

Table of Contents

| | |
|--|----|
| Chapter 1. General introduction | 1 |
| 1.1 Nanomedicine | 3 |
| 1.2 Targeted drug delivery | 10 |
| 1.2.1 The protein corona..... | 14 |
| 1.3 Endosomal escape | 17 |
| 1.4 Stimuli-responsive release of cargo | 22 |
| 1.5 Mesoporous silica materials..... | 26 |
| 1.5.1 Ordered mesoporous silica materials | 27 |
| 1.5.2 Dendrimer-like mesoporous silica materials..... | 31 |
| 1.5.3 Gated mesoporous silica nanomaterials..... | 34 |
| Chapter 2. Objectives | 39 |
| Chapter 3. Targeting Innate Immunity with dsRNA-Conjugated Mesoporous Silica Nanoparticles Promotes Anti-Tumor Effects on Breast Cancer Cells | 43 |
| 3.1 Abstract | 47 |
| 3.2 Introduction..... | 47 |
| 3.3 Results and discussion..... | 50 |
| 3.4 Conclusions..... | 58 |
| 3.5 References..... | 59 |
| 3.6 Supporting Information..... | 61 |
| Chapter 4. Nanoparticle-cell-nanoparticle communication by stigmergy to enhance poly(I:C) induced apoptosis in cancer cells | 69 |
| 4.1 Abstract | 73 |
| 4.2 Introduction..... | 73 |
| 4.3 Results and discussion..... | 77 |
| 4.4 Conclusions..... | 82 |
| 4.5 References..... | 82 |
| 4.6 Supporting Information..... | 84 |

Table of contents

| | |
|---|------------|
| Chapter 5. High capacity mesoporous silica nanocarriers for retinal delivery of siRNA..... | 93 |
| 5.1 Abstract | 97 |
| 5.2 Introduction..... | 97 |
| 5.3 Results and discussion..... | 100 |
| 5.4 Conclusions..... | 109 |
| 5.5 Experimental section..... | 110 |
| 5.6 References..... | 115 |
| Chapter 6. Conclusions and Perspectives | 121 |