

Thesis Summary

Design and Synthesis of Two-photon Absorption Chromophore with EGTA (Calcium Chelator) Unit for Ca^{2+} Uncaging Reaction

(Ca^{2+} アンケージング反応を志向した EGTA ユニットの有する二光子吸収発色団の設計と合成)

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In this research study, the design and synthesis of an EGTA platform were performed for the future generation of Two-photon(TP)-responsive Ca^{2+} chelators. The versatile intermediate was applied to the synthesis of novel TP responsive chromophores. The TP uncaging efficiency (δ_u) of the developed new calcium chelators such as 4-amino-4'-nitro-1,1'-biphenyl-substituted EGTA (BP-EGTA), and 2-(4-nitrophenyl)benzofuran-substituted EGTA (NPBF-EGTA) were found to be ~ 8 GM at 800 nm and ~ 21 GM at 740 nm respectively. These values are higher than other caged calcium compounds. The acetoxymethyl (AM) ester with the high efficient chromophore i.e., NPBF chromophore, was synthesized and successfully applied to a Ca^{2+} -uncaging reaction triggered by photolysis in physiological studies, in which stimulation of the presynaptic terminals was possible by TP uncaging of the elicit of neurotransmitter release.

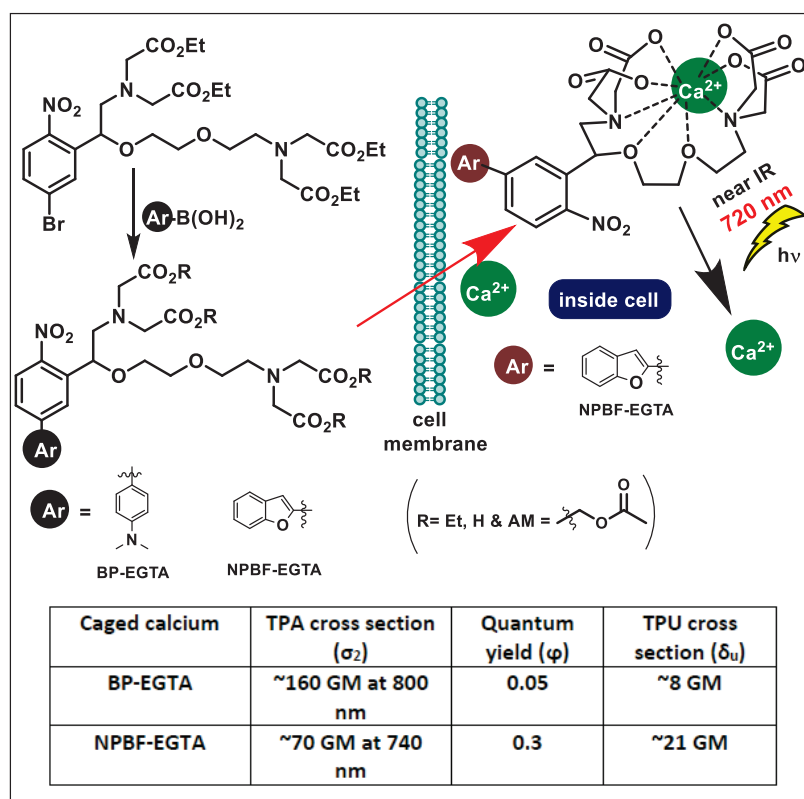


Figure. Summary of this research