

Table of contents

<i>Acknowledgements</i>	5
<i>English summary</i>	6
<i>Danish summary / Dansk Sammenfatning</i>	7
1. Introduction	8
1.1. Electrical stimulation: application and limitations	8
1.2. Optical control of cell activation	9
1.3. Photosystem I: a molecular photovoltaic device.....	12
1.4. Aims of the present project.....	15
1.5. Description of the project	16
References	17
2. Spatial Distribution of the Electric Potential from Photosystem I Reaction Centers in Lipid Vesicles	23
Summary	23
2.1. Introduction	24
2.2. Methodology	25
2.3. Results	28
2.4. Discussion.....	35
References	39
3. Analysis of Light Induced Transmembrane Ion Gradients and Membrane Potential in Photosystem I Proteoliposomes	42
Summary	42
3.1. Introduction	43
3.2. Materials and methods.....	44
3.3. Results	50
3.4. Discussion.....	60
3.5. Conclusion.....	63
References	65
4. Incorporation of Photosynthetic Reaction Centers in the Membrane of Human Cells: Toward a New Tool for Optical Control of Cell Activity	70
Summary	70
4.1. Introduction	71
4.2. Materials and methods.....	72

4.3. Results	74
4.4. Discussion	81
4.5. Conclusions and perspectives	84
References	85
5. <i>General discussion</i>.....	89
5.1. Introduction	89
5.2. Discussion of the main results	89
5.3. Methodological considerations	93
5.4. Perspectives.....	96
5.5. Conclusions	97
References	98