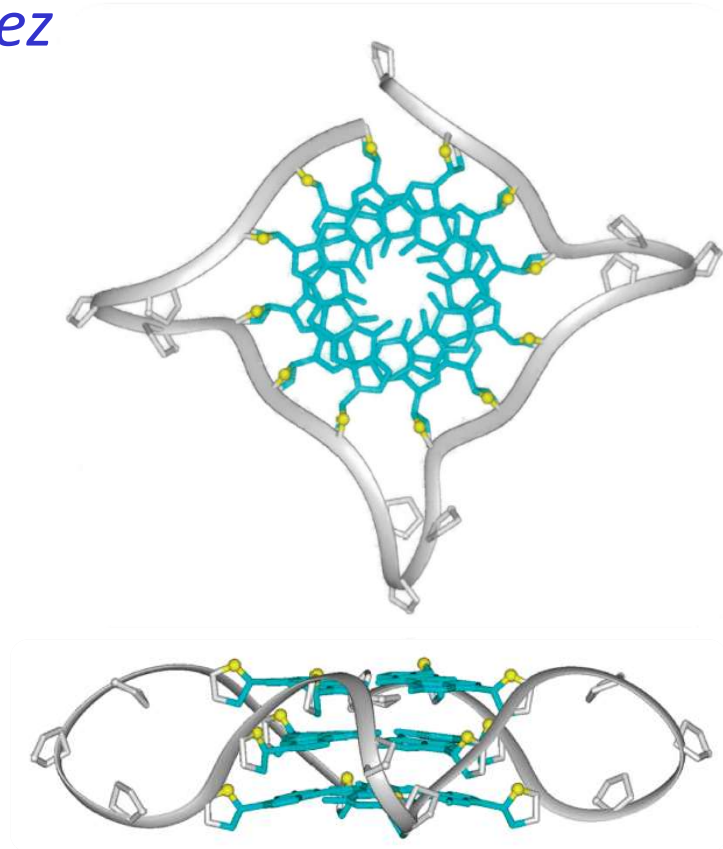
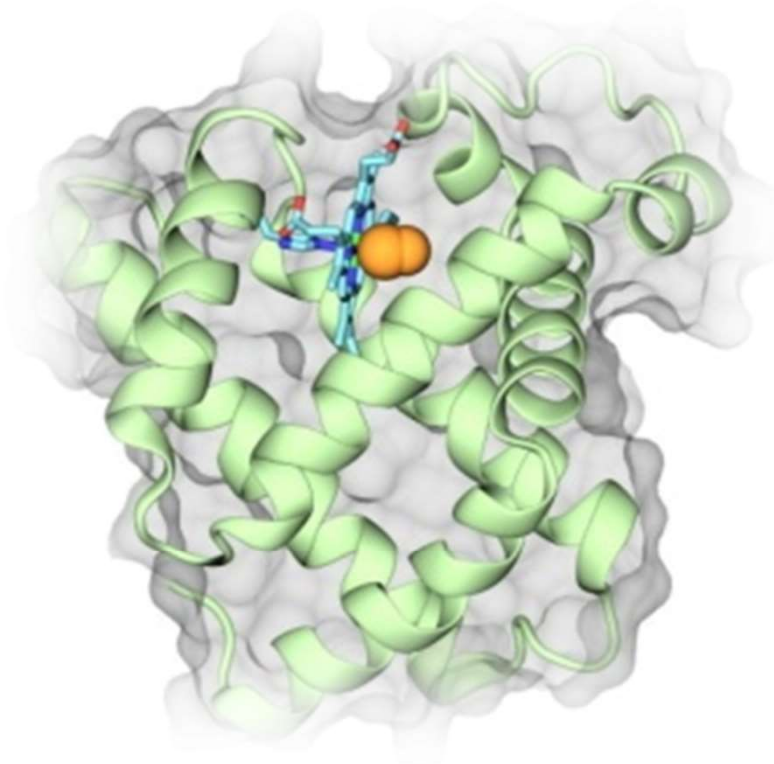


Fisica dei sistemi biologici: dalle proteine al DNA

Lucia Comez



Consiglio Nazionale delle Ricerche

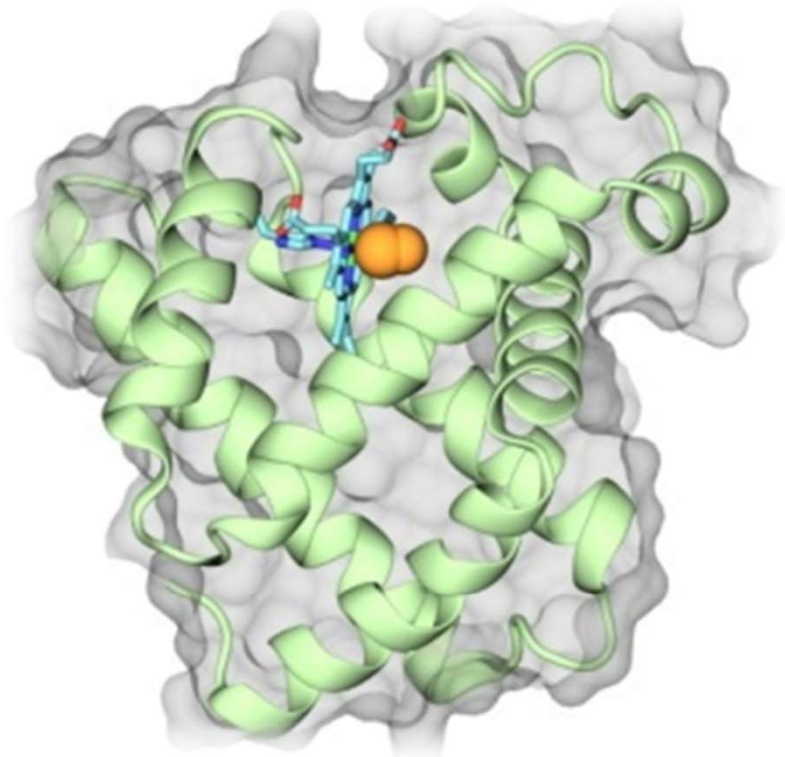
c/o Dipartimento di fisica e geologia

comez@iom.cnr.it

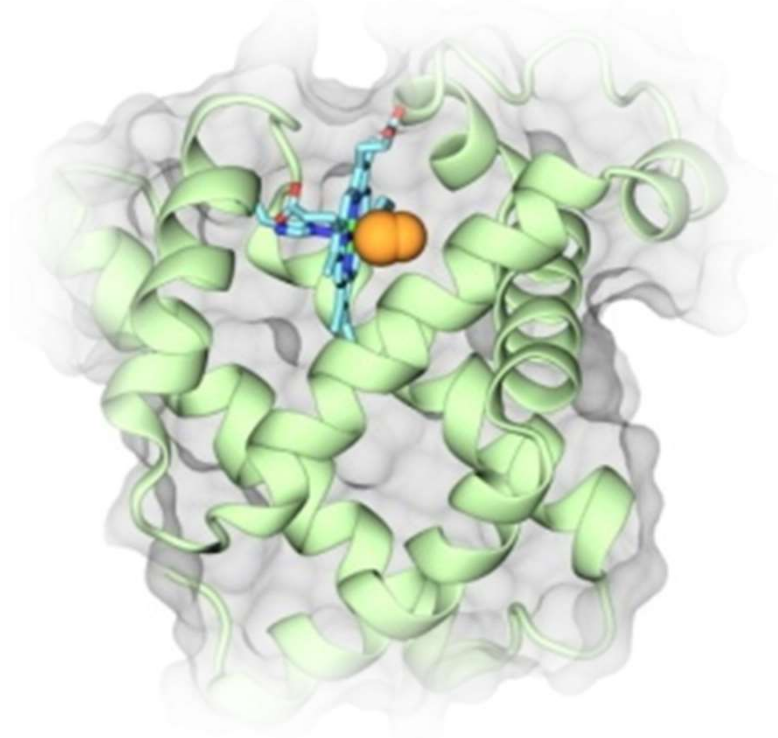
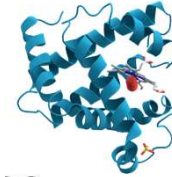
<https://sites.google.com/view/ghost-laboratory/home>



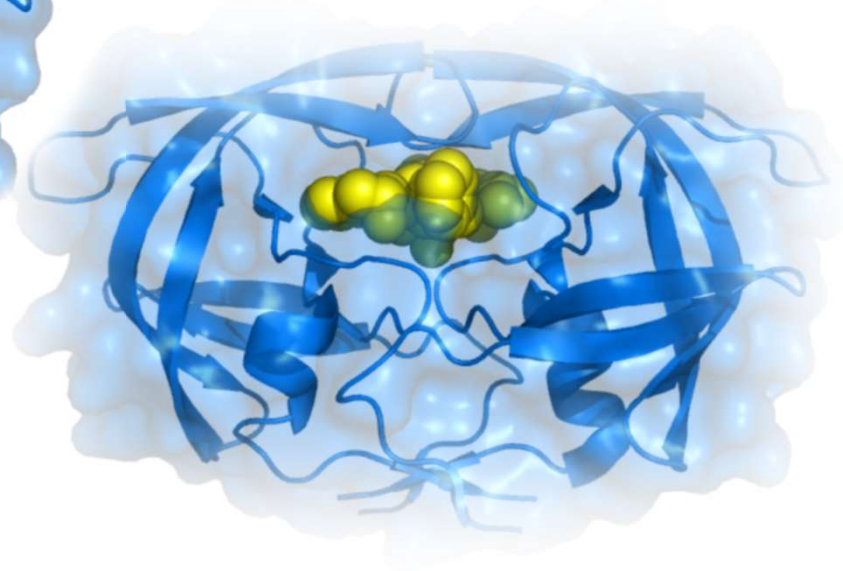
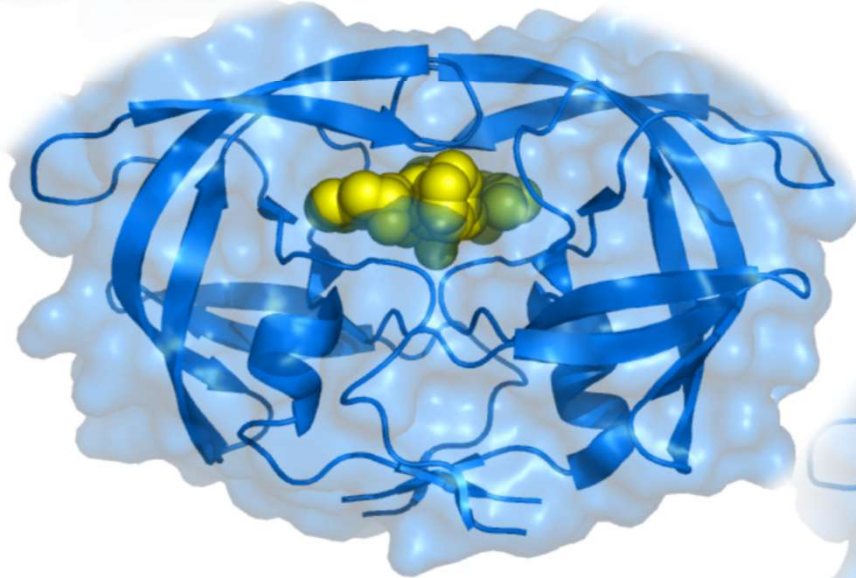
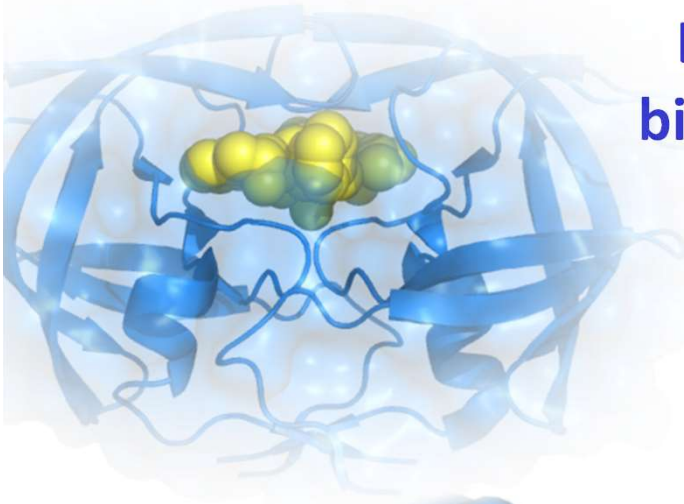
Looking for the secret of biomolecules' functionality



Popular name: **Myoglobin**
Structure resolved in: 1957
Function: to store O₂ in muscles
Path to functionality:
still under investigation



Looking for the secret of biomolecules' functionality



Popular name: **HIV-1 protease**

Structure resolved in: 1989

Fuction: to cleave polyproteins
in HIV

Path to functionality:

still under investigation

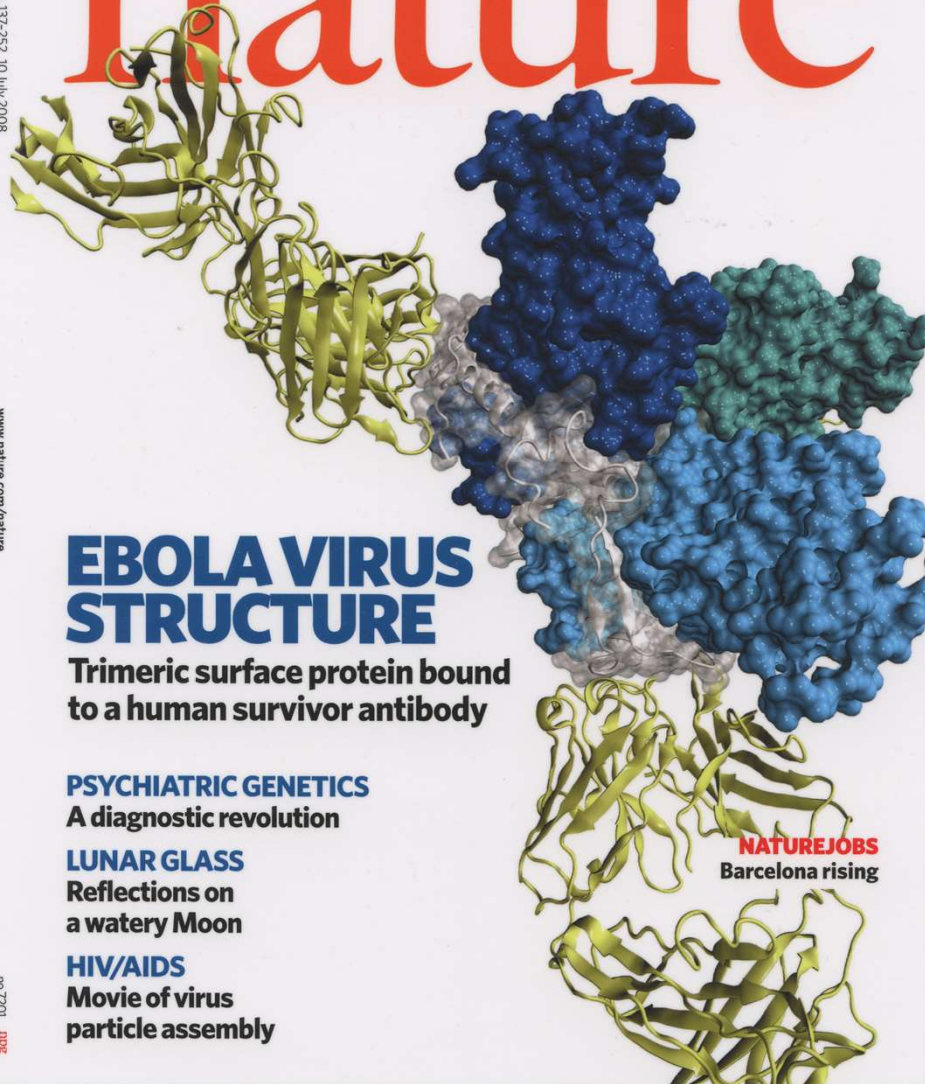
10 July 2008 | www.nature.com/nature | \$10

THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

nature

454, 137-252 10 July 2008

www.nature.com/nature



EBOLA VIRUS STRUCTURE

Trimeric surface protein bound to a human survivor antibody

PSYCHIATRIC GENETICS

A diagnostic revolution

LUNAR GLASS

Reflections on a watery Moon

HIV/AIDS

Movie of virus particle assembly

NATUREJOBS
Barcelona rising

no. 7201
pp. 8

nature chemical biology

JANUARY 2013 VOL 9 NO 1
www.nature.com/naturechemicalbiology

A pathogenic pore

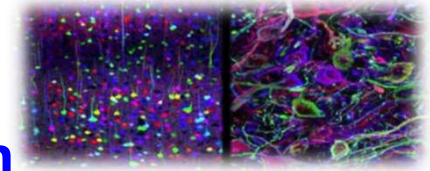


HYDROGENASES
Redefining inactivation

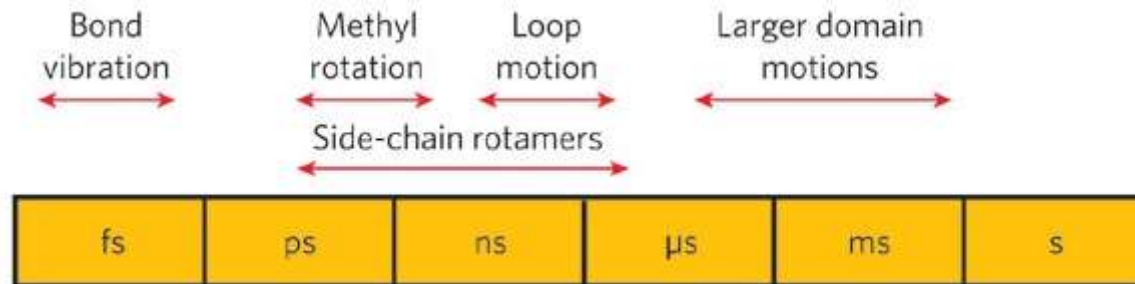
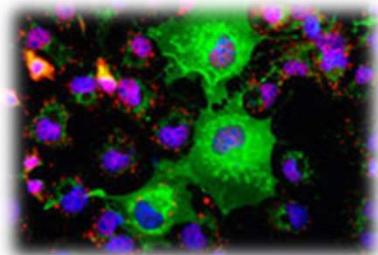
PROTEIN DESIGN
Ubiquitin gets specific

OMICS
Translating peptides

Protein structure is essential,
but it's only a piece of information



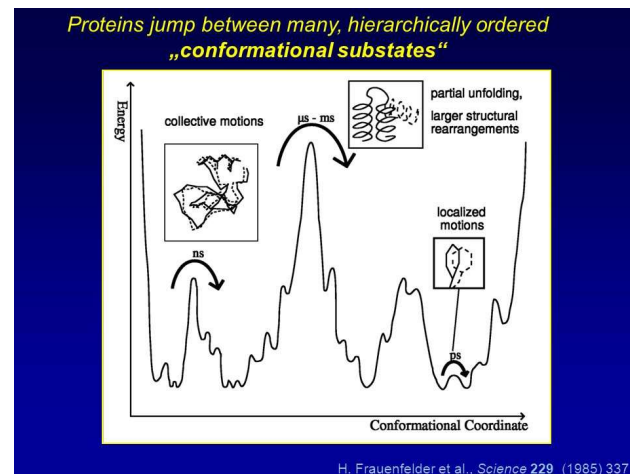
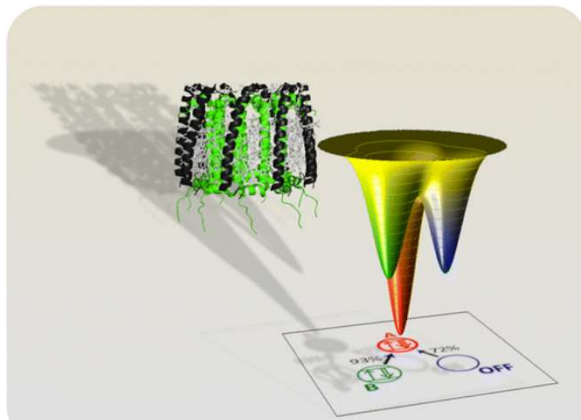
Protein structural dynamics is also key.
Many orders of magnitudes covered in time.



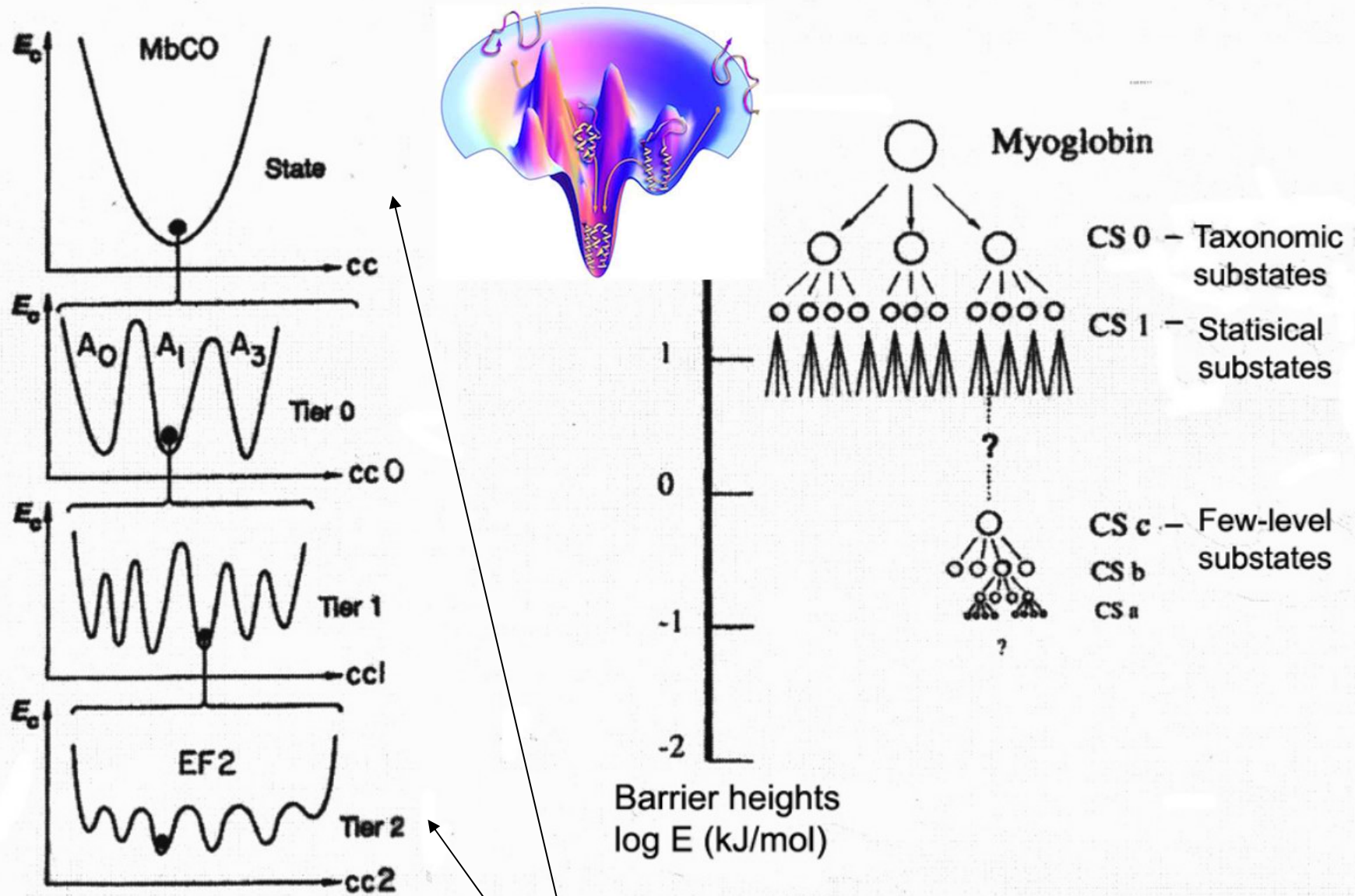
Local flexibility

Conformational changes

Vibrational collective dynamics

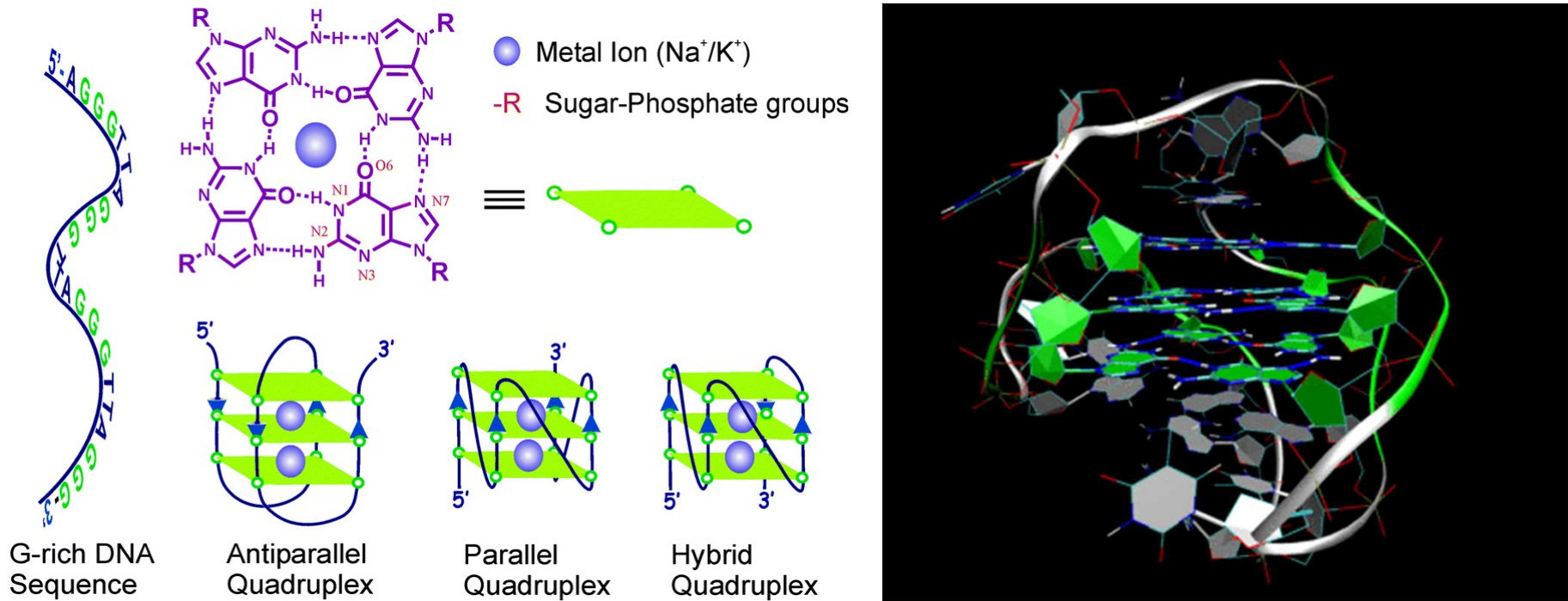


Proteins are supramolecular machines that carry out a wide range of different functions, many of which require flexibility.

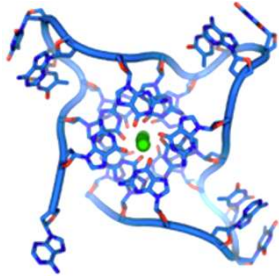


Every single dynamical step, even the tiny ones, may be involved in functionality!!!

G-quadruplex structures: nanoDNA



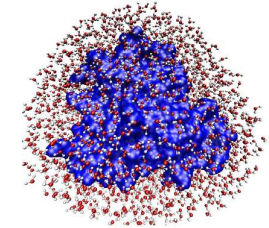
- Oligonucleotides, guanine-rich sequences (tens of nucleotides).
- Their stability depends on temperature, pH, ligands.
- G-quadruplexes are considered as an attractive target for cancer therapy.



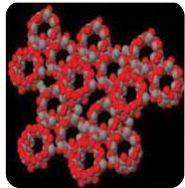
Structural properties of G4 in crowding conditions (Raman, CD)

Coll. con Prof. A. Paciaroni

**DNA-solvent interactions:
Spectroscopic broad band investigations
(Brillouin, Raman, IR, CD)**



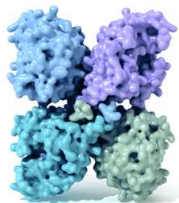
Coll. con Prof. A. Paciaroni, Dr. S. Corezzi, Gruppo di chimica-fisica (GCF)



pH and T- responsive microgels and nanosponges

Coll. con Dr. S. Corezzi, Prof. A. Orecchini , Prof. A. Paciaroni

**Structural and dynamical properties of proteins toward the unfolding in different molecular environments
(Raman, IR, X-ray, Neutrons)**



Coll. con Prof. A. Paciaroni, Prof. A. Orecchini – GCF

Technological developments in neutron scattering.

ESS new European Source

Referente Prof. A. Orecchini

