



National Student Team Contest (first stage)

Task 2. Plasmon resonance

Proteins in living cells perform their functions in pairs and groups. One of the methods which allows investigation of molecular interaction is surface plasmon resonance (SPR). SPR occurs when polarized light strikes an electrically conducting surface, often gold films, at the interface between two media. This generates electron charge density waves called plasmons, reducing the intensity of reflected light at a specific angle known as the resonance angle, in proportion to the mass on a sensor surface.

1. What kind of molecules can be investigated with this technique? What parameters of interactions of molecules can be determined? **(1 point)**
2. What are the main limitations of this method? **(2 points)**
3. What other techniques allows obtaining the same parameters as SPR? **(1 point)**
4. Propose a “molecular fishing” protocol to identify ligands specifically interacting with a molecule of interest in a complex media, for example cell lysate. What methods should be used? **(2 points)** How can nanotechnology help to improve the method? **(0,5 points)** Why is it necessary to use SPR at the last stage of a protocol? **(0,5 points)**
5. Suggest an example of application of the proposed protocol to find a ligand to the target molecule, which would help in drug design. **(3 points)**

Total – 10 points