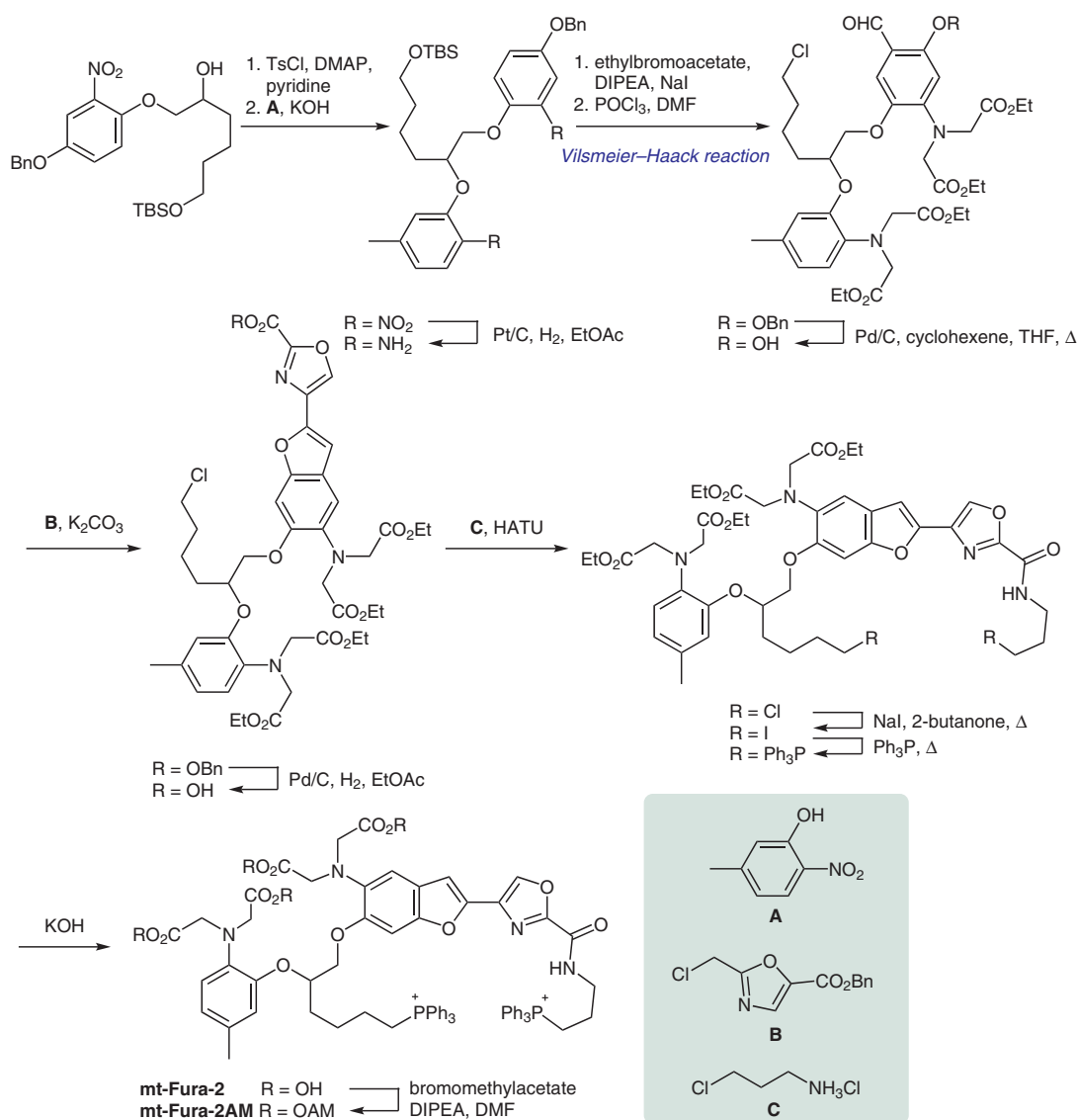


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A Synthetic Fluorescent Mitochondria-Targeted Sensor for Ratiometric Imaging of Calcium in Live Cells
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A Mitochondria-Targeting Calcium Dye



Significance: Ca²⁺ signaling is central to several essential physiological processes. Synthetic dyes offer a convenient means to measure Ca²⁺ concentration in live cells. The authors describe the synthesis of mt-Fura-2(AM) as the first ratiometric Ca²⁺ dye that targets mitochondria. This probe overcomes the limitations of other sensors such as poor mitochondrial localization, leakage, cytotoxicity, and low photobleaching resistance.

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Comment: Mt-Fura-2 was synthesized in 17 steps from commercially available starting materials. Derivatives of mt-Fura-2 containing one, two, or three phosphonium cations were synthesized and it was found that two phosphonium cations were optimal for mitochondria targeting. The authors demonstrated the superiority of mt-Fura-2AM over rhod-2-AM, a non-ratiometric calcium dye, and found that it was suitable for use in cells in which genetically encoded Ca²⁺ indicators are difficult to transfect.