

Index

Acknowledgements	I
Abstract	III
Resumen	IV
Resum	V
Abbreviations	VII

1. Introduction

1.1. Outline.....	4
1.2. Cardiovascular diseases (CVD) biomarkers	9
1.3. Evanescent wave-based biosensors	14
1.4. Surface functionalization	17
1.5. Framework	21
1.6. Structure of the Thesis	22
1.7. References	24

2. Computational study of the cardiac Troponin I interaction

2.1. Introduction	31
2.2. Binding sites identification	35
2.3. Molecular docking	36
2.4. Binding sites results	38
2.5. Molecular docking results	39
2.6. Conclusions	42
2.7. References	42

3. Real-time tracking of the biofunctionalization by PBG biosensors	
3.1. Introduction	45
3.2. PBG sensors nanofabrication	46
3.3. Surface chemistry	51
3.4. Surface characterization	54
3.5. UV Light assisted immobilization of the half antibodies	55
3.6. Experimental opto-fluidic set-up	58
3.7. Real-time monitoring of the half IgG immobilization.....	62
3.8. Conclusions	64
3.9. References	64
4. BSA protein direct detection by PBG biosensors	
4.1. Introduction	68
4.2. Scanning Near Field Optical Microscope (SNOM) characterization	69
4.3. Drop-casting half antibody biofunctionalization.....	74
4.4. Direct and real-time BSA protein detection by PBG biosensors	75
4.5. Direct and real-time detection of CVD biomarkers.....	78
4.5.1. C-Reactive protein (CRP) detection	79
4.5.2. Myoglobin (Mb) detection	79
4.5.3. cTnI and cTnT detection	82
4.6. Alternatives to half antibody and 1 ng/mL cTnT detection.....	84
4.7. Conclusions	88
4.8. References	90
5. Conclusions and future steps	
5.1. Conclusions	95
5.2. Future steps	97

Author publications

Journal publications	98
Conference publications	99