; di-8-ANEPPS >60 min; BERST1 5; Fluo Volt >90

di-4-ANEPPS 32-67 min

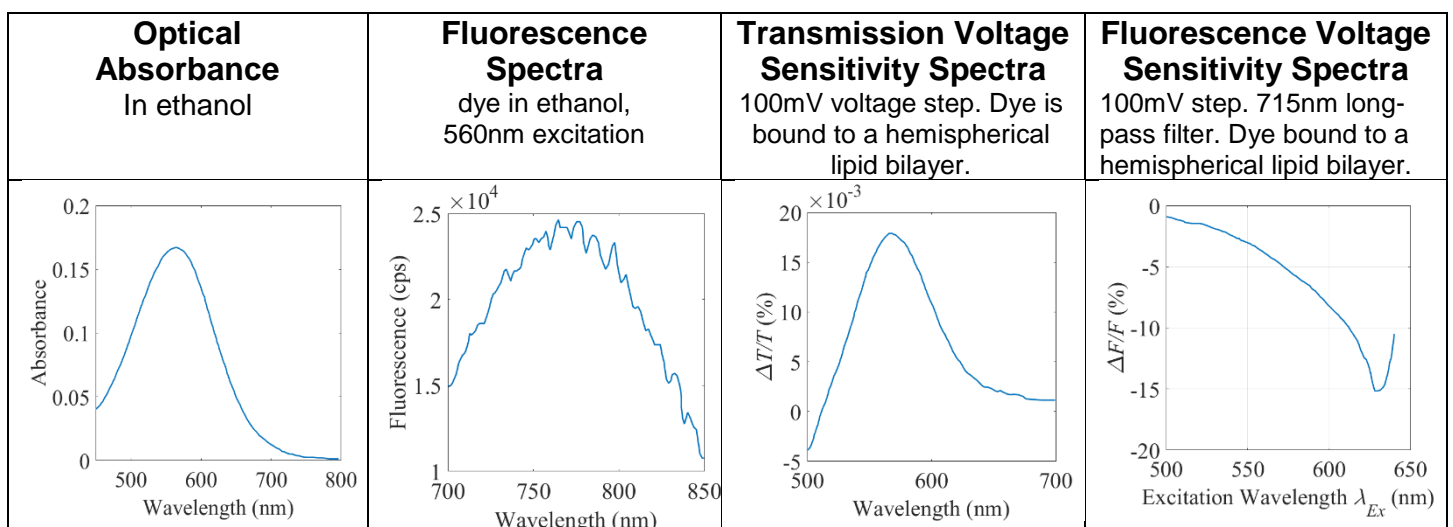
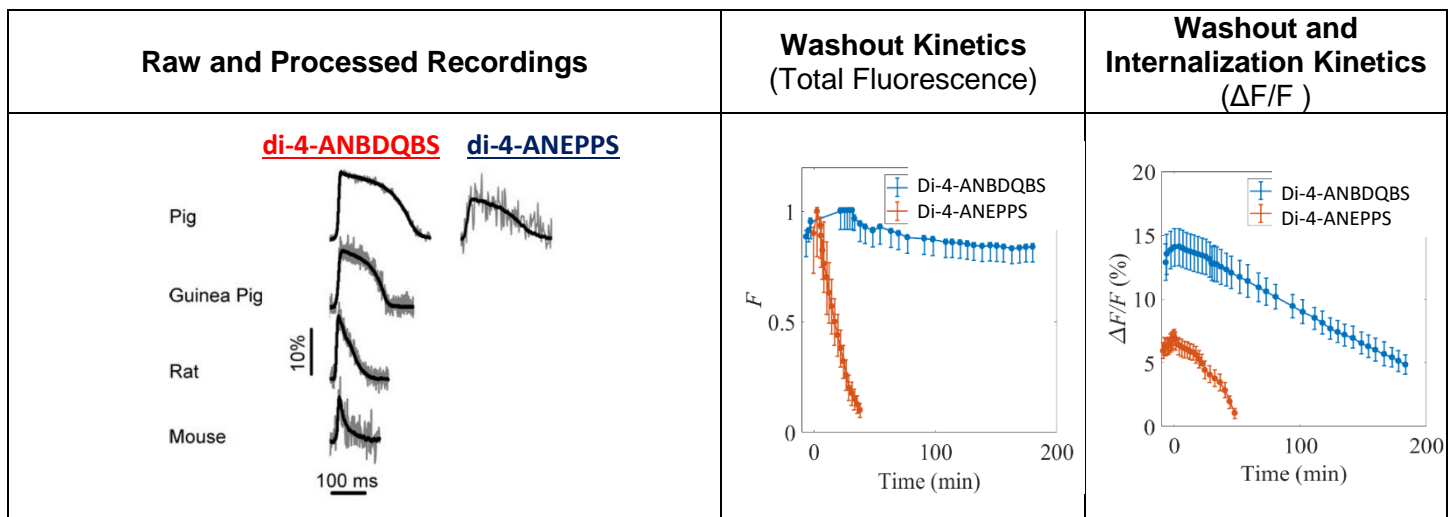
QuasAr 21-48; di-4-ANEPPS 8-9; di-8-ANEPPS 12; BERST1 24; Fluo Volt 27

Fluo Volt: <13%/s (46800%/hr)

QuasAr 0.008; di-4-ANEPPS 0.3; di-8-ANEPPS 0.3; BERST1 0.017

QuasAr 70; di-4-ANEPPS 170; di-8-ANEPPS 170; BERST1 25; Fluo Volt 15

QuasAr Red/Far Red; di-4-ANEPPS Green/Red; di-8-ANEPPS Green/Red; BERST1 Red/Far Red; Fluo Volt Blue/Green



Patent No. 8155730. Composition, Method, System, & Kit for Optical Electrophysiology. Issued: 10/14/2012. Pertsov, Matiukas, Loew, Wuskell. **Patent No. 9,357,924.** Composition, Method, System, & Kit for Optical Electrophysiology, Issued: 5/19/2016. Pertsov, Matiukas, Loew, Wuskell. **Patent No. 9,636,424.** Composition, Method, System, & Kit for Optical Electrophysiology, Issued: 5/2/2017. Pertsov, Matiukas, Loew, Wuskell.

Select Publications using Di-4-ANBDQBS:

1. A Matiukas, BG Mitrea, M Qin, AM Pertsov, AG Shvedko, MD Warren, AV Zaitsev, JP Wuskell, MD Wei, J Watras, LM Loew. 2007. Near-infrared voltage-sensitive fluorescent dyes optimized for optical mapping in blood-perfused myocardium. *Heart rhythm : the official journal of the Heart Rhythm Society* 4:1441-1451.
2. RD Walton, D Benoist, CJ Hyatt, SH Gilbert, E White, O Bernus. 2010. Dual excitation wavelength epifluorescence imaging of transmural electrophysiological properties in intact hearts. *Heart rhythm : the official journal of the Heart Rhythm Society* 7:1843-1849.
3. A Klimas, CM Ambrosi, J Yu, JC Williams, H Bien, E Entcheva. 2016. OptoDyCE as an automated system for high-throughput all-optical dynamic cardiac electrophysiology. *Nature communications* 7:11542.
4. M Warren, KW Spitzer, BW Steadman, TD Rees, P Venable, T Taylor, J Shibayama, P Yan, JP Wuskell, LM Loew, AV Zaitsev. 2010. High-precision recording of the action potential in isolated cardiomyocytes using the near-infrared fluorescent dye di-4-ANBDQBS. *Am J Physiol Heart Circ Physiol* 299:H1271-1281.
5. BJ Hansen, J Zhao, TA Csepe, BT Moore, N Li, LA Jayne, A Kalyanasundaram, P Lim, A Bratasz, KA Powell, OP Simonetti, RS Higgins, A Kilic, PJ Mohler, PM Janssen, R Weiss, JD Hummel, VV Fedorov. 2015. Atrial fibrillation driven by micro-anatomic intramural re-entry revealed by simultaneous sub-epicardial and sub-endocardial optical mapping in explanted human hearts. *Eur Heart J* 36:2390-2401.
6. VV Fedorov, AV Glukhov, R Chang, G KostECKI, H Aferol, WJ Hucker, JP Wuskell, LM Loew, RB Schuessler, N Moazami, IR Efimov. 2010. Optical mapping of the isolated coronary-perfused human sinus node. *J Am Coll Cardiol* 56:1386-1394.
7. P Lee, C Bollensdorff, TA Quinn, JP Wuskell, LM Loew, P Kohl. 2011. Single-sensor system for spatially resolved, continuous, and multiparametric optical mapping of cardiac tissue. *Heart rhythm : the official journal of the Heart Rhythm Society* 8:1482-1491.
8. I Uzelac, Fenton, F.H.,. 2015. Robust Framework for Quantitative Analysis of Optical Mapping Signals without Filtering. *Computing in Cardiology* 42:461-464.
9. R Macianskiene, I Martisiene, A Navalinskas, R Vosyliute, R Treinys, B Vaidelyte, R Benetis, J Jurevicius. 2015. Evaluation of excitation propagation in the rabbit heart: optical mapping and transmural microelectrode recordings. *PloS one* 10:e0123050.
10. K Thorsen, VS Dam, K Kjaer-Sorensen, LN Pedersen, VA Skeberdis, J Jurevicius, R Treinys, I Petersen, MS Nielsen, C Oxvig, JP Morth, VV Matchkov, C Aalkjaer, H Bundgaard, HK Jensen. 2017. Loss-of-activity-mutation in the cardiac chloride-bicarbonate exchanger AE3 causes short QT syndrome. *Nature communications* 8:1696.
11. P Lee, P Yan, P Ewart, P Kohl, LM Loew, C Bollensdorff. 2012. Simultaneous measurement and modulation of multiple physiological parameters in the isolated heart using optical techniques. *Pflugers Archiv : European journal of physiology* 464:403-414.
12. C Gloschat, K Aras, S Gupta, NR Faye, H Zhang, RA Syunyaev, RA Pryamonosov, J Rogers, MW Kay, IR Efimov. 2018. RHYTHM: An Open Source Imaging Toolkit for Cardiac Panoramic Optical Mapping. *Scientific reports* 8:2921.
13. U Nussinovitch, L Gepstein. 2015. Optogenetics for in vivo cardiac pacing and resynchronization therapies. *Nature biotechnology* 33:750-754.

