科目ナンバリング	U-LAS14 20068 LE68						
授業科目名<英訳>	Proteins-workforce of life-E2 Proteins-workforce of life-E2			担当者所属職名・氏名	農学研究科　准教授 YASIR SERAG ALNOR MOHAMMED SERAG ALNOR		
群	自然科学科目群	分野(分類)	生物学(各論)		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	水3	配当学年	主として1・2回生	対象学生	理系向

[授業の概要・目的]

Purpose
This course will introduce the wonderful world of proteins. Proteins are a type of organic macromolecule that are fundamental building blocks of life. While we hear a lot about proteins in daily life, in ads for protein shakes and protein powders, there are a few misconceptions about why proteins are essential and how they work. The many proteins manufactured by cells perform a broad range of essential functions; they are the molecular workforce of living organisms. Proteins catalyze metabolic reactions, replicate DNA, respond to stimuli, provide movement, and much more. Here, we will explore how proteins are constructed and fold into three-dimensional shapes, the kinds of bonds that hold these folded structures together, and the immense range of proteins' roles in our life. We will also explore how proteins are purified and characterized in order to understand their structure and function.

[到達目標]

1. Gain a deeper understanding of proteins and structural biology.
2. Appreciate the important range of roles the proteins perform in our life.
3. Be familiar with the tools for studying, characterizing, and determining the 3D structure of proteins.

[授業計画と内容]

The following topics will be covered during the 14 weeks of the semester. Week 15 is an exam session, and a feedback class is given at week 16.

Main topics
1. Review of basic cell biology
2. Introduction to proteins and amino acids and their vital role in the cell
3. Levels of protein structure and forces that hold proteins into their three-dimensional functional form
4. Protein synthesis in the cell and its post-translational modifications
5. Protein translocation, sorting into different organelles and degradation
6. Proteins as catalysts for cellular processes
7. Nature of proteins embedded in cell membranes and their role in signal transduction
8. Role of proteins in innate and adaptive immune response
9. DNA cloning, recombinant expression and mass production of proteins
10. Purification and overview of techniques for analyzing proteins
11. Selected methods for characterizing proteins and their function
12. Protein design and engineering
13. Tools in determining protein three-dimensional structure
14. Proteome analysis and its significance

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Proteins-workforce of life-E2(2)

[履修要件]

English proficiency sufficient for understanding lectures, reading articles and texts, and participating in class discussions. A knowledge of high school biology and chemistry is also required.

[成績評価の方法・観点]

Grading: Class attendance and active participation (20%), assignment and quizzes (30%), and final exam or coursework (50%).

[教科書]

未定
Introduced during class

[参考書等]

（参考書）
授業中に紹介する
Handouts and supplemental readings will be distributed electronically and/or as a hard copy in class

[授業外学修（予習・復習）等]

Students should read or listen to the required pre-class materials and submit any required assignment before the class, and come to class ready to participate in class activities.

[その他（オフィスアワー等）]

No fixed office hours. Students are requested to make appointments directly or by email.

[主要授業科目（学部・学科名）]