科目ナンバリング	U-LAS14 10008 LE68						
授業科目名<英訳>	Fundamentals of Cell and Molecular Biology-E2 Fundamentals of Cell and Molecular Biology-E2			担当者所属職名・氏名	理学研究科　准教授　TAKENAKA, Mizuki		
群	自然科学科目群			分野(分類)	生物学(総論)	使用言語	英語
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2026・前期	曜時限	金2	配当学年	主として1・2回生	対象学生	全学向

[授業の概要・目的]

The purpose of this course is to provide fundamentals of current biology, in particular focused on micro-level biology below the cell level with an "Essential Cell Biology", which is a university level standard textbook. Students will learn the functions of characteristic molecules of life such as DNA, RNA and proteins in the cell. Furthermore, how the structural features of these molecules contribute their respective functions will be discussed. This course will also cover the relevance between the functions of these biological molecules and various life phenomena at the cell or individual organism level.

【内容説明】この授業の目的は、大学レベルの標準的な教科書である「Essential cell biology」を用いて、現代生物学の基礎、特に細胞レベル以下のミクロレベルの生物学に焦点を当て学ぶことである。DNA、RNA、タンパク質といった生命を構成する特徴的な分子が細胞内でどのような働きをしているのかを学ぶ。さらに、これらの分子の構造的特徴が、それぞれの機能にどのように寄与しているかについても議論する。また、これらの生体分子の機能と細胞や生物個体レベルでの様々な生命現象との関連についても取り上げる。

[到達目標]

This course will provide a fundamental understanding of molecular and cell biology.
Students will be able to explain how the cell is organized and how it functions in English.

[授業計画と内容]

1. Cells: The Fundamental Units of Life
2. Chemical Components of Cells
3. Protein Structure and Function
4. DNA Replication, Repair, and Recombination
5. From DNA to Protein: How Cells Read the Genome
6. How Genes and Genomes Evolve
7. Membrane Structure
8. Transport Across Cell Membranes
9. Energy Generation in Mitochondria and Chloroplasts
10. Intracellular Compartments and Protein Transport
11. Cell Signaling and Cytoskeleton
12. The Cell Division Cycle
13. Sexual Reproduction and the Power of Genetics
14. Cellular Communities: Tissues, Stem Cells, and Cancer

≪A final written exam≫

15. An Oral exam and feedback

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Fundamentals of Cell and Molecular Biology-E2(2)

[履修要件]

This course is open to all students, BUT it is recommended that students have at least a high school "basic biology" level of knowledge.

[成績評価の方法・観点]

Class attendance and active participation (20%), weekly small tests (30%), a final written exam (25%) and an oral exam (25%).

[教科書]

Alberts Bray et al. 『Essential Cell Biology』 （W W Norton & Co Inc）ISBN:9780393680362
Summary of the lecture contents will be provided at the class.

[授業外学修（予習・復習）等]

Reading the textbook before the lecture will help the students to understand the lecture.
Students should review the textbook after the lecture and answer the questions provided.

[その他（オフィスアワー等）]

Contact: mizuki.takenaka@pmg.bot.kyoto-u.ac.jp
Any questions and requests are welcome by prior arrangements via E-mail.

[主要授業科目（学部・学科名）]

理学部