| Subject | Food and Chemistry<br>（食糧と化学） | Day/Period | 1st quarter<br>Thur./3rd~4th | Object | AMB/JYPE |
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| Instructor (Post) | M. Ishikawa (Prof.) et al. | Categories | Specialized Subjects | Preferable Participants | 3rd&4th-year & JYPE students |
| Position | Faculty of Agriculture (Graduate School of Agricultural Science) | | | Credits | 2 |
| | | | | Semester | 7 and 9 |
| Subject Numbering | ABS-AGC362E | | | Language Used in Course | English |

1. Class subject: **Biochemistry and chemistry of food and bioactive natural products**

2. Object and summary of class: This class object is to study the basic concepts of biochemistry and chemistry of food and related bioactive natural products. More than ten Professors and Associate Professors will give the lectures weekly to introduce their specific research fields.

3. Keywords:

4. Goal of study: The goal of this class is to obtain the background knowledge concerning biochemistry and chemistry as well as the basic principles of food science and natural products chemistry.

5. Contents and progress schedule of class:

1. Food allergens: why certain types of proteins contained in foods act as allergens? **(Prof. Masako TODA**)
Biochemical and immunological properties of food allergens that induce food allergies will be introduced.

2. Novel functions of dietary vitamins and its contribution to our health. (**Prof. Hitoshi SHIRAKAWA**)
This lecture will focus on physiological roles of vitamins in food and also will mention about the recent knowledge of their functions for health maintenance.

3. Food and bioactive natural products for human health (**Prof. Kiyotaka NAKAGAWA**)
This lecture will give you basic understanding of the roles of food and bioactive natural products to prevent against ageing and oxidative damages (e.g., dementia, cancers, atherosclerosis). This lecture will also address the development of food for human health.

4. Beneficial health effects of dietary lipids (**Assoc. Prof. Takahiro EITSUKA**)
Lipids play important roles in the function of our body in both health and disease. This lecture will provide basic knowledge of health functions of dietary lipids and their mechanisms of action.

5. Chemistry and biochemistry of marine toxins I (**Prof. Mari YAMASHITA**)
Some of the marine animals contain highly toxic compounds which could cause food intoxication. Isolation, structural determination, analytical methods and pharmacology of these compounds will be presented.

6. Chemistry and biochemistry of marine toxins II **(Assoc. Prof. Keiichi KONOKI**)
Isolation, structural determination, analytical methods and pharmacology of marine toxins will be presented. (This lecture is the second part of lecture about the marine toxins.)

7. Application of high pressure to food processing. (**Prof. Tomoyuki FUJII**)
High pressure technique is one of non-thermal processing of food. In this lecture, the quality of the pressurized food will be discussed from the viewpoint of the high pressure effect on food structure.

8. Protein chemistry (**Prof. Yoshikazu TANAKA**)
To understand function of protein, determining its 3D structure is of significance. In this lecture, basic principle of 3D structure determination is introduced. The practical experiment will be carried out as well.

9. Bioactive molecules and their application for drug discovery (**Prof. Minoru ISHIKAWA**)
There are many biologically active compounds in natural products. This lecture will focus on bioactive compounds in human health, their target molecules, and applications for drug discovery and medicinal chemistry.

10. Medicinal chemistry of antibacterial and antiviral agents (**Prof. Hirokazu ARIMOTO**)
Selected topics in anti-infective agents will be discussed with an emphasis on how organic chemistry is used in the drug development process.

11. Synthetic and medicinal chemistry of marine natural products (**Prof. Hirofumi UEDA)**
Marine natural products that display important biological activities with remarkable potency and specificity are known to be useful for understanding/regulating biological events. This lecture will give an overview of the synthetic and medicinal chemistry of some important marine natural products.

12. Nutrient-inspired biomaterials and its applications for the health purpose (**Assoc. Prof. Taiki MIYAZAWA**)
There are different types of nutrients in nature, which have a variety of different biological activities and physical properties. The challenge of biomaterials, composed primarily of these properties, is one of the important topics for human health. The basic outline and application of this research area are introduced in this lecture.

13. Mechanisms of salt and fluid homeostasis: Insights from renal physiology (**Assoc. Prof. Yusuke OHSAKI**)
The kidney produces urine and regulates blood pressure by controlling plasma volume. This lecture introduces how kidney manages fluid and electrolyte balance in response to sodium intake.

14. Harmful natural products: Cases from food poisoning and tooth decay (**Assoc. Prof. Yuta KUDO**)
This lecture introduces natural products harmful to human health, derived from terrestrial plants and oral bacteria responsible for dental cavities, focusing on their chemistry, biosynthesis, and bioactivity.

6. Preparation:

7. Record and evaluation method: Attendance to the lectures 50%, reports 50%

8. Textbook and references: Textbook and references will be introduced by each professor.

9. Self study: Read textbooks and references to advance knowledge about related topics

10. In addition: For inquiry, please contact Prof. Minoru Ishikawa: minoru.ishikawa.e4@tohoku.ac.jp