

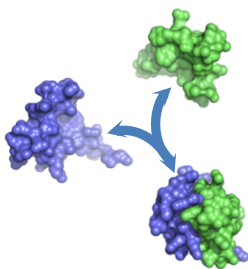


April 1-3, 5, 2019

Protein-protein recognition: from structures to dynamics

A theoretical and practical course

Teachers: Prof. Daniele Dell'Orco, University of Verona (*theory*)
Dr. Valerio Marino, University of Verona, University of Pisa (*practice*)



Protein-protein recognition is a precisely designed mechanism by which biological information is processed and transmitted across all known biochemical pathways. Alterations of the recognition process may lead to dysfunctional states that propagate far beyond the individual protein complex, at the level of the whole biological network. The course will introduce the structural and dynamical basis of the broad variety of existing protein-protein interactions, emphasizing the interconnection between structural features and typical kinetic and thermodynamic properties, which overall determine the specific role the interactions play in their biological context. Hands-on practical bioinformatics sections will facilitate the understanding of the topics introduced in theoretical lectures.

Number of participants: The maximum number of graduate students/attendees allowed in the course is *limited to 20*. In order to register, please send an email to: daniele.dellorco@univr.it **before March 27, 2019** providing your contact and present qualification.

	Monday April 1	Tuesday April 2	Wednesday April 3	Friday April 5
	<i>Part 1</i> <i>Dynamics of protein-protein recognition: protein graphics and structural bioinformatics</i>		<i>Part 2</i> <i>Protein-protein interactions: overview of experimental techniques for the analysis</i>	
9:30 – 13:00	AULA Suzuki Chimica Biologica Ist. Biologici <i>Theory 1-A</i>	AULA Informatica Ist. Biologici <i>Theory 1-B</i>	AULA Suzuki Chimica Biologica Ist. Biologici <i>Theory 1-C</i>	AULA Suzuki Chimica Biologica Ist. Biologici <i>Case Studies</i>
14:00-17:30	AULA Informatica Ist. Biologici <i>Practice 1-A</i>	AULA Informatica Ist. Biologici <i>Practice 1-B</i>	-	-

Detailed program

- **Theory 1-A.** The biological variety of protein-protein interactions: examples; biochemical equilibria involving proteins; determination of the equilibrium constants; effects of point mutations on protein-protein affinity; kinetics of protein-protein interactions; determination of the rate constants; effects of point mutations on the kinetics of protein-protein interactions; from kinetics and thermodynamics to structure.
- **Practice 1-A.** Bioinformatics tools to handle and visualize protein structures and protein-protein complexes. The UniProt database, The Protein Data Bank database; the PyMol molecular graphics environment. Hands-on and tutorials.
- **Theory 1-B.** The protein-protein docking problem. Flexible and rigid body docking. Examples. The ZDOCK webservice and practical session.
- **Theory 1-C.** An overview of some useful experimental techniques to quantify protein-protein interactions. Introduction to surface plasmon resonance and isothermal titration calorimetry. Principles, examples and applications. How to study weak and strong protein-protein interactions in practice.
- **Case-studies:** Analysis and discussion of cases-studies of practical relevance in groups of participants.