

Biological Physics 2 - 2018-19 Program

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Solar system formation. The Earth at its formation time. Lead-lead dating
The spontaneous generation hypothesis and the origin of life. Miller experiment
The Oparin model of cell. The cell structure
Nucleic acids. Duplication and transcription. Genetic expression control: the Lac operon
Cell division: Meiosis, Mitosis. Mendel laws
Membranes
Biological universal rules
The spontaneous folding
Molecular Dynamics: Bonded and Non-bonded potentials
Finding the conformational minimum
Quantum sorting: why there are 20 amino acidic residues and 4 nucleic bases
Proteins sequencing. Protein alignment: dot plot, Odd score, dynamical programming. The PAM matrices
The immune system. Antigens, antibodies and the MHC molecules. Molecular mimicry: looking for short homologies (epitopes). Statistical and biological meaning of peptides homologies
X-ray Absorption Spectroscopy. A historical introduction
Transmission and fluorescence detection. EXAFS and XANES
Metals in Biology. The XAS applied to metallo-proteins
Quaternary Structure: Haemoglobin and cooperativity. The MCW model