

論文 / 著書情報
Article / Book Information

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| 題目(和文) | |
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| 著者(和文) | FANG Kun |
| Author(English) | Kun Fang |
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論文要約

THESIS OUTLINE

学生氏名 : Kun Fang
Student's Name

Thesis Abstract

Chapter I General Introduction

- 1.1. Mechanobiology and cell biology
- 1.2. Complex cell microenvironment
 - 1.2.1. Biochemical cues in ECM
 - 1.2.2. Biophysical cues in ECM of tissues
- 1.3. Protein-immobilized surfaces to mimic ECM
 - 1.3.1. Protein immobilization strategies
 - 1.3.2. Design of surface topography
- 1.4. External physical forces for cell engineering
 - 1.4.1. Cyclic stretch
 - 1.4.2. Ultrasound
- 1.5. Challenges of combining biochemical and biophysical cues
- 1.6. Aim and outline

Chapter II Cyclic Stretch Modulates Cell Morphology Transition under Geometrical Confinement by Covalently Immobilized Gelatin

- 2.1. Introduction
- 2.2. Material and Methods
 - 2.2.1. Materials
 - 2.2.2. Synthesis of phenyl azido-modified gelatin
 - 2.2.3. Coating of photo-reactive gelatin and micropattern
 - 2.2.4. Surface characterization
 - 2.2.5. Cell culture and cyclic stretch application
 - 2.2.6. Cell growth analysis
 - 2.2.7. Cell morphology analysis
 - 2.2.8. Statistical analysis
- 2.3. Results and Discussion
 - 2.3.1. Micropatterns
 - 2.3.2. Cell growth on gelatin under force loading
 - 2.3.3. Cellular morphology with geometrical confinement
 - 2.3.4. Cellular morphology on non-pattern surface with force loading
 - 2.3.5. Cellular morphology on micropattern surfaces with force loading
- 2.4. Conclusions

Chapter III Enhanced Osteogenic Differentiation by DOPA-BMP-2 Immobilization and Ultrasound Radiation

- 3.1. Introduction
- 3.2. Material and Methods
- 3.3. Results and Discussion
- 3.4. Conclusions

Chapter IV Conclusions and Future Perspectives

- 4.1. Conclusions
- 4.2. Future perspectives
 - 4.2.1 The role of cytoskeleton tension in modulating cell mechanosensation
 - 4.2.2 The crosstalk of BMPR and integrin in biophysical environment
 - 4.2.3 The dimensionality may need to be considered

List of Publications

List of Presentations

Acknowledgement