Course description for Postgraduates, School of Basic Medicine

<table>
<tr><td colspan="3">Course Title: Epigenomics and Precision Medicine</td><td colspan="2">Course Code: 510.562</td></tr>
<tr><td colspan="5">Course category: □High-level course □International course □Advanced international courses ■Common course</td></tr>
<tr><td colspan="5">Course Type: □1st-level discipline basic courses ■2nd-level discipline basic courses □Optional professional courses</td></tr>
<tr><td colspan="5">The methods of Assessment: closed-book exam</td></tr>
<tr><td colspan="3">Teaching Method: lectures in English</td><td colspan="2">Applicable Educational Level:
Master ■ Doctor □</td></tr>
<tr><td colspan="2">The Beginning of the Term: the 1st semester</td><td>Total Hours /Teaching Hours: 16h</td><td colspan="2">Credits: 1</td></tr>
<tr><td colspan="5">Applicable Specialty:</td></tr>
<tr><td>Name of the Teachers of the Course Group</td><td>Professional Title</td><td>Major</td><td>Age</td><td>Academic Direction</td></tr>
<tr><td>Ximiao He</td><td>Professor</td><td>Genomics</td><td>38</td><td>Epigenomics and Precision Medicine, Bioinformatics</td></tr>
<tr><td colspan="5">Course Outline:
Students are expected to master the essential knowledge of: Basic concepts of genomics, epigenetics, DNA methylation, major research areas in genomics, mechanism of DNA methylation, technologies for epigenetics, major types of histone modifications, non-coding RNAs biological significance, human genome project, principles and applications of DNA sequencing technology, assembly process of nucleosome, technologies for histone modification, non-coding RNA related technologies, concept of precision medicine.

Topic 1: Genomics and Sequencing
1）Introduction to Genomics and HGP
2）Major Research Areas in Genomics
3）Introduce to DNA Sequencing
4）Applications of DNA Sequencing

Topic 2: Epigenomics
1) Introduction to Epigenomics
2) Major Research Areas in Epigenomics</td></tr>
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3) Major Approaches to Epigenomics

Topic 3: DNA Methylation

1) Introduction to DNA Methylation
2) Major Approaches to Measure mC
3) Comparison Between Major Methods

Topic 4: Organization of Nucleosome and Histone Modifications

1) Nucleosome Structure and Genomic Organization of Nucleosome
2) Nucleosome Positioning and Gene Regulation
3) Approaches to study Nucleosome Positioning
4) Introduction to Histone Modification and Major Types of Histone Modification
5) Approaches to study Histone Modifications

Topic 5: Non-coding RNA

1) Introduction to ncRNAs
2) Biological roles
3) ncRNAs in human disease
4) Methods for discovery and measurement
5) *LncRNA*

Topic 6:Precision Medicine & Personal Genome

1) Personalized medicine: current status and future perspectives
2) Precision Medical and Clinical Research
3) Personal Genome Diagnostics

Guide Books:

Epigenetics, 2nd Edition, Edited by C. David Allis, Danny Reinberg, *and* Monika Lachlan

Main Reference Books:

1．朱冰，孙方霖主译，《表观遗传学》，科学出版社，2016 年
2．杨焕明，《基因组学》第 1 版，科学出版社，2016 年
3．(英) Mike Starkey, Ramnath Elaswarapu 著，于军主译，《基因组学:核心实验方法》第 1 版，科学出版社，2012 年
4．杨金水，基因组学第 3 版，高等教育出版社,2013 年