

Bioinformatics

Titulaire

Vincent DETOURS (Coordonnateur)

Mnémonique du cours

INFO-G4410

Crédits ECTS

5 crédits

Langue(s) d'enseignement

Anglais

Période du cours

Premier quadrimestre

Campus

Erasme

Contenu du cours

The course starts by presenting microarray technologies and the preprocessing steps required before any biological investigation can be carried out. Next, I introduce methods basically extending the pre-genomics, low-throughput gene expression experiments to genome-wide screens. Then the course unfolds with the presentation of recent tools that operate, not at the level of individual gene, but at the level of functionally related gene sets and global molecular phenotypes. More specifically we will learn about:

- > microarray normalization-sequence alignment for next generation sequencing
 - > selection of differentially expressed genes-gene set analysis methods-supervised and unsupervised classification of genome-wide expression profiles
 - > typical statistical illusions that come with the above,
 - > If time allows, transcriptome sequencing will be overviewed
- Computational methods will be introduced together with the research problems drawn mostly from oncology research. Thus, the student will learn for example:
- > to what extent the global gene expression varies among different human populations,
 - > how to predict cancer outcome from gene expression profile,
 - > how to establish connection between drugs and biological conditions from gene expression databases,
 - > etc.

Objectifs (et/ou acquis d'apprentissages spécifiques)

Provide conceptual tools for a critical assessment of the functional genomics literature. Introduction a several important databases. Reproduce elementary, but wide-spread functional genomics data analysis schemes.

Pré-requis et co-requis

Connaissances et compétences pré-requis

Bachelor level descriptive statistics.

Méthodes d'enseignement et activités d'apprentissages

The course does not present a nicely polished textbook view of science, but science in the making with its ethods, turn arounds and controversies. Lectures are interrupted by hands-on exercises in which the student actually use the methods on real life data and reproduce published research results. Students are empowered to conduct their own analysis by reproducing the bioinformatics analysis of a published study.

Contribution au profil d'enseignement

Master in-depth scientific knowledge to understand a problem scientific research and the questions it asks, identify the most relevant experiences and the most appropriate techniques to meet them.

To master a new field of research, to be creative, to be able to be critical and to write a research project.

Master the basic scientific techniques of biomedical research that will enable him/her to develop and implement an experimental approach, to compare its results forecasts, and to assess the validity limits of its model.

To be able to read, interpret, criticize a scientific article To question oneself, to be critical, to debate, to debate and / or to defend one's ideas.

Consider ethical issues and apply ethical behavior.

Références, bibliographie et lectures recommandées

NA

Autres renseignements

Lieu(x) d'enseignement

Erasme

Contact(s)

Vincent.Detours@ulb.be

Any communication regarding the course must contain 'INFO-G4410' in the subject line.

Méthode(s) d'évaluation

Examen écrit

Examen écrit

Question fermée à Réponses Multiples (QRM)

Examen à livre ouvert

Méthode(s) d'évaluation (complément)

Written exam if the sanitary situation allows it, oral otherwise.

Langue(s) d'évaluation principale(s)

Anglais et Français

Programmes

Programmes proposant ce cours à la faculté de Médecine

MA-BIMED | **Master en sciences biomédicales** | finalité
Approfondie/bloc 1 et finalité Spécialisée/bloc 1

