
Title: Biologically Structured Water: A Review of the Biological Significance, and Relevance to Health, Vitality and Resilience to Environmental Stresses and Aging



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Proposal

A contemporary review of biologically structured water is needed to bolster and champion the veracity and biological significance of structured water in all life forms. As research contributes more pieces of information a clearer picture emerges that structured water is foundational to life and vitality. A literature review should include an array of biological terms for biological structured water such as bound, interfacial, exclusion zone, vicinal, activated, or clustered water for a more comprehensive literature search that includes related research. The ubiquitous nature, organization, and structure of biological water determines its unique and prominent properties and vital functionality at all life scales. Well hydrated adults have a water content of about 65 to 75% of their body mass. Also due to the hydration levels in intracellular and intercellular tissue, and composition of blood, along with its low molecular mass (18 g/mol) interfacial, structured water accounts for 99% of the molecules in humans.

The hydrogen bond links in the crystalline lattice of structured water allows it to maintain flexibility that is crucial to its gel-like properties and its ability to hydrate complex surfaces and microsites in biomolecules. Also, the liquid crystalline nature of biologically structured water governs a myriad of redox pathways. In addition, interfacial water is a source of cell energy through capture, storage, and release of subtle electromagnetic fields, redox/membrane potential, and energy generation by the water respiration pathway. The liquid crystalline water properties also provide biological coherence and super coherence through resonance with biomolecules and macromolecular vibration and oscillation. The biological significance of structured water at higher life scales can be evaluated and monitored using physiological responses such as respiration rates and hydration levels in animals. Also, the biological importance of structured water in higher plants can be investigated by measuring foliar fluorescence, gas exchange rates at the whole organism scale under a wide range of stressor treatments. In addition, it is relatively easy to estimate and measure the amount of interfacial, or bound water content in plants.

Plant studies have also shown resilience to biotic and abiotic stressors in response to watering or irrigation with generated, structured water treatments. Numerous aging studies have associated health and resilience to age-related diseases. These studies generally recommend specialized rehydration treatments. These same studies also admit that increasing the levels of intracellular water content with rehydration treatments has not always succeeded. Rehydration in older adults is difficult because as humans age they have a diminished capacity to convert tap water into biologically structured water that can be transported across cell membranes and hydrate as intracellular water. In summary, a clearer understanding of biological significance structured water would lead to improved biological interventions. Any treatments or therapies that maintain, enhance, or replenish biologically structured water should significantly contribute to overall health, resistance to biotic and abiotic stress conditions, resilience to age-related diseases, and enhanced longevity.

In this Special Issue, potential topics include but are not limited to:

- The molecular organization and liquid crystalline nature of biological structured water.
- Significance of H-bonds and delocalized electrons and protons to water properties and functionality at all life scales.
- Basic structured water properties and associated biological functionality at atomic, molecular, and cellular scales.
- Interplay between biologically structured water and redox biology.
- Biologically structured water as a supplemental cell energy source.
- Structured water interactions with magnetic fields.
- Biologically structured water interplay with quantum biology.
- Biologically structured water in interfacial or exclusion zones on cell membranes.
- Interfacial structured water resonance and biological coherence, or super coherence in organisms.
- Structured water interplay with plants grown under abiotic and biotic stress conditions.
- Human dehydration and replenishment therapy research or case studies.
- Structured water effects for enhancing human immunity.
- Methods and techniques for generating structured water at small and large scales.

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