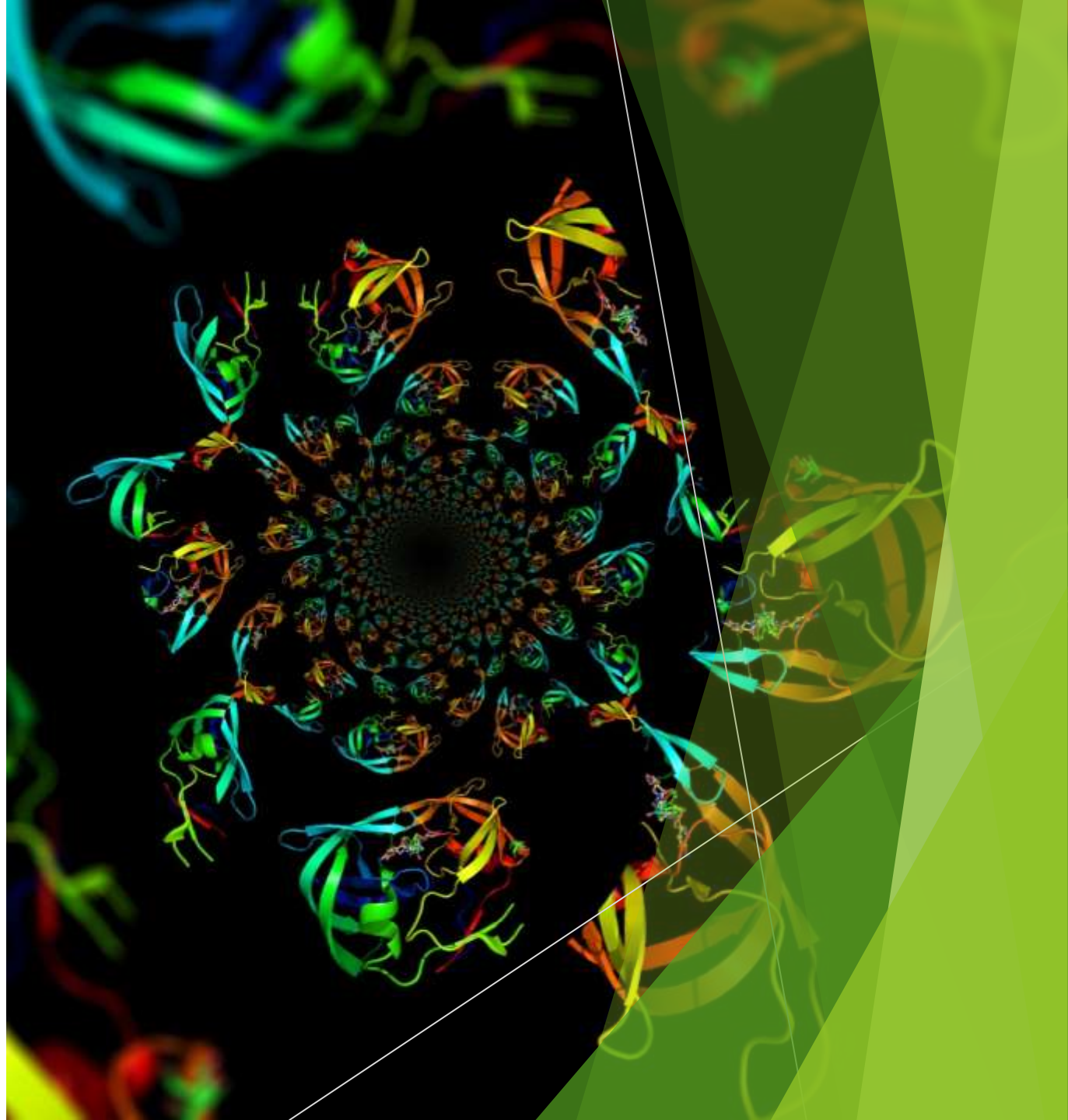


Master program in Molecular and Cellular Biology

Curriculum in Advanced cellular studies

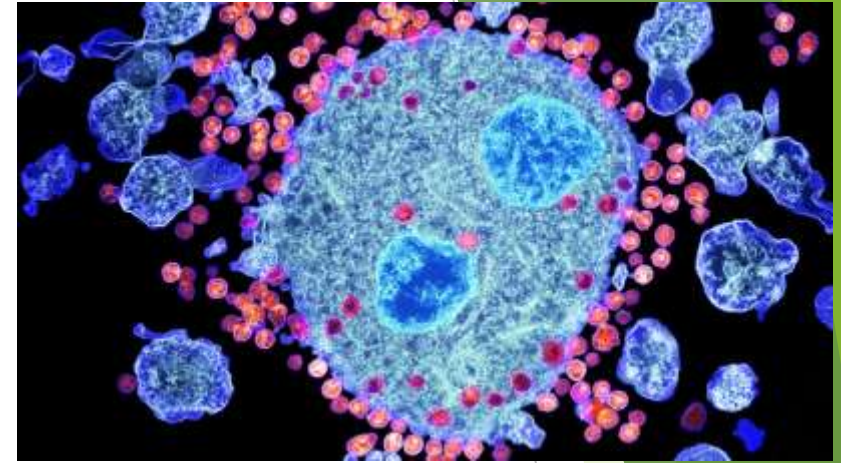
Prof. Enzo Tramontano
email: tramon@unica.it



Aim of the course:



The course has the aim to provide a deep knowledge related to:

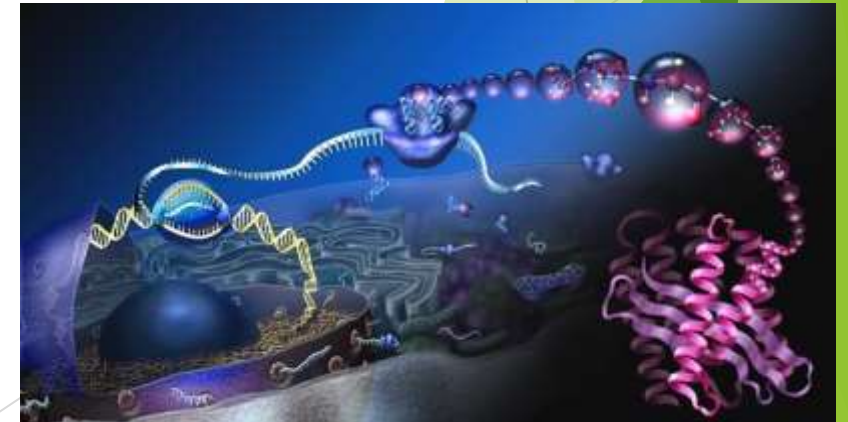


Understanding of cellular and biomolecular phenomena

In-depth knowledge and expertise in the use of advanced biomolecular methodologies

Biological, biochemical and biomolecular applications in the pharmaceutical and biotechnological field

Data analysis skills

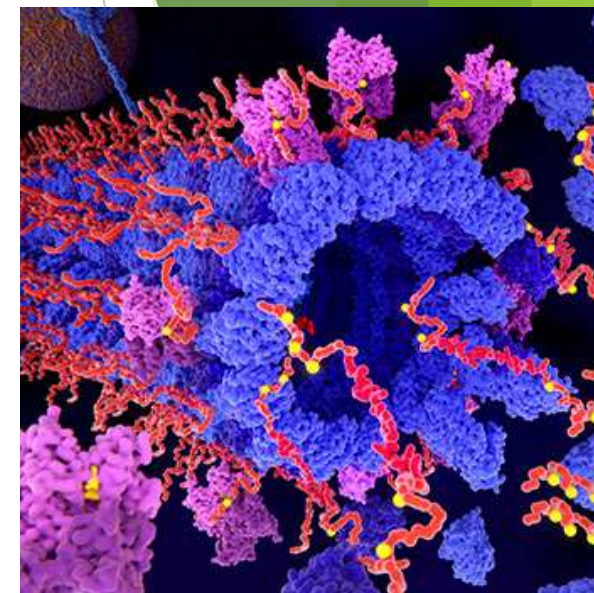


CdLM

ADVANCED CELLULAR STUDIES

Title of the course	CFU Lectures/ Lab activities	hours
1° YEAR (A.A. 2021-22)		
Bioinformatics	9 [3 (2+1) + 3 (2+1) + 3 (2 + 1)]	84 (28+28+28)
Advanced biological methodologies	9 [3 + 3 (2 + 1) + 3 (2 + 1)]	80 (24+28+28)
Metabolic Biochemistry	7 (6 + 1)	60
Molecular Virology	7 (5 + 2)	64
Evolutionary Genomics	7 (5 + 2)	64
Basis of Scientific Methodology	7 (4 + 3)	56 (32+24)
English level C1	3	24
Optional teaching activities	6	
Laboratory practice	10	
TOTAL CFU 1° YEAR	65	

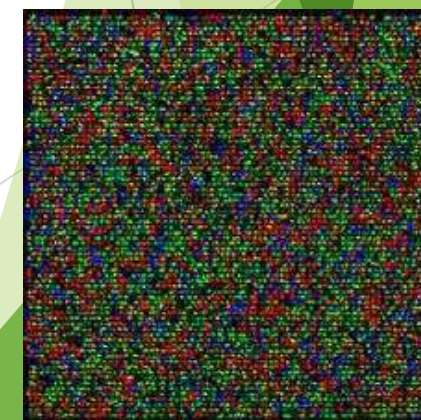
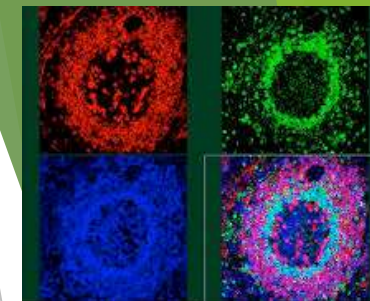
CFU = University training credits



CdLM

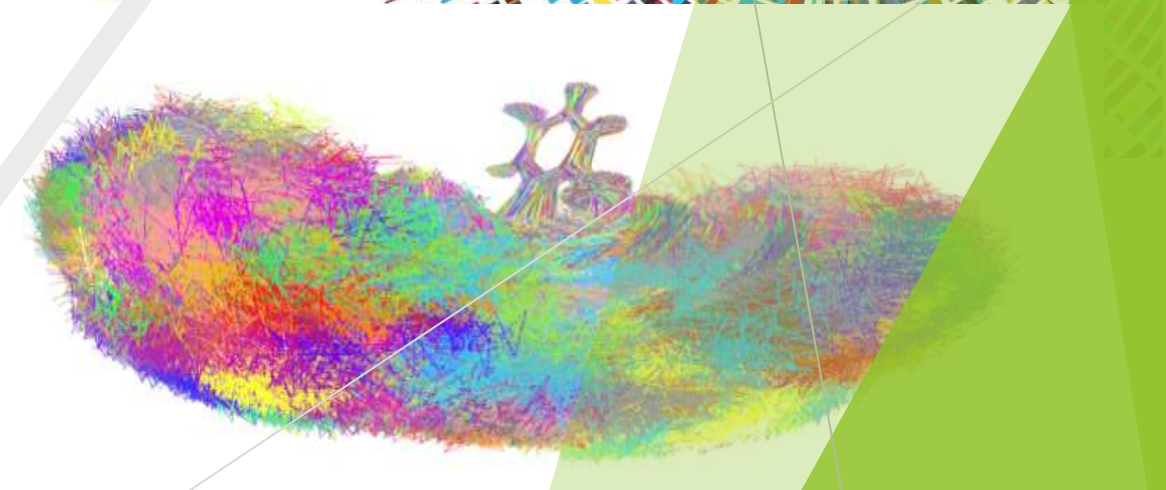
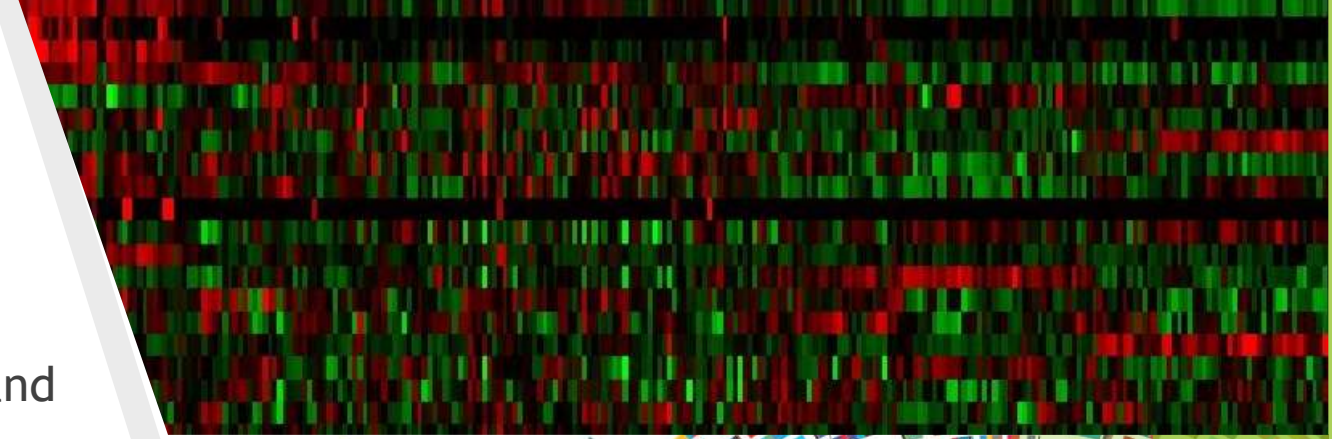
ADVANCED CELLULAR STUDIES

Title of the course	CFU Lectures/ Lab activities	hours
2° YEAR (A.A. 2022-23)		
Cellular and molecular basis of nutrition	7 (5 + 2)	64
Molecular Microbiology	7 (5 + 2)	64
Cellular and molecular bases of cancer and tissue regeneration	7 (5 + 2)	64
Optional teaching activities	9	
Laboratory practice	13	
Thesis	12	
TOTAL CFU 2° YEAR	55	
TOTAL	120	



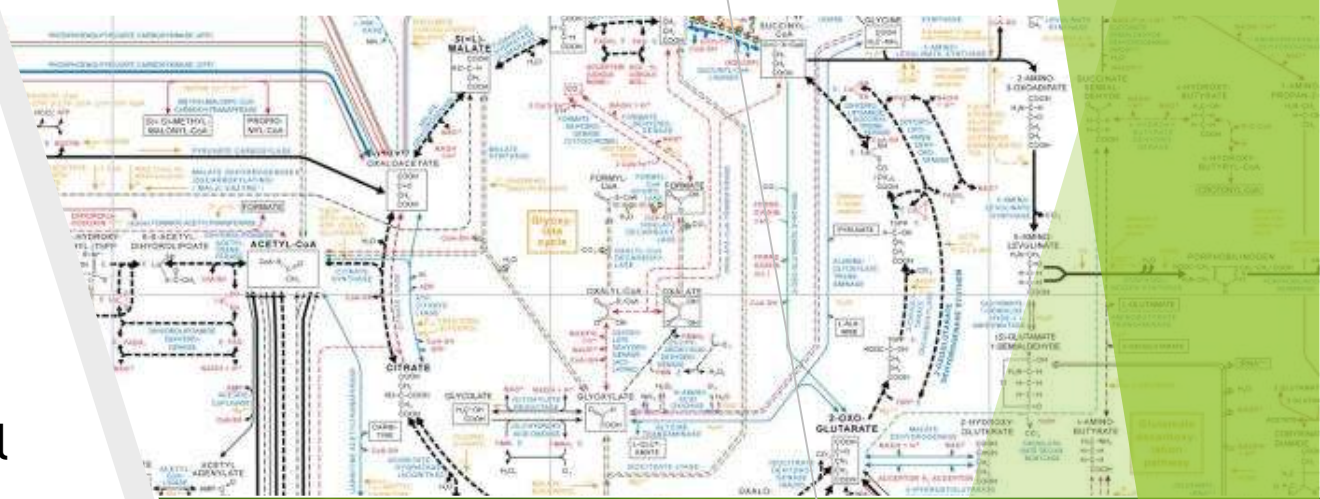
What students learn:

- ▶ **Bioinformatics:** genomics, transcriptomics and protein modeling analysis in silico
- ▶ **Advanced biological methodologies:** spectroscopic methodologies, structural biology, proteomics analysis
- ▶ **Basis of Scientific Methodology:** basics of biostatistics, basic skills to design a scientific experiment according to a hypothesis-based approach



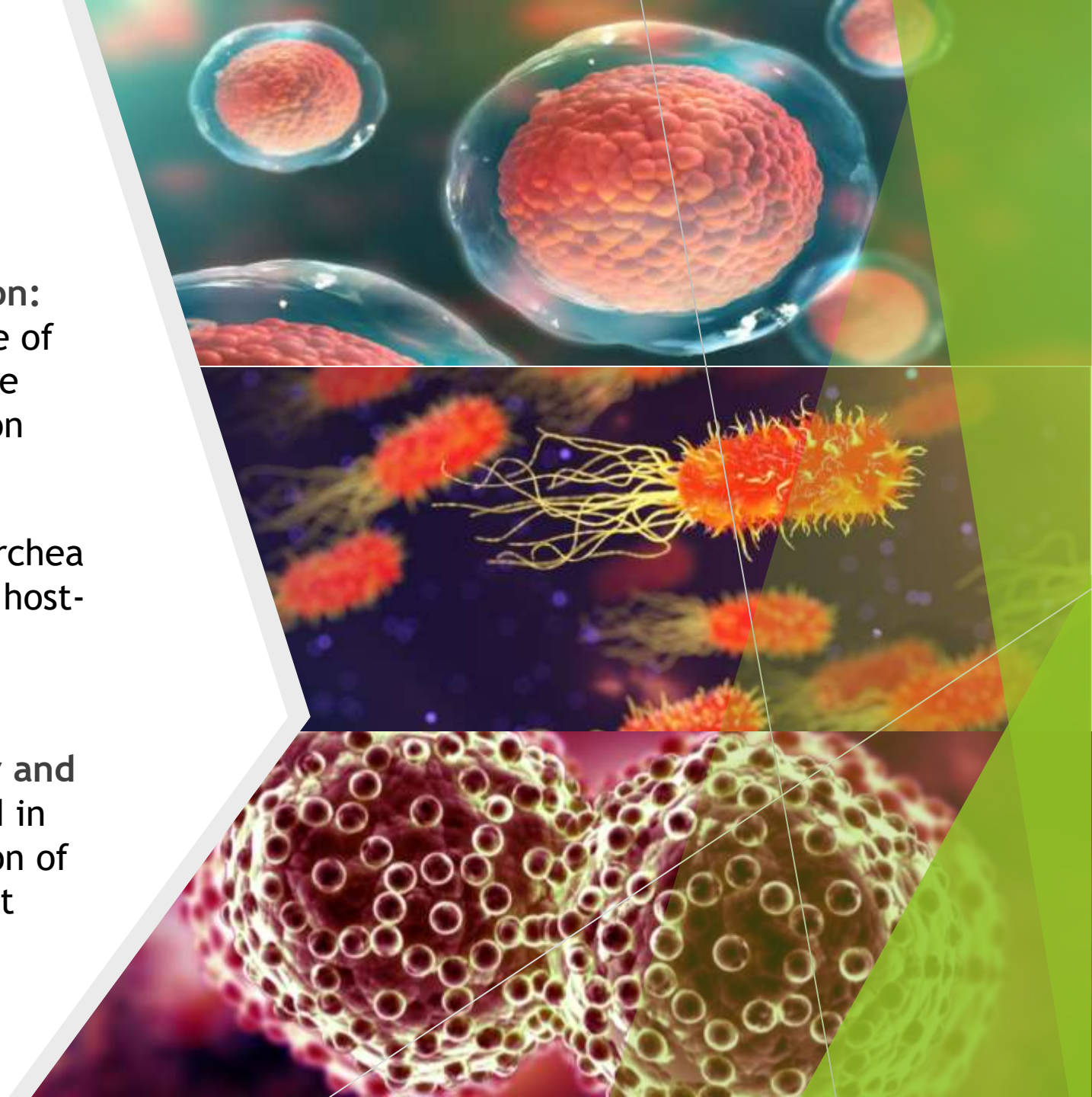
What students learn:

- ▶ **Metabolic biochemistry:** molecular mechanisms underlying metabolic and hormonal regulatory pathways
- ▶ **Molecular Virology:** biology of the major pathogenic virus families, their immune evasion systems, antiviral strategies
- ▶ **Evolutionary genomics:** evolution, organization and function of genomes, genetic basis of speciation, adaptation, and change in response to selection



What students learn:

- ▶ **Cellular and molecular basis of nutrition:** mechanisms underlying the nutritional role of macro and micronutrients in relation to the homeostatic regulation of body composition
- ▶ **Molecular Microbiology:** bacteria and archaea diversity, human bacteria and microbiota, host-pathogen interactions
- ▶ **Cellular and molecular bases of cancer and tissue regeneration:** mechanisms involved in tissue repair and regeneration, contribution of the immune system to cancer development



Laboratory practice:

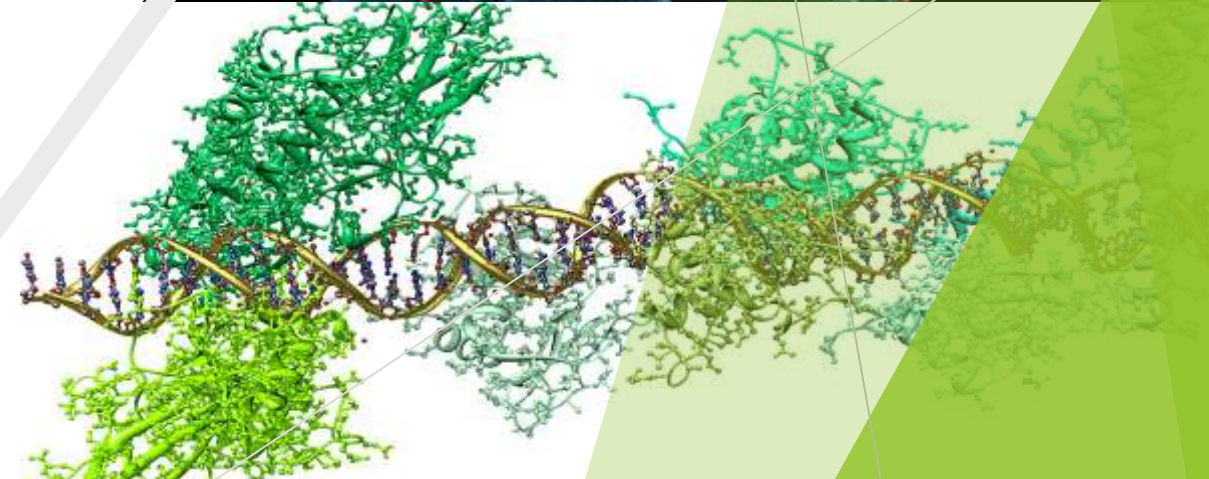
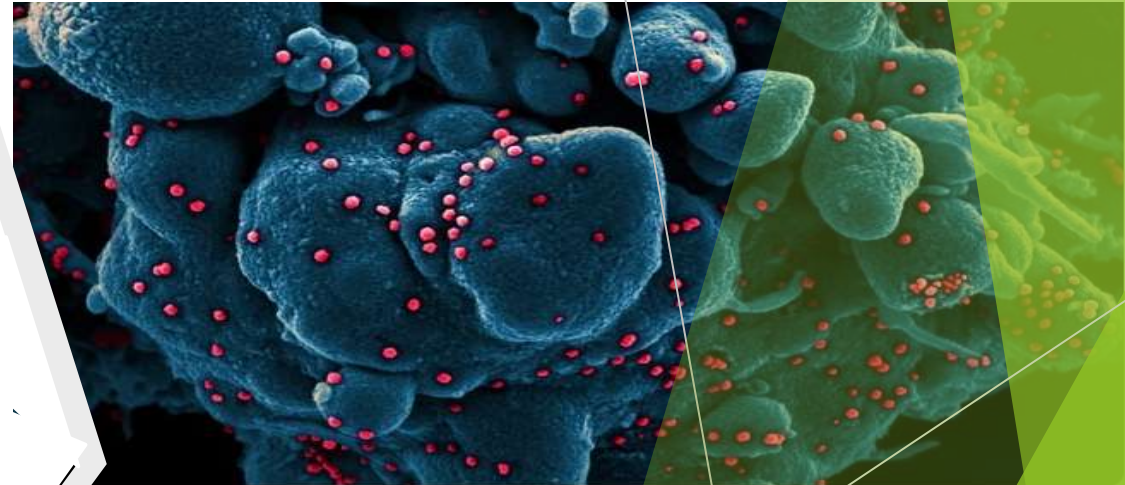
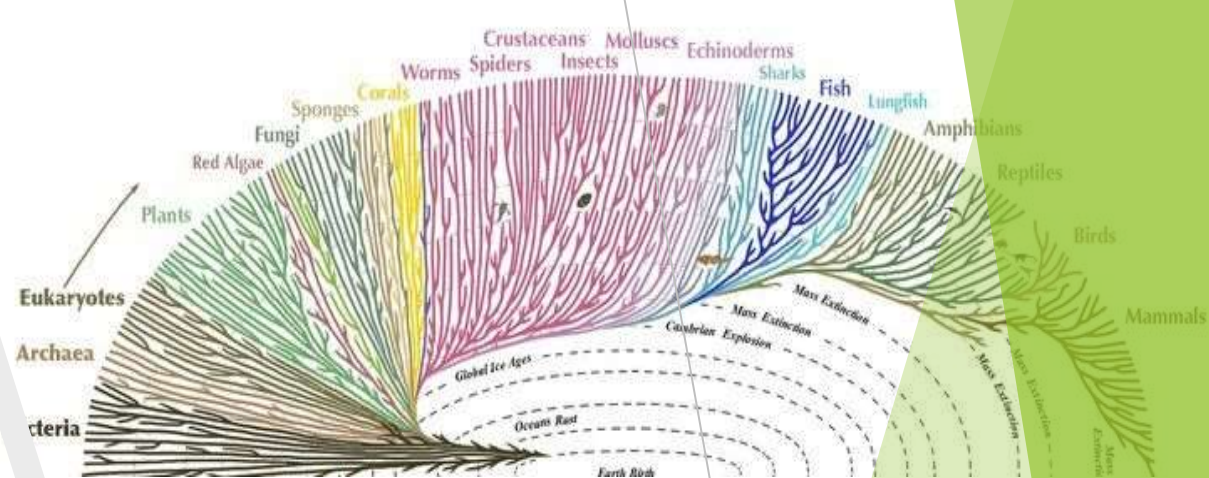
Students will acquire advanced technology expertise and lab skills working on up-to-date instruments in:

- ▶ 400 hours of laboratory teaching within curricular courses
- ▶ 600 hours of laboratory activity in University research labs or external research labs
- ▶ 400 hours of laboratory work for thesis preparation



Example of Master thesis areas:

- ▶ Proteomic analysis
- ▶ Biochemical exploitation of drug development
- ▶ Characterization of photosynthetic system components
- ▶ Drug design and development
- ▶ Molecular genetics
- ▶ Genetic bases of sport performances
- ▶ Human retroviruses
- ▶ Antiviral strategies
- ▶ Host-virus interaction
- ▶ Lipid metabolism



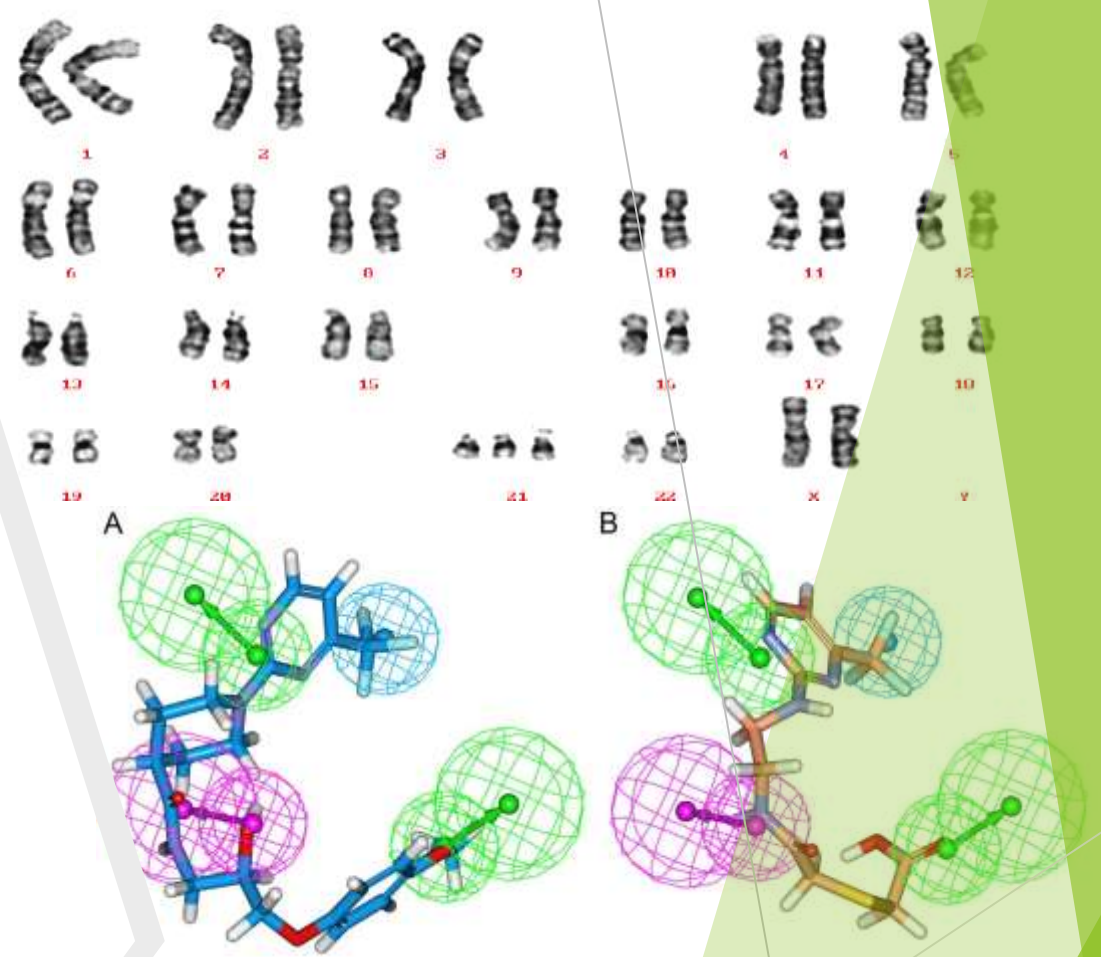
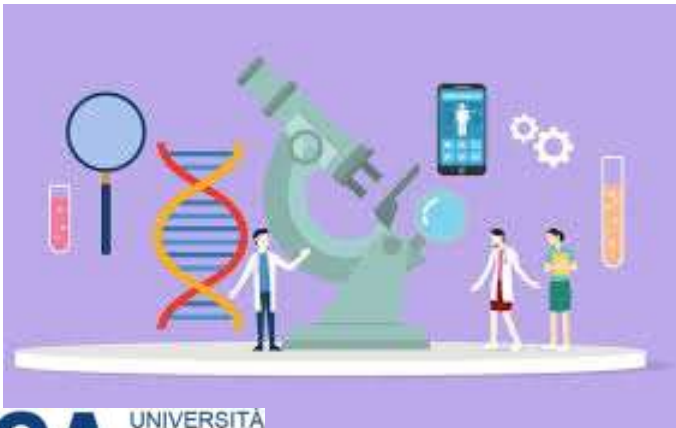
Employment opportunities

- ✓ PhD applications
- ✓ Research activity in Universities and other research institutes
- ✓ Pharmaceutical and biotechnology industries
- ✓ Biological analysis laboratories (hematological, immunological, histological, pregnancy, metabolic, genetic)
- ✓ Analysis laboratory for the control of food
- ✓ Teaching



Application requirements:

- ▶ Bachelor degree in Life Science areas including basic knowledge of:
 - ✓ Eukaryotic and procaryotic cells
 - ✓ Metabolic pathways
 - ✓ Genetics, genome replication and expression
 - ✓ B2 level of English



Inquire addresses for further information:

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