SUPPORTING INFORMATION

Caged vanilloid ligands for activation of TRPV1 receptors by 1- and 2-photon excitation †

Jun Zhao,[‡] Tony D. Gover,[§] Sukumaran Muralidharan,[‡]
Darryl A. Auston,[‡⊥] Daniel Weinreich,[§‖] and Joseph P. Y. Kao*[‡§⊥]

Medical Biotechnology Center, University of Maryland Biotechnology Institute, Baltimore, MD
Program in Neuroscience, University of Maryland, Baltimore, Baltimore, MD
Department of Pharmacology, University of Maryland School of Medicine, Baltimore, MD
Department of Physiology, University of Maryland School of Medicine, Baltimore, MD

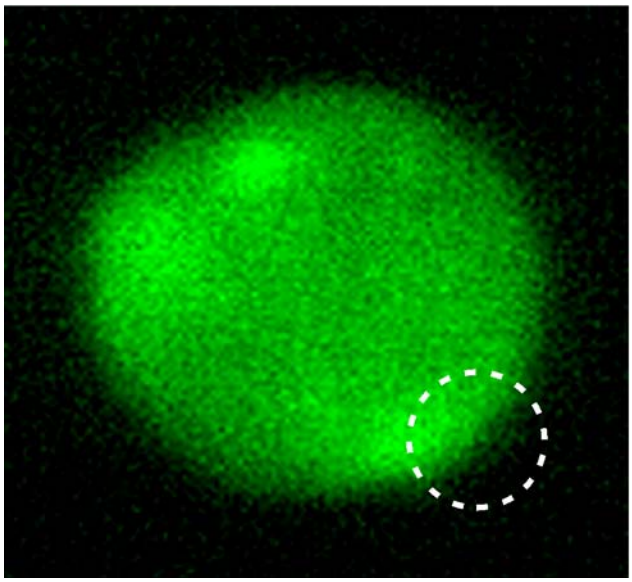
[‡]Medical Biotechnology Center
[§]Program in Neuroscience
[‖]Department of Pharmacology
[⊥]Department of Physiology

*Corresponding author:

Joseph P. Y. Kao
Medical Biotechnology Center, Room S219
University of Maryland Biotechnology Institute
725 W. Lombard St.
Baltimore, MD 21201

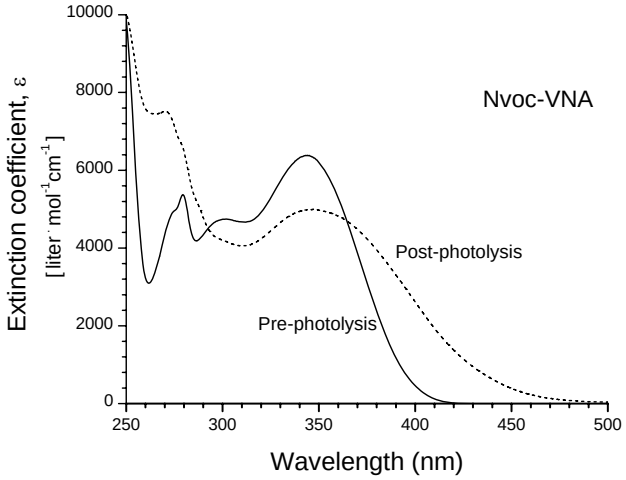
Phone: 410-706-4167
Fax: 410-706-8184
E-mail: jkao@umaryland.edu

Supplemental Figure 1. Experimental configuration for focal photolysis in a neuron



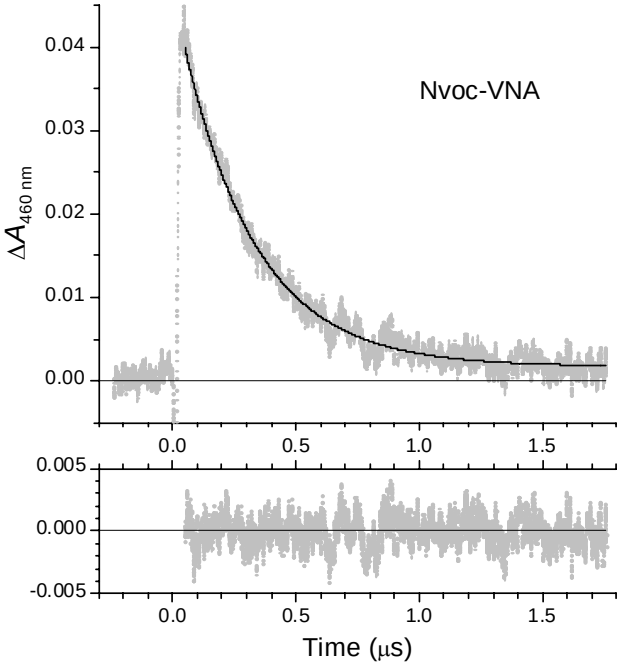
Optical section through the center (widest part) of a rat nodose neuron loaded with fluo-3 indicator through a whole-cell patch pipette. The photolysis spot (10-μm diameter, outlined by white circle) was positioned so that less than half of the spot overlapped with the cell. This was to ensure that photolysis occurred only in a small region of the neuron near the cell surface. Focal photolysis and imaging were performed on a Zeiss 5 Live microscope.

Supplemental Figure 2. UV-visible absorption spectrum of Nvoc-VNA



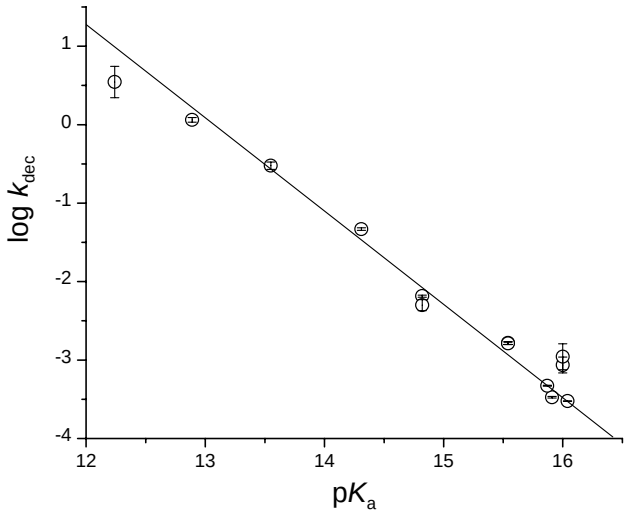
The solid and dashed spectra were acquired, respectively, before and after photolysis for 4 min with 225 mW of the UV emission from an argon ion laser.

Supplemental Figure 3. Transient absorbance spectral changes following laser flash photolysis of Nvoc-VNA.

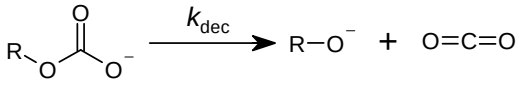


The absorbance at 460 nm of a solution of Nvoc-VNA in acetonitrile was monitored. At time zero, an 8.6-ns, 200-mJ pulse of 355-nm light was delivered to the sample. In the upper panel, gray points are experimental data (average of 5 replicates), and the solid black curve is the nonlinear least-squares single-exponential fit to the data. The exponential time constant was τ = 0.297 ± 0.001 μs. The residuals of the least-squares fit are shown in the lower panel.

Supplemental Figure 4. Relationship between monocarbonate ester decarboxylation kinetics and acidity of the parent alcohol.



Linear least-squares analysis of kinetic data for monocarbonate ester decarboxylation:



where k_{dec} is the unimolecular rate constant for decarboxylation, and pK_a values are for the hydroxyl group of the parent alcohol R-OH. The data of Sauers et al. (1975) used in the analysis were derived from the following parent alchohols: methanol, ethanol, 2-chloroethanol, 2,2-dichloroethanol, 2,2,2-trichloroethanol, 2-methoxyethanol, *n*-propanol, *i*-propanol, propargyl alcohol, and *t*-butanol. Where k_{dec} was determined by two independent methods, both values were included in the analysis. Experimental uncertainties were use as weights. The analysis yielded the relation $\log k_{dec} = m\text{p}K_a + b$, where $m = -1.189 \pm 0.006$, and $b = 15.55 \pm 0.09$.