科目ナンバリング	U-LAS70 10002 SE50						
授業科目名<英訳>	ILAS Seminar-E2 :Discussions in Biomechanics and Biophysics（バイオメカニクス・生物物理セミナー） ILAS Seminar-E2 :Discussions in Biomechanics and Biophysics			担当者所属職名・氏名	医生物学研究所 助教　　金　英寛		
群	少人数群	単位数	2単位	週コマ数	1コマ	授業形態	ゼミナール（対面授業科目）
開講年度・開講期	2026・後期	受講定員(1回生定員)	12 (12) 人	配当学年	主として1回生	対象学生	全学向
曜時限	水5	教室	共北3B			使用言語	英語
キーワード	Biophysics / Biomechanics / Functional adaptation / Skeletal physiology						

[授業の概要・目的]

May force be with you. This famous goodbye phrase from Star Wars summarizes the important roles physical forces like gravity and friction play in our daily life. Living systems including our bones, muscles, cells and even proteins in our body depend a lot on physical forces to function properly. For example, why do astronauts become osteoporotic after prolonged stay in space? How do plants orient their position to maximize contact with sunlight? In this seminar, we will discuss some of the ground breaking discoveries and technological advances integrating biology, physics, and chemistry. Specifically, we will explore the mechanisms in which living systems, including the human body, adapt to and utilize physical forces to survive and function normally, and sometimes, abnormally.

[到達目標]

The goal of this seminar is to help students develop a multidisciplinary approach to scientific discussion and problem solving in life sciences and medicine. By the end of this course, students will be able to:

Develop multidisciplinary perspectives when discussing complex problems in life sciences.

Explain the fundamental mechanisms by which living systems sense and adapt to physical forces.

Develop and present their own ideas effectively through presentations and discussions.

[授業計画と内容]

Discussions in this seminar will center on the impact of physical forces on living systems, and adaptive responses of such systems to acting forces. Some selected discussion topics are listed below. Topics might be flexibly changed based on our interests.

1) Recent exciting discoveries in science (3 weeks)
We will begin the discussion series by exploring ground-breaking discoveries in biology, chemistry, physics and/or engineering, and discuss their impacts on the society. Through this session, we will learn how to obtain fundamental knowledges from scientific articles.

2) Exploring interconnectivity between physics and biology (3 weeks)
Discussions here will explore interesting phenomena involving the interaction between physical forces and living systems. We will discuss how living systems sense and react to physical forces in the environment. Specific examples of adaptations to forces in biology will be drawn from plants, animals, and even from the human body.

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3) Role of forces in the skeletal system (3 weeks)
Why do astronauts become osteoporotic after prolonged stay in space? This topic will look specifically into the role of physical forces in the skeletal system. We will discuss how bone architecture adapts to the mechanical environment from the perspective of interaction of forces, cells, and even molecules.

4) Biomechanical researches exploring disease treatments (3 weeks)
This topic will focus on the latest biomechanical researches that seek to understand disease development, and propose treatment strategy. Through this topic, we will discuss the role of multidisciplinary approaches in the advancement of life sciences and medicine, helping to develop a mindset to tackle complex problems in science with multidisciplinary solutions.

5) Student presentations and lecture review (2 weeks)

6) Feedback (1 week)

[履修要件]

None in particular. The seminar will be discussion-based.

[成績評価の方法・観点]

Attendance and class participation: 60%, Discussions and presentations: 40%

[教科書]

使用しない

[参考書等]

（参考書）
Handouts may be given out.

[授業外学修（予習・復習）等]

Prior reading of scientific papers on topics to be discussed is recommended to enhance understanding.

[その他（オフィスアワー等）]

Office hours will be announced during class hours.

[主要授業科目（学部・学科名）]