

## 课程大纲

### COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	BIO5030/再生生物学与再生医学 BIO5030/ Regenerative Biology and Medicine
2.	课程性质 Compulsory/Elective	选修 Elective
3.	课程学分/学时 Course Credit/Hours	3 学分/48 学时 3 Credits/48 Hours
4.	授课语言 Teaching Language	英语 English
5.	授课教师 Instructor(s)	陈永龙 CHEN, YONGLONG
6.	先修要求 Pre-requisites	细胞生物学 Cell Biology
7.	教学目标 Course Objectives	<p>Regenerative biology refers to the general understanding of renewal, restoration, and growth that makes genomes, cells, organisms, and ecosystems resilient to natural fluctuations and disturbance, while regenerative medicine is a branch of translational research in tissue engineering and molecular biology which deals with the process of replacing, engineering, or regenerating human cells, tissues, or organs to restore or establish normal function, such as replacing bone marrow in leukemia, cartilage in osteoarthritis, or cells of the heart after a heart attack. Tissue is normally generated during fetal development by the differentiation of embryonic stem cells or during postnatal life by a similar differentiation of adult stem cells. Regenerative medicine tries to mimic these processes, thus treating patients suffering from degenerative diseases.</p> <p>In this course, we will 1) discuss the achievements of stem cell research on both pluripotent stem cells and adult stem cells, and challenges lying ahead, including bioethical issues; 2) explore basic mechanisms of how cells differentiate into various tissues in response to a variety of biologic signalling molecules, as well as application of such factors for <i>in vitro</i> tissue engineering; and 3) discuss the recent advancement on clinical trials dealing with various degenerative diseases.</p>
8.	教学方法 Teaching Methods	<p>This course will be conducted with lectures (24 hrs) in combination with student paper presentations/journal clubs (24 hrs). Every student needs to write two commentary/review essays (each essay with no less than 300 words) on journal club topics.</p> <p>课堂讲授时注意引导学生就再生生物学和再生医学的重要现象展开讨论，从中发掘归纳出科学问题，并寻找相应的解决问题的思路和方法，比较在不同实验技术背景下研究思路的差异。鼓励学生积极提出自己的想法，不要轻易接受一种现成的理论。学生们将选择经典的科学问题，就最新进展做口头报告，并以短文形式陈述自己的独到见解。</p>
9.	教学内容 Course Contents	

	<b>Section 1</b>	Introduction of regenerative biology
	<b>Section 2</b>	Introduction of regenerative medicine, using pancreas development, pancreatic beta cell regeneration, and cell transplantation therapy of diabetes as an example.
	<b>Section 3</b>	Embryonic stem cells and nuclear transplant cloning
	<b>Section 4</b>	Induced pluripotent stem cells
	<b>Section 5</b>	Gastruloids
	<b>Section 6</b>	Adult stem cells and organoids
	<b>Section 7</b>	Regenerative biology of peripheral nervous system
	<b>Section 8</b>	Regenerative medicine of peripheral nervous system
	<b>Section 9</b>	Regenerative biology and medicine of eyes
	<b>Section 10</b>	Regenerative biology of central nervous system
	<b>Section 11</b>	Regenerative medicine of central nervous system
	<b>Section 12</b>	Regenerative biology of skin
	<b>Section 13</b>	Regenerative medicine of skin
	<b>Section 14</b>	Tissue engineering of the reproductive system
	<b>Section 15</b>	Regenerative biology and medicine of heart
	<b>Section 16</b>	Regenerative biology and medicine of blood
	<b>Section 17</b>	Regenerative biology of hepatocytes
	<b>Section 18</b>	Regenerative medicine of liver
	<b>Section 19</b>	Intestine stem cells
	<b>Section 20</b>	Regenerative medicine of intestine
	<b>Section 21</b>	Regenerative biology of lung
	<b>Section 22</b>	Regenerative medicine of lung
	<b>Section 23</b>	Regenerative biology and medicine of limb
	<b>Section 24</b>	Review
<b>10.</b>	<b>课程考核 Course Assessment</b>	
	<p>请再此注明： ①考试； ②分数构成：</p> <ol style="list-style-type: none"> <li>1. Class participation 20%</li> <li>2. Presentations 25%</li> <li>3. Commentary Essays 25%</li> <li>3. Final Exam 30%</li> </ol>	
<b>11.</b>	<b>教材及其它参考资料 Textbook and Supplementary Readings</b>	
	<p>Reference books:</p> <ul style="list-style-type: none"> <li>• Regenerative Biology and Medicine, 2<sup>nd</sup>, David L. Stocum. 2012</li> </ul>	

- Regenerative Medicine and Tissue Engineering. Editor Jose A. Andrades, ISBN 978-953-51-1108-5. 2013