ANAT 381, Experimental Embryology – Syllabus Fall 2018

Objectives:
This course was originally entitled as "Experimental Basis of Embryology" and is thus oriented to describing embryology/ developmental biology based on experimental findings in various animal models. The **objective** of this course is to provide fundamental understanding of the cellular and molecular processes that are essential for reproduction and embryonic development and to present how various experimental approaches have revealed what we now know about different aspects of embryology. Importantly, anatomical development of embryonic "organs" is NOT a focus of this course. For example, how each of different organs in our body form at different stages of pregnancy and what occurs in each trimester will **NOT** be lectured; these subjects will simply force students to memorize the subject matters. Rather, ANAT381 attempts to equip students with tools to understand the process of organ formation, if and when they need to understand it.

This course also aims at providing basic knowledge about applications of embryology investigated in animal models to human clinics, such as assisted reproductive technology, genetic diagnosis, environmental effects on embryonic development, stem cell technologies, and inherited or acquired human diseases.

Lecture contents include mechanisms of gamete production, fertilization, preimplantation embryonic development, implantation, and embryonic axis formation. Recent progresses related to developmental biology, such as genetic and epigenetic control of embryo development and stem cell biology, will also be lectured. These subjects will be presented in conjunction with basic biological concepts, including molecular signaling, cell-cell interaction, and cell fate decision control. The course is continuously updated to provide information on recent research progress and novel techniques as well as in clinical applications of reproductive and developmental biology. Lectures will be recorded, but recordings will not be downloadable. Students will need to access such online device as Zoom and TurningPoint.

Course Requirements:
The course requires prior knowledge of molecular and cellular biology and genetics.
Requirements ANAT261, BIOL202

Schedule and Assessment:
Time: Mondays and Tuesdays 11:35 to 12:55.
Place and Format: For 2020 Fall semester, ANAT381 will be delivered online via **Zoom**.
Evaluation: We will hold **two types of exams**. One is a "section" exam, which will be held at the end of each section (when all classes by one lecturer are completed); therefore, there will be five section exams in this semester. The other is a "final" exam, which will be organized by the University in December 2020. While a section exam focuses only on learning materials of one section, the final exam covers all subjects lectured in ANAT381. The weights of these exams are 39% of a final grade for the sum of all section exams and 61% for the final. See a chart below for details and clarity. The style of these exams will mainly be written exams. Section exams may be short-writing tests, which could include multiple choice questions. The final exam will be made of essay questions. Each of these exams will be presented, and answers submitted, online through myCourses. Answers will need to be submitted within 72 hours after the presentation of questions. Details and Q&A sessions will be provided at the Introduction lecture, on myCourses, and as exams near.

	Class #	Section Exam	Final Exam	% weight for Grade
Introduction	Not included in any of exams			0%
Section 1	5	8%	12.5%	20.5%
Section 2	3	5%	8.0%	13.0%
Section 3	6	10%	15.5%	25.5%
Section 4	5	8%	12.5%	20.5%
Section 5	5	8%	12.5%	20.5%
	24	**39%**	**61.0%**	*100.0%*

Textbook and Supplementary materials
The course is based on lectures and notes provided by the lecturers. Relevant materials will be uploaded on myCourses before each lecture. No textbooks are assigned, but for general knowledge on developmental biology (not necessarily specific to course contents), "Principles of Development" by Wolpert, Tickle, and Arias (Oxford University Press) is recommended. Instructors are not responsible for the content of materials distributed by the NTC.

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Important Note: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the code of student conduct and disciplinary procedures. For further information see: www.mcgill.ca/integrity

Month	Date	Day	Lecturer	Lecture #	Lecture Contents	Email
September	2	W	Makoto Nagano	1	Introduction (***not included in exams***)	makoto.nagano@mcgill.ca
September	***7***	***M***	***Labor Day***			
			< Germ Cells to Embryos >			
September	9	W	Hugh Clarke	2	Making germ cells	hugh.clarke@mcgill.ca
September	14	M		3	Making eggs	
September	16	W		4	Making sperm	
September	21	M		5	Making embryos	
September	23	W		6	Placenta and Implantation	
			< Genetic Diagnosis of Preimplantation Embryos >			
September	28	M	Asangla Ao	7	Assisted Reproductive Technology	asangla.ao@mcgill.ca
September	30	W		8	romosome abnormality in gametes and preimplantation embryos	
October	5	M		9	Preimplantation genetic diagnosis	
October	7	W			Break for mid-term prep	
October	***12***	***M***	***Thanks Giving***			
			< Establishment of the Body Axes >			
October	14	W	Aimee Ryan	10	Transitioning from single cell to gastrula	aimee.ryan@mcgill.ca
October	19	M		11	Axis development and organizers I	
October	21	W		12	Axis development and organizers II	
October	26	M		13	Morphogens, boundaries, and compartments	
October	28	W		14	Limb development	
November	2	M		15	Environmental effects on embryogenesis	
			< Epigenetic Regulation of Development >			
November	4	W	Jason Tanny	16	Chromatin & DNA methylation	jason.tanny@mcgill.ca
November	9	M		17	Histone modification	
November	11	W		18	Genomic imprinting	
November	16	M		19	X-chromosome inactivation	
November	18	W		20	Epigenetic inheritance	
			< Stem Cells - Biology and Applications >			
November	23	M	Makoto Nagano	21	Stem cell definition	
November	25	W		22	Pluripotency of fetal germ cells - Origin of pluripotency	makoto.nagano@mcgill.ca
November	30	M		23	Controlling pluripotency	
December	2	W		24	Induction of differentiation in stem cells	
December	3	T		25	Clinical applications of postnatal stem cells	
December			**Final Exam**			

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