

# Review of: "Visualizing sequential compound fusion and kiss-and-run in live excitable cells"

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This is an exciting and ground-breaking paper from the group led by Ling-Gang Wu at NIH. It uses state of the art STED imaging to visualize individual vesicle fusion events in primary bovine adrenal chromaffin cells. Using a creative combination of small molecule dyes and genetically transfected fluorescent reagents, along with electrophysiology, the authors show beautiful images of vesicle fusion profiles in living cells. Their images show convincing evidence for homotypic vesicle-vesicle fusion in neuroendocrine cells. They show evidence for vesicles releasing their contents and then remaining attached to either the membrane or an adjacent vesicle. They define these as kiss-and-run fusion events, although they do not show evidence of these empty vesicles departing. They further define the situation where a vesicle remains intact after emptying its contents into a neighboring membrane-attached vesicle as a new form of release: compound kiss-and-run. The images are beautiful, although the writing is a bit difficult to follow with lots of abbreviations and some clunky usage. I'd like to see the vesicles that are defined as kiss-and-run events actually depart from the membrane but there may be technical reasons that this is not possible. Overall, I think this study will have a major impact on our way of thinking about vesicle fusion and is a technical tour-de-force.