Quantum Biology, Elementary Particles and Agriculture: Strange Bedfellows

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***Abstract*- Quantum phenomena have been thought to play an important role in biological organisms. Some of these have been proved experimentally. We have also postulated an important role of quantum phenomenon on biological organisms. In this paper we examine whether the manipulation of these phenomenon can lead to desirable phenotypes in biological organism. We also hypothesize a "Quantum Grover Network" (QGN) in biological organisms. The role of elementary particles in biology and biotechnology is also discussed.**

***Index Terms*- Quantum Grover Network" (QGN), Multiverse, super positions, Stress**

INTRODUCTION

Our group has published extensively on possible role of quantum phenomenon in biological systems (Grover, 2011a, 2011b, 2011c, 2014, Grover and Grover 2011, Grover et al. 2013 a, 2013b). Extending this concept further we asked whether this could have relevance to the most pressing problems humanity faces in the field of agriculture and medicine.

QUANTUM PHENOMENON POSTULATED BY OUR GROUP AND THEIR MANIPULATION FOR AGRICULTURE

We have proposed that each molecule in a biological cell could be a database of quantum superpositions (Grover and Kumar, 2014). The existence of multiple distinct states simultaneously is termed as quantum superposition. A popular example is that of a cat dead and alive at the same time. In fact right from sub atomic particles to atoms, molecules, organelles, cells, tissues, organs and entire organisms could be considered as a database of superpositions.

Each member of database of superpositions is entangled and thus can non-locally communicate with other states. Also, the database of one object (itself a superposition of many states) interacts with the database of other interacting object. The two databases are entangled and show non local communication between them. The non-local interactions occur at the speed of light and do not require any medium. We have proposed the widespread occurrence of entanglement between different components of a biological system. Entanglement has so far not been experimentally reported in biological systems. Even in physical systems for a long time the entanglement was demonstrated for two particle systems only. Only recently multi party entanglement has been reported for three particles (Erven et al. 2014). Krenna et al. 2014 have created an entangled state of 103 dimensions from just a pair of photons. Our group showed that maximum computational capacity of the proteins involved in heat stress is significantly different from that of the proteins not involved in heat stress (Grover et al. 2017). Now let us ask whether the modulation of quantum phenomenon described above can be achieved with the ultimate purpose of increasing agricultural productivity and alleviating human disease.

ENGINEERING QUANTUM PHENOMENON IN BIOLOGICAL SYSTEMS

Stress is one of the major factors affecting crop yield. In fact the answer is that we may be basically altering quantum properties only by doing genetic engineering or molecular breeding. When we introduce novel genes in the genome by genetic engineering we are basically altering the patterns of

quantum computation in the cell. What are the existing patterns of computation in the cell and how are they altered remains to be investigated. For a biological molecule the superpositions of only the conformational states permitted by physical laws would take place. If we alter the molecule, the patterns of superpositions might change. As non-local communication occurs between superposed states the pattern of non-local communication might get altered, ultimately resulting in different phenotype.

We feel that it is important to realize that at a basic level genetic engineering leads to differences in the quantum physical properties of a biological organism. Genetic Engineering is one of the ways in which the quantum physical properties of the organism may be altered. There may be other efficient and inexpensive ways of altering the basic quantum physical properties of the biological organisms directly.

QUANTUM GROVER NETWORK

As mentioned earlier we have proposed that from elementary particles to biological organisms themselves every form of matter may be viewed as a database of superpositions. Since according to multiverse hypothesis these superpositions are in different universes one can envisage a network between these superpositions. (Though, there would be no physical connection between them). This network we term as Quantum Grover Network or QGN. It would be interesting to know whether by altering communication between different members of a network, and/or altering the topology of the network, we could alter the phenotype of biological organisms. This would be same as manipulating non-local communication at various levels in the biological organisms.

ELEMENTARY PARTICLES IN BIOLOGY AND BIOTECHNOLOGY

It is well known that biological organisms are made up of organs, which are made up of tissues, which in turn are made up of cells which in turn have organelles, molecules and atoms. The atoms are made up of elementary particles. Till date there have been no theoretical and experimental studies about the elementary particles in the biological organisms. There is no reason to believe that elementary particles won't have a role to play in the biological organisms. If it is true it would be pertinent to ask further whether the elementary particles are of different type and flavours in different cells/tissues/organs. Whether the elementary particles are different/their behaviour is different in the same type of atoms found in different places mentioned above. It would be further important to ask whether the elementary particles are different in the aspects mentioned above in different physiological situations. Not only behaviour/type but information processing by elementary particles might also differ.

CONCLUSION

In this paper we postulate that in future if the technology advances to a sufficient level manipulating quantum properties of the biological organisms and their constituent may prove to be an effective method for altering their phenotype.

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