Course description

High throughput technologies in drug discovery (2 CFU)

Program of the course

Today, translational research requires a broad range of research interests from single gene analysis to the analyses of protein networks. The analysis of thousands of samples in parallel with high quantitative and statistical accuracy is currently possible due to the development of high throughput (HT) technologies in genomics, proteomics, and cell biology. Many basic questions could not be addressed due to the lack of HT technologies. The number of academic sites establishing HT platforms for drug discovery has increased dramatically all over Europe during the past ten years, mostly due to a reduction in the cost of equipment, a contraction of pharmaceutical early stage research programs, and increased collaboration among consortia constituted by government grant agencies, academic institutions, pharmaceutical companies, and private research foundations.

This course will give an overview of the main HT technologies, strategies and goals pursued in drug discovery and biomedical research in academic environments.

- HT technologies in biomedical research and drug discovery (8h).

To approach today’s research challenges in biotechnology and translational pharmacology, several types of High Throughput (HT) technology platforms have been established. In this part of the course we will focus on the underlying general approaches and clarify technical issues regarding:

HT technologies in genomics and proteomics with particular regard to their use in drug discovery and biotechnology.

HT imaging platforms in drug discovery: High throughput microscopy from single cell analysis to systems biology; applications in drug discovery, toxicology, and biomarker analysis.

In this section we will analyze issues relating to the planning and development of a HT screening project, from the choice of the cell-based assay to the design of the screen, drug library choice, probe selection, and drug screening strategies.

- HT Screening applications in detail (8h): Successful application of HT technology in drug screening and biomarker identification will be presented in the form of an open discussion session by teachers and students to highlight strategies, critical points and achievements. When possible (a minimum of 10 students must register), groups of 2-3 students will be engaged in a practical course that requires planning and application of HT microscopy in drug discovery to be performed in open lab sessions.

Lecturer
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Curriculum Vitae

Present Positions:
2000 – present: Senior scientist, section Biochemistry, Department of Biology, University of Rome Tor Vergata, Italy

Education:
1985: Awarded of Degree (Laurea) in Biological Science (110/110) University of Rome “La Sapienza” Italy
1986-1988: International Fellowship at Institut Curie Paris-Sud, Orsay France awarded by Institut Pasteur Fondazione Cenci Bolognetti
1991. Awarded of PhD Title by University of Rome La Sapienza

Past Positions and honours:
2008-2015 Head of the HighThroughput image Facility at the Consorzio Mario Negri Sud (S.Maria Imbaro Chieti)
2005-2015: Head of unit Functional proteomics laboratory at Consorzio Mario Negri Sud
2000-2002: Visiting Scientist at Department of immunology and Genetics - Max Perutz Laboratory, University of Vienna, Austria
1996-2000: University Assistant, University of Vienna Institute of Genetics and Microbiology, Vienna Biocenter, Austria.
1990-1991: Post-Doctoral Fellowship at Department of Cellular and Developmental Biology, University of Rome, "La Sapienza, Italy awarded by the Institut Pasteur-Fondazione Cenci-Bolognetti.
Main actual Interests: We use omic technologies with particular regard to HT microscopy technologies to identify compounds required for remyelination and clarify pathways leading to CNS myelination and the mechanism of action of antiproliferative drugs based on inhibition of preylation; We also use yeast and neuroblastoma cells to decipher basic mechanisms of myosin-based trafficking of membrane in the secretory pathways.
Grants: Her research has been funded by Carichieti Foundation, Telethon, AIRC, CNR/MIUR, FWF Standing-alone (Austria), ÖAD-Action Project WTZ/Kontakt I.20 (Austria).
Partecipation to EU projects: Coordinator of the Bioimaging Node Facility application for I call for Eurobioimaging HT microscopy Nodes: Passed first selection and technical requirement; EUCILIA consortium : Partner inside Consorzio Mario Negri Sud Unit Luini
Publications:
https://www.researchgate.net/profile/Antonella_Ragnini-wilson/contributions