THE ROLE OF QUANTUM COHERENT EFFECTS IN DNA-PROTEIN SIGNALING

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Experimental Observations

In experiments made in our Laboratory

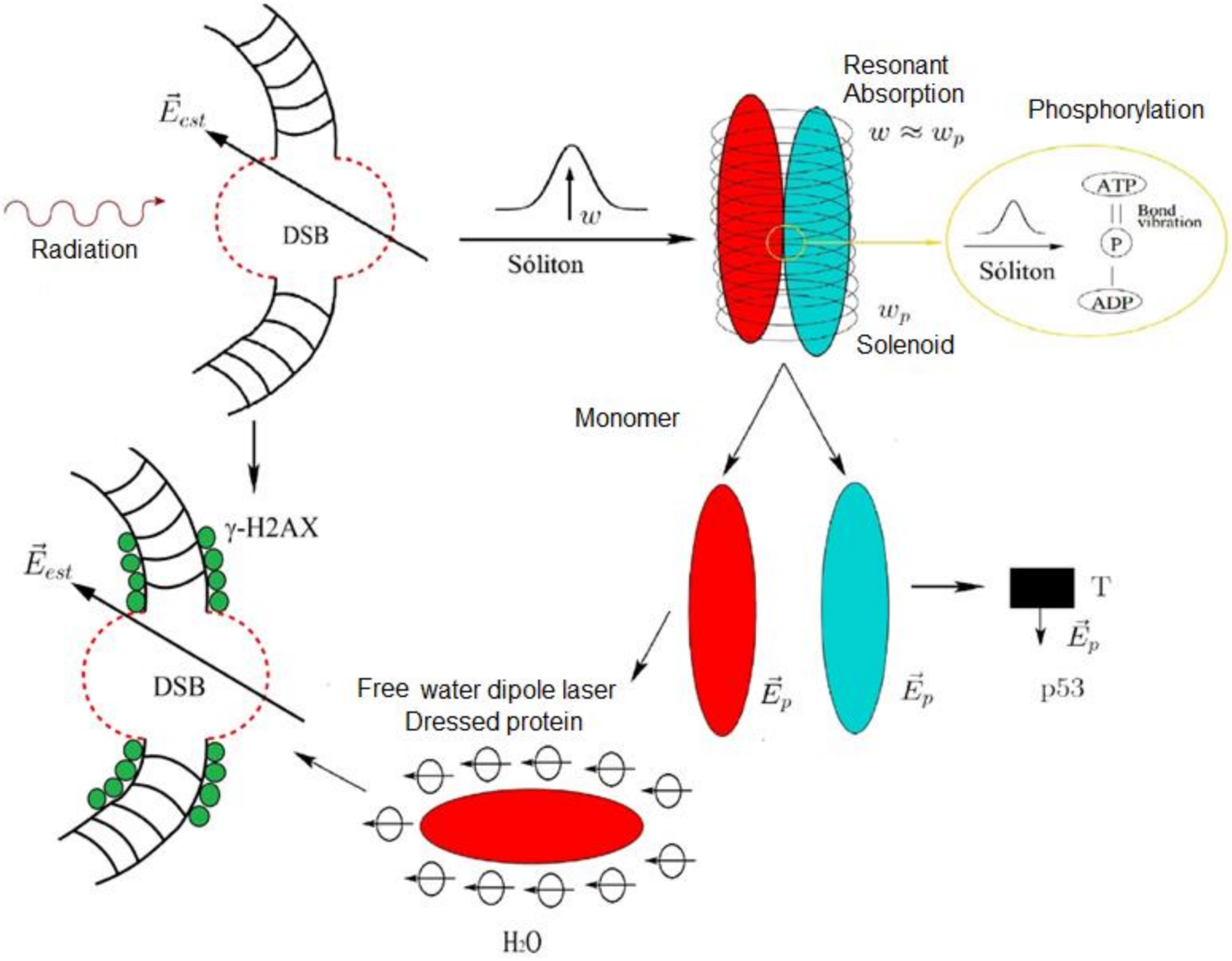
Ionizing radiation (IR)
(gammas and electrons)
+
Static electric field (SEF)

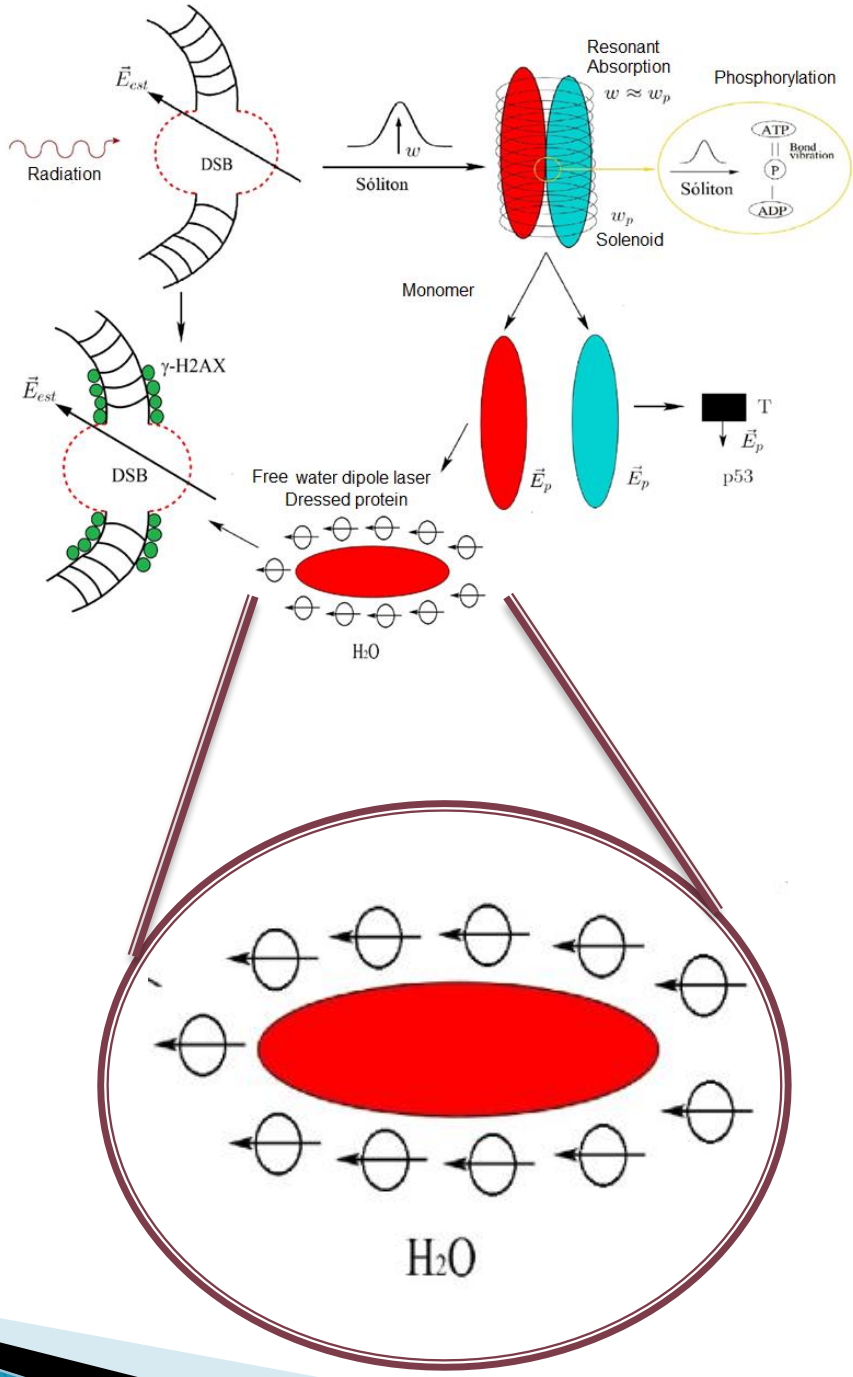
- *Microcystis Panniformis (Cyanobacteria)*
- *Candida Albicans*
- MRG5 – lung cancer cells – mollecular test
- Breast cancer cells, T47D
- *Deinococcus radiodurans*

- Decreased cell growth
- Suppression *of* “shoulder repair”
- Increased the cellular death

The conclusions show that static electric fields are very efficient radio synthesizers. It also suggests that the electric fields actually interfere negatively in the repair process. There is only physically plausible explanation for the high loss of cell viability due to the exposure of cells irradiated to a SEF, which per se does not affect the repair.

NEW CHALENGES!!!!


Resonant
Absorption
$w \approx w_p$
Phosphorylation
$\vec{E}_{est}$
Radiation
DSB
w
Sóliton
w_p
Solenoid
ATP
Bond vibration
P
ADP
Sóliton
Monomer
γ-H2AX
$\vec{E}_{est}$
DSB
$\vec{E}_p$
$\vec{E}_p$
T
$\vec{E}_p$
p53
Free water dipole laser
Dressed protein
H_2O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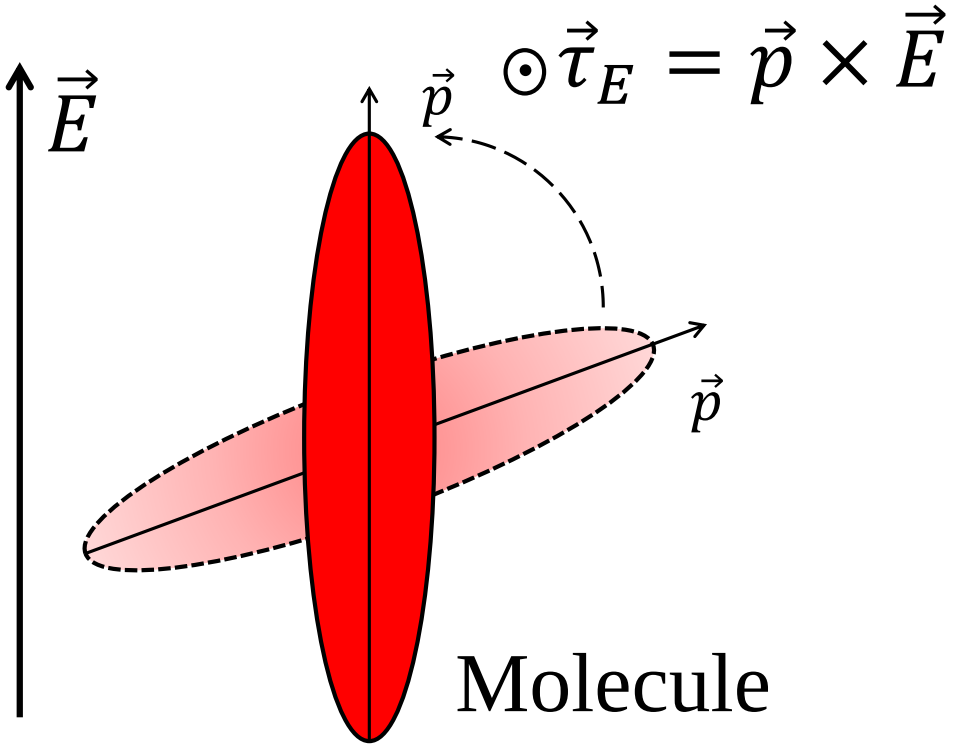
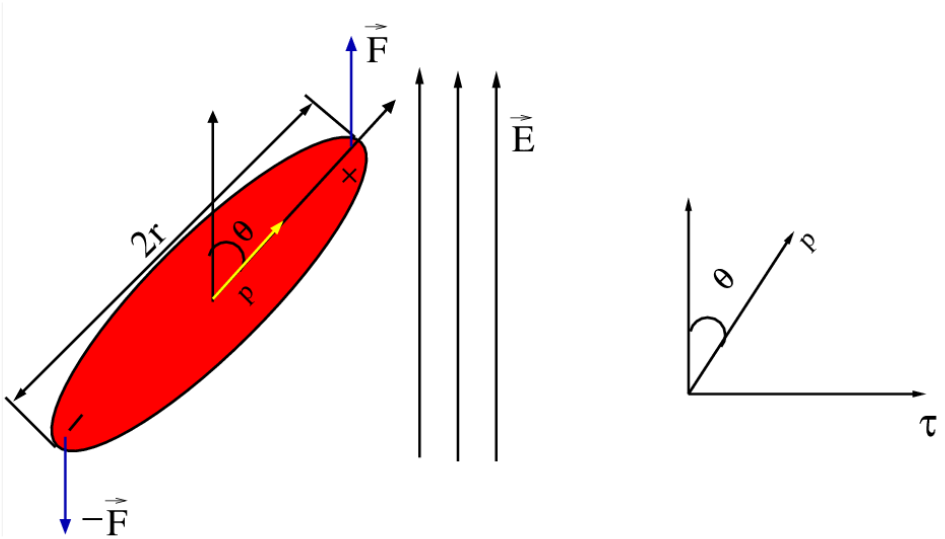
$\vec{E}_p$
p53
H2O
H2O

Those repair proteins could be polarized in the direction that the SEF is applied via a rotation of their dipole moments from the applied torque of the exogenous electric field.



Some considerations and calculations

Electric dipole in vacuum and subjected to an electric field $\vec{E}$

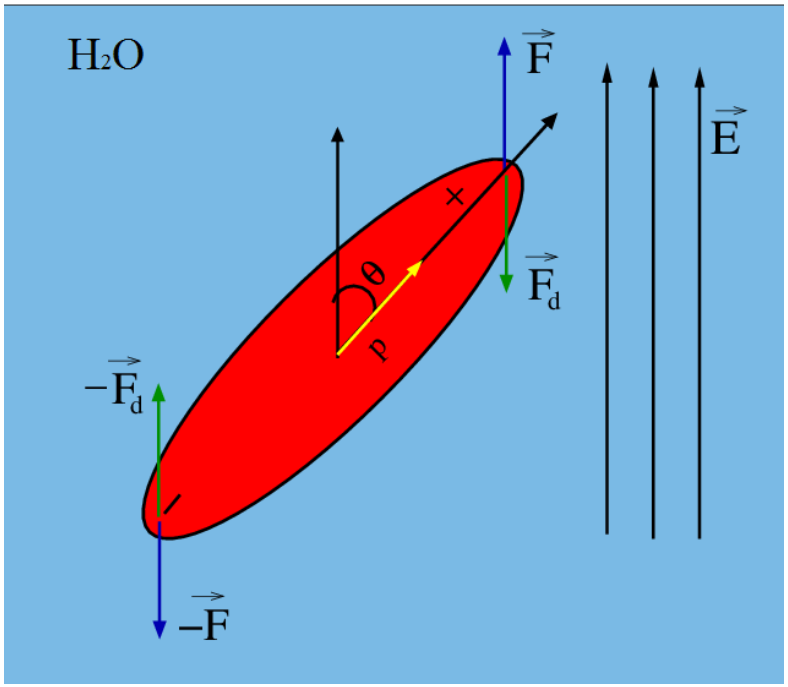


$$\tau_E = pE\sin\theta \qquad (1)$$

$$\boldsymbol{\tau_E = 5,9 \times 10^{-26} sin\theta\ Nm} \qquad (2)$$

$$\boldsymbol{< \tau_E >= 3,8 \times 10^{-26} Nm} \qquad (3)$$

Electric dipole immersed in water and subjected to an electric field $\vec{E}$



$$\vec{\tau}_d = 2\vec{r} \times \vec{F}_d \tag{4}$$

$$\boxed{\tau_d = 2{,}7 \times 10^{-21} \sin\frac{\theta}{2}\ Nm} \tag{5}$$

$$\boxed{< \tau_d >= 1{,}7 \times 10^{-21} Nm} \tag{6}$$

Total torque

$$\tau_T = \tau_E - \tau_d \tag{7}$$

$$\tau_E < \tau_d \Rightarrow \tau_T < 0$$

$$\tau_{Ee} > \tau_E \Rightarrow \tau_{Ee} > \tau_d \Rightarrow \tau_T > 0$$

$$\tau_{Ee} = P_{efet} E \sin\theta \tag{8}$$

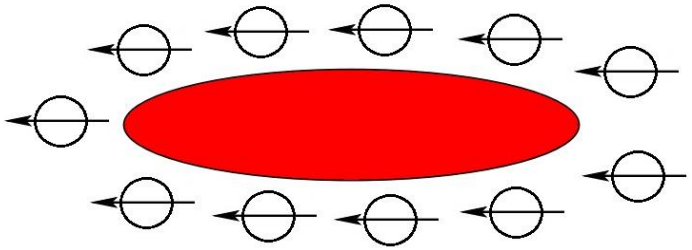
$$P_{efet} E \sin\theta > \tau_d \tag{9}$$

$$P_{efet} > \frac{\tau_d}{E\langle \sin\theta \rangle} \tag{10}$$

The *free water dipole laser effect*

Some conditions the water molecule → coherently → Impurity

Formation of a "permanent" electric dipole moment around the protein via the quantum-coherent effect developed by Del Giudice and collaborators.



H_2O

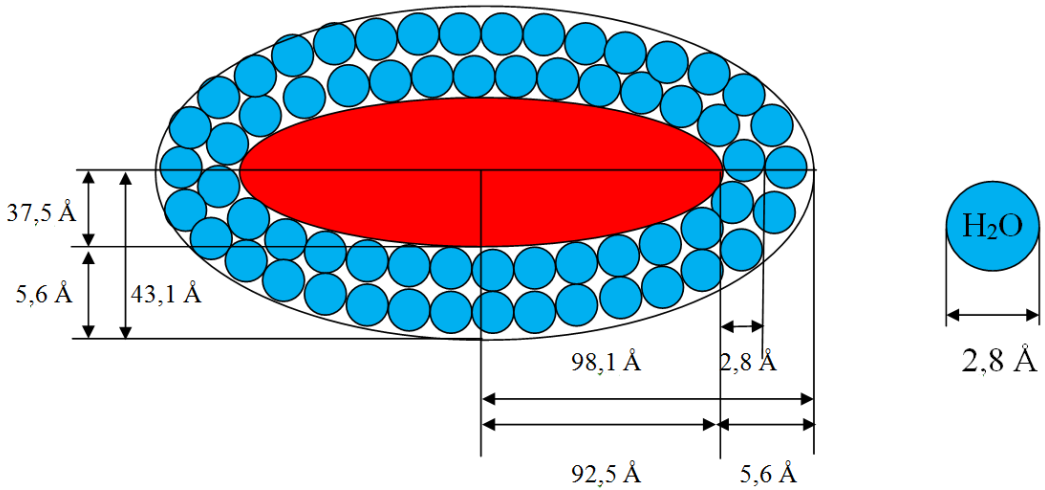
$$\vec{P}_{efet} = \vec{p} + \sum_{i=1}^{n} \vec{p}_i \qquad (11)$$

$$P_{efet} > \frac{\tau_d}{E\langle \sin\theta \rangle} \tag{12}$$

$$p + N_{esc} p_{H2O} > \frac{\gamma\omega}{E} \tag{13}$$

$$N_{esc} > \frac{\gamma\omega}{E p_{H2O}} - \frac{p}{p_{H2O}} \tag{14}$$

$$N_{esc} \approx 9 \times 10^{13} \text{ Water molecules} \tag{15}$$



Dressed protein

$$\tau_{Ee} = 1{,}11\times10^{-14}\sin\theta\ Nm$$
$$\tau_{de} = 1{,}07\times10^{-14}\sin\frac{\theta}{2}\ Nm \qquad (16)$$

$$\langle\tau_{Ee}\rangle = 7{,}07\times10^{-15}\ Nm$$
$$\langle\tau_{de}\rangle = 6{,}81\times10^{-15}\ Nm \quad \Rightarrow \quad \tau_{Ee} > \tau_{de} \qquad (17)$$

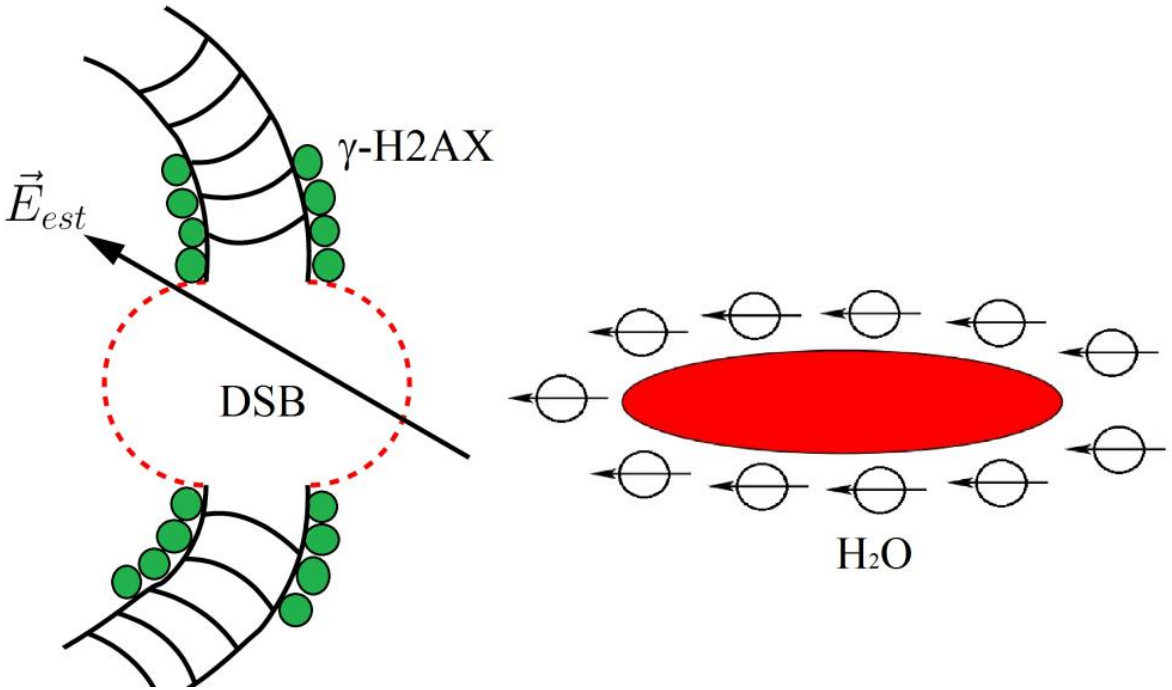
Conclusions

It is clear that the not dressed protein is unable to overcome the viscosity of the medium for static electric fields (SEF) with intensities under 2kV/cm. However, it was observed that the protein is polarized for SEF with intensities equal or below this given value. These facts lead to the generic conclusions:

(i) if the protein is dressed, a very intense and permanent electric dipole moment is formed around the protein;

(ii) that it is necessary to dress the protein for alignment to occur.

Recognition



Another history!

SPASIVA

OBRIGADA

THANK YOU

MUCHAS GRACIAS