Subject Name:

Integrative unit with omic & bioinformatic tools (from the biosynthesis of molecules to the positive or negative human health benefits)

Course Type:

Lectures/case studies with personal work

Outline:

Transcriptomics, proteomics, and metabolomics are three major platforms of comprehensive omics analysis in the science of food and complementary medicine. Other omics disciplines, including those of epigenetics and microRNA, are matters of increasing concern. The increased use of the omics approach in food science owes much to the recent advancement of technology and bioinformatic methodologies. Moreover, many researchers now put the combination of multiple omics analysis (integrated omics) into practice to exhaustively understand the functionality of food components. However, data analysis of integrated omics requires huge amount of work and high skill of data handling. This course will provide participants with biological examples of data integration in the fields of human nutrition, and the challenges that researchers face. The course will focus on the biosynthesis of molecules to the positive or negative human health benefits (vitamins, microtoxins, secondary metabolites as carotenoids or polyphenols) by exploring the biosynthesis path way and the behaviour in the food stream.

Semester Schedule and Credit:

Subject	Year	Semester	Day/Period	Credit
Integrative unit with omic & bioinformatic tools `	2	Fall		1,5

Location:

University of Bordeaux (UB)

Instructor Information:

Prof. Dominique Rolin (UB), Prof. Antoine de Daruvar, Prof Michel Hernould, Prof. Catherine Bennetau, Prof Jean-Michel Merillon, Associated Prof Gérard Barroso, Associated Stéphanie Krisa, Prof Thierry Noel

General Instructional Objective (GIO):

During this course student will learn about:
- the basic concepts, technical terms and technology involved of omic tools from the sample preparation to the exploration of the data
- how to read, understand and interpret omics research results
- the challenges and best practice for working in an integrated manner with genomic, transcriptomic, proteomic and metabolomic data
- Explore the field of nutrition through examples of molecules which have positive or negative human health benefits (vitamins, microtoxins, secondary metabolites as carotenoids or polyphenols)

Specific Behavioral Objectives (SBO):

Students will receive
- information about the harmful effects of toxic substances on humans, entering the food or formed in foods. The biological significance of toxic substances in food and influences acting on their rise.
- Information about vitamins and their natural source in plants, the biological significance and physiological role bio-availability and requirements, sources, deficiency & excess.
- Elementary idea of probiotics, prebiotics, organic Food
- Information about secondary metabolites produced by plants such as anthocyanes, carotenoids and their potential benefits for human nutrition

Course Overview/ Schedule:

1. Lectures by specialists of omic tools and bioinformatic
2. Analysis of omic data
3. Case studies of selected molecules from their biosynthesis in plants or microorganisms to their human nutritional effects

Homework:

◦ At home, students will have to prepare a survey on one molecule which have positive or negative human health benefits (vitamins, microtoxins, secondary metabolites as carotenoids or polyphenols). They will have to present as a conference to other students.

Grading Method and Criteria:

Students are evaluated on their attendance to lectures. Each student has to take part in the presentation of one molecule which have human benefits.. Both the clarity and the accuracy of the presentations will be quoted. Each student will also have to answer to precise questions from the audience. The accuracy of their answer will be evaluated. The students will have to report on the practical training. The report will be quoted

Textbook/ Referenced Materials: None

Notes: None