



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Fernando Magallon	Project Number S0519
Project Title Using Fluorescence Quenching as an Indicator for Successful Reaction in Copper (I) Catalyzed [3+2] Cycloaddition	
Abstract Objectives/Goals -Find reaction conditions for using fluorescence quenching as an indicator for successful reaction in copper(I) catalyzed [3+2] cycloaddition. -Find copper binding ligands that can accelerate the [3+2] cycloaddition. Methods/Materials Materials: Dansyl azide, dansyl alkyne, tris-HCl buffer pH 7.0, 7.5, 8.0 8.5, copper sulfate, DMSO, H(2)O, sodium ascorbate, 96-well plate, phenanthroline. Procedures: 1) Place 100uL of 50uM dansyl azide/dansyl alkyne mixture into columns 1-6. 2) Place 100uL of 50uM unreactive quencher/dansyl azide mixture into row D and H in columns 7-12. 3) Place 75uL of 50uM unreactive quencher/dansyl azide mixture and 25uL of 50uM adduct solution into row C and G in columns 7-12. 4) Place 50uL of 50uM unreactive quencher/dansyl azide mixture and 50uL of 50uM adduct solution into row B and F in columns 7-12. 5) Place 100uL of 50uM adduct solution into row A and E in columns 7-12. 6) Place 50uL of 1mM CuSO(4) solution in water into rows A-D. 7) Place 50uL of 500uM CuSO(4) solution in water into rows E-H. 8) Place 50uL of Tris-HCl buffer pH=8.5 into columns 1-12. 9) Place 25uL of 10mM ligand into columns 1 and 7. 10) Place 25uL of 5mM ligand into columns 2 and 8. 11) Place 25uL of 2mM ligand into columns 3 and 9. 12) Place 25uL of 1mM ligand into columns 4 and 10. 13) Place 25uL of 500uM ligand into columns 5 and 11. 14) Place 25uL of 250uM ligand into columns 6 and 12. 15) Place 50uL of 100mM sodium ascorbate into columns 1-12. 16) Place 96-well plate in UV plate reader for 1 hour, set to collect fluorescence values every 2 minutes. Results Reaction conditions were found at 50uM fluorophore concentration. Ligands found that accelerate reaction to 100% completion are commercially available. Kinetics were done on best ligands and graphs with equations have been determined to calculate the concentration of the substrates at a certain time period. Conclusions/Discussion These conditions are very useful for efficiently labeling and functionalizing viruses with compounds in [3+2] cycloaddition to make them target for example certain cells in the human body, like cancer. Also, these conditions for reaction in [3+2] cycloaddition may have many other applications.	
Summary Statement I am finding reaction conditions for using fluorescence quenching as an indicator for successful reaction in copper (I) catalyzed [3+2] cycloaddition, and finding copper binding ligands that can accelerate the reaction.	
Help Received My mentor Warren Lewis, at The Scripps Research Institute helped me learn the level of chemistry required to perform this research, along with help on getting started on doing kinetics.	