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## Fluorescence correlation spectroscopy on electron transfer reactions : probing inter- and intramolecular redox processes

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# **Fluorescence Correlation Spectroscopy on Electron Transfer Reactions**

**Probing Inter- and Intramolecular Redox Processes**

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# Contents

<b>Prologue</b>	<b>1</b>
<b>1. Introduction</b>	<b>2</b>
1.1 Introduction.....	3
1.2 Copper proteins .....	5
1.3 Fluorophore .....	8
1.4 Fluorescence resonance energy transfer (FRET) .....	9
1.5 Single molecule techniques.....	12
1.6 Electron transfer theory .....	17
1.7 Scope of this thesis.....	21
References.....	22
<b>2. Calibration of experimental setup, biomolecular reactions and photoinduced electron-transfer reaction</b>	<b>29</b>
2.1 Introduction.....	31
2.2 Materials and methods.....	32
2.3 Fluorescence correlation spectroscopy calibration: Results and discussion.....	37
2.4 Diffusion, bimolecular interactions and their dependency on viscosity.....	46
2.5 Photobleaching and blinking of fluorophore.....	50
2.6 Photoinduced electron transfer (PET).....	52
References.....	55
<b>3. Fluorescence correlation spectroscopic studies on labeled Zinc Azurin: Direct observation of intermolecular electron-transfer reactions between label and redox agents</b>	<b>63</b>
3.1 Introduction.....	65
3.2 Materials and methods.....	66
3.3 Results.....	71
3.4 Discussion.....	85
3.5 Concluding remarks.....	92
References.....	93
<b>4. Observation of intramolecular electrons-transfer reactions by fluorescence correlation spectroscopy: Photoinduced electron-transfer between the label and the copper center</b>	<b>96</b>
4.1 Introduction.....	98
4.2 Materials and methods.....	99
4.3 Results and discussion.....	105
4.4 Concluding remarks.....	124
References.....	127
Appendix .....	132

<b>5. Labeling and fluorescence correlation spectroscopic studies on Lys122Ser and Lys122Gln mutants of Copper Azurin</b>	<b>134</b>
5.1 Introduction.....	136
5.2 Materials and methods.....	137
5.3 Results and discussion.....	142
5.4 Comparison of fluorescence resonance energy transfer (FRET) and photoinduced electron transfer (PET) reaction in Copper Azurin-ATTO655.....	158
5.5 Future plans and concluding remarks.....	162
References.....	163
<b>6. Outlook</b>	<b>167</b>
Summary	174
Samenvatting	177
Curriculum Vitae	182
List of publications	184
Acknowledgement	186



## *Prologue*

This is where it all started. I was a research-fellow in Prof. Dr. Shyamalava Mazumdar's group at the department of chemistry, Tata Institute of Fundamental Research (TIFR), Mumbai, India. This group had a very long history of studying metal-containing proteins e.g. cytochrome  $c_{552}$ , thermostable cytochrome P450,  $Cu_A$  from cytochrome c oxidase and so on. A special focus was on cytochrome P450<sub>cam</sub>, a bacterial mono-oxygenase containing iron in the active site of the protein, the crucial model of my project. The main task was to engineer mutations in the active site of the cytochrome P450 protein, which in turn, could help in the catalytic degradation of pesticides and also of flavonoid compounds. My approach was first to scan available literature to create a full list of plausible mutants. Some of the candidates were removed from the list as they were judged to affect the active site structure of the protein too severely. Then, the rest were evaluated by energy minimization or docking procedures. In the end, I identified a few single and double mutants, which were considered capable of performing catalyzed degradation. Working with something as fragile and complex as a protein really kindled my interest in protein structure-function relationships, enzyme mechanisms and redox chemistry of proteins. I wanted to follow this interest to understand, think and research better. After the completion of the research project on cytochrome P450 enzyme in TIFR, I was lucky to be able to pursue my interests further by becoming a graduate student in Prof. Dr. Gerard W. Canters' group in the department of molecular biophysics at Leiden University, The Netherlands.