An integral predictive model between exposures to non-thermal electromagnetic waves effects

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1 Introduction

Typically cells have a spatial arrangement of atoms that are typical for building, maintaining homeostasis and apoptosis. It has been supported that such states of biomolecules are related to spectral coherence and decoherence frequency bands. A review of 724 biomedical publications, from 1970 to 2020, have reported either beneficial or detrimental biological effects caused by non-thermal EMF from frequencies within the ELF to the THz bands. Based on this strong evidence is provided to support the causal relation between exposure to EMFs and health effects on living cells and biomolecules, and can therefore lead to unhealthy conditions depending on wave frequency, pulsing properties field intensity and exposure times. In addition, 229 experiments were also reviewed and confirm that non-thermal electromagnetic waves can induce changes on the cell. Current single or composed (modulated) frequencies in communication technology fit 94.2% with the proposed quantum model as related to healthy or unhealthy behaviour. This offers the potential to optimize the calibration of chosen bands. This is relevant in the upcoming 5G bands in which 80 % of the proposed frequencies fall within the detrimental decoherent or modulated coherent frequency bands. Further research to counteract the non-thermal unhealthy effects may generate ideas for optimizing the equilibrium between coherent and decoherent waves and produce groundbreaking health conscious technologies.

2 Fröhlich's Hypothesis

The presence of electromagnetic fields in biological systems has been supported. Bioelectric communication generated by EM rhythm of coherent groups of cells, and cell to cell communication form a organization of EM (electromagnetic) signals of different frequencies. which cover the being and are similar to an information network controlling cell metabolism. Thus EM homeostasis emerges: which is, the capability of the human body to maintain homeostasis of the highly complex EM interactions within cells despite an external EM loud environment. Several researchers have proposed the Bose-Einstein condensation principle for self-organizing-synergetic structure that works in biological processes and in present in several systems of boson-like quasi-particles in condensed inorganic matter. A dynamic model for cellular oscillations has been proposed by Fröhlich was that part of the cellular energy supplied to the biological system isn't used to reach thermal equilibrium but instead to create order. This is relevant because it is possible to excite these processes via external EM radiation of the correct frequencies and this mechanism can explain how under specific circumstances the ordering of a system is enforced via the supply of energy (in this case the living systems).

2.1 Defining Coherent vs decoherent states

Decoherence can be viewed as a loss of information into the system (this is often modelled as a heat bath), every system is loosely coupled with the energetic state of its surroundings. In quantum mechanics, particles such as electrons are described by a wave function, a mathematical representation of the quantum state of a system; a probabilistic interpretation of the wave

function is used to explain various quantum effects. As long as there is a definite phase relation between different states, the system is said to be coherent. Coherence is preserved under the laws of quantum physics. Decoherence provides an explanation for the apparent wave-function collapse, as the quantum nature of the system "leaks" into the environment. That is, components of the wave function are decoupled from a coherent system and acquire phase from their immediate surroundings. (Wikipedia on Quantum decoherence).

3 Conclusions

They make 10 simple conclusions based on their findings from 721 papers. They consist of the following:

1. external non-thermal EM waves can be beneficial or detrimental for living cells and biomolecules, depending on the nature of the typical external EM frequency patters that can stabilise internal coherent frequency patterns or induce internal decoherent frequency patterns. (ie can regulate damaged biomolecules or induce damaging changes).
2. a number of current researchers further support the known models of Fröhlich and Davydov (ie research is still ongoing and appears to support the previous findings).
3. many investigations show a stabilisation of conformational states of biomolecules that can lead to healthy conditions, whereas destabilisation of conformational states can produce unhealthy conditions.
4. frequency patterns that stabilize or destabilise living systems can be calculated by the quantum wave equation (coined by us the GM-scale biophysical principle) that can be seen as is a further precision of Fröhlich's wave equation (possible mathematical answer to the biological question of healthy vs unhealthy EM).
5. about 226 published investigations in the period 1972 till 2020 were analysed and show that external non- thermal electromagnetic exposures to living cells at typical MHz- and GHz-frequencies are associated with healthy or unhealthy conditions depending on their position on the patterned GM-scale of coherent and decoherent frequency bands (there should no longer be debate as to whether or not there is an effect on living tissues).
6. it is considered that acceptable levels of safety of non-thermal external electromagnetic waves acting on living cells, biomolecules and living beings can be realised when a sufficient level of coherent signals are present in man-made signals (there could be safe levels and we could determine them, but the current signals do not necessarily fall under those conditions).
7. inorganic semi- and superconductors are able to mimic these coherent signal patterns. It is envisioned that chip-technology can become available to improve the safety of external non-thermal electromagnetic waves.
8. the total actualized meta-analysis of about 721 papers of external non-thermal electromagnetic biological influences very clearly obeys the proposed quantum wave equation that is based on Bose-Einstein type of wave behaviour (we can figure this out mathematically possibly).
9. there seems to be consensus between researchers that: 1) non thermal electromagnetic waves have an impact on health (there is an effect), 2) frequency modulations of coherent frequencies for a major part show a disadvantageous influence on health properties (the effect is mostly bad for us), 3) since selected frequencies can either be related to health promoting effects or to frequencies related to unhealthy situations, presently used communication

technology can be fine-tuned to greater extent of safety (we can improve our current telecommunications industry).

10. the proposed frequency algorithm of healthy and unhealthy modes of EMF radiation offer attractive possibilities for the design of dedicated protective technologies.