

Advanced enzyme engineering

2 units (selection)

Akihiko Tsuji · PROFESSOR / BIOLOGICAL REACTIONS, BIOLOGICAL SCIENCE AND TECHNOLOGY, EARTH AND LIFE ENVIRONMENTAL ENGINEERING

Target This class introduces engineering of enzyme molecule for the medical application.

Outline Basics of design of enzyme and their inhibitor by chemical and gene technologies for medical application are introduced.

Style Lecture

Keyword *enzyme, medical application, protein engineering*

Fundamental Lecture “**Biochemistry 1**”(1.0), “**Protein Engineering**”(1.0)

Relational Lecture “**Advanced Biochemistry**”(0.5), “**Biomolecular Design**”(0.5), “**Advanced Cell Physiology**”(0.3)

Requirement Students are required to have a good understanding of undergraduate-level biochemistry.

Goal

1. Understanding of enzyme character required for therapeutic use.
2. Understanding of design of enzyme molecule for therapeutic use.

Schedule

1. Introduction of medical application of enzyme
2. Basic of enzymology (1) Kinetics of enzyme reaction
3. Basic of enzymology (2) Regulation of enzyme activity
4. Therapeutic use of enzyme
5. Problem in therapeutic use of enzyme (1) Immunological problem
6. Problem in therapeutic use of enzyme (2) Drug delivery system.
7. Problem in therapeutic use of enzyme (3) Preparation of large quantity of enzyme
8. Example of design of enzyme for medical use
9. Example of design of enzyme for diagnosis
10. Engineered enzyme used for therapy of lysosome disease(1)Deficiency of beta glucosidase
11. Example of engineered enzyme used for therapy of lysosome disease (2) Deficiency of alpha glucosidase
12. Application of PEG-modified enzyme (1) Preparation of PEG asparaginase
13. Application of PEG-modified enzyme (2) Characterization of PEG asparaginase
14. Target enzyme for development of new drug
15. Engineering of enzyme inhibitor

16. Report preparation Presentation

Evaluation Criteria Evaluation by report

Textbook To be introduced in the class

Reference To be introduced in the class

Contents <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216646>

Student Able to be taken by student of other department

Contact

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Note When you take this class, it is necessary to do preparation for 2h and review for 2h every 2h class for your understanding and taking credit.