Nanomedicine & Biotherapeutic Discovery

Extended Abstract

Possible to Excite Transmission of Nerve Signals in Brain for Cancer Therapy

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Abstract

Neutral radical Acetylcholine Molecule (ACh) play important role in the transmission of peripheral nerve signals and in the processes of the central nervous system which are related with consciousness but also might be employed for the therapy of brain and other nervous system tumors. Molecular complex containing two ACh molecules and photoactive hypericin molecule (in the center of figure) in acetonitrile or in water molecules environments were investigated using quantum mechanical various density functional methods. During research efforts at Los Alamos National Laboratory (LANL) focused on constructing a quantum computer based on regular arrays build from neutral radical molecules possessing one single unpaired electron spin. The idea was built on the ability to manipulate individual electron spins in a solid matrix or lattice. It was suggested that self-assembled monolayer systems could be used to create a macroscopic ensemble of quantum entangled 3-spin groups as a first step in quantum information processing. The spins of such a group could be connected by dipole-dipole quantum couplings. Application of a non-uniform external magnetic field could allow selective excitation of every spin inside the group. The proper sequence of resonant electromagnetic pulses would then drive all spin groups into a 3-spin entangled state. We have found self-assembly of four neurotransmitter ACh molecular complexes in a water molecules environment by using geometry optimization with DFT B97d method. These complexes organize to regular arrays of ACh molecules possessing electronic spins, i.e. quantum information bits. These spin arrays could potentially be controlled by the application of a non-uniform external magnetic field and by attaching the molecules to the ACh arrays with proper choosing parameters of g-tensor. The proper sequence of resonant electromagnetic pulses would then drive all the spin groups into the 3-spin entangled state and proceed large scale quantum information bits. Calculations by using time dependent density functional methods PBE0 and PBEh1PBE with basis setTZVP shows that maximum of excitation by light should be in the region 660-650 nm depending on various molecules environments. That allow to excite transmission of nerve signals in brain or other nervous systems for cancer therapy.

Biography

Arvydas Tamulis is an Expert of European Commission, Brussels, Belgium. He has performed this present research work in Vilnius University Institute of Theoretical Physics and Astronomy, Vilnius, Lithuania as a Senior Researcher. He has 231 scientific publications. He is currently working in the fields of quantum entanglement and quantum information in nano-biology and molecular medicine.

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