A Paradigm Shift in Life Sciences: From Molecular to Electronic Biology – A Breakthrough in Protein and DNA Analysis

GALVESTON, TEXAS, USA, September 6, 2023 /EINPresswire.com/ -- In a groundbreaking development that holds transformative implications for life sciences, pharmacy, and biomedicine, researchers are pioneering new methodologies that emphasize the electronic properties of biological molecules. The new approach suggests a revolutionary shift from traditional molecular biology toward Electronic Biology.

A Revolution Four Decades in the Making

Forty years ago, a groundbreaking article introduced the Informational Spectrum Method (ISM) for analyzing the biological properties of proteins and DNA (https://pubmed.ncbi.nlm.nih.gov/2581884/). This method, which utilizes the Electron-Ion Interaction Potential (EIIP), determined only by atomic numbers of elements (https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.29.105), has proven to be a powerful tool for various biological applications. Its utility ranges from protein-protein interactions, biological effects of mutations, design of novel proteins and functional mapping of DNA sequences (http://electronicbiology.org/biomedical-articles/). Remarkably, all these analyses are conducted solely based on data from the Mendeleyev Periodic Table and primary structure of sequences.

A Milestone in COVID-19 Research

Significantly, the ISM method was also employed in the first-ever published article about the SARS-CoV-2 virus, which causes COVID-19. Published in January 2020 (https://pubmed.ncbi.nlm.nih.gov/32419926/), the study utilized ISM to identify ACE2 as the virus receptor, propose cell-to-cell transmission as a route of infection, and identify a highly conserved domain of the viral antigen as a potential vaccine and therapeutic target. Remarkably, these insights were derived immediately after the first sequencing of the SARS-CoV-2 virus, using only data from the Periodic System of Elements

Unveiling the Future: No Structure, No Problem

Recently, a team of researchers at the University of Gothenburg announced an innovative technique for identifying proteins not based on their 3D structure but on their amino acid count

or atomic composition (https://www.cell.com/iscience/fulltext/S2589-00422301053-2). This method offers a faster, easier, and more reliable approach than traditional methods that rely on molecular structure. Compelling experimental evidence has recently emerged, indicating that precise recognition and targeting between biological molecules can occur at distances beyond 1000 Å, independently of the 3D structure (https://www.science.org/doi/10.1126/sciadv.abl5855). These findings underscore the critical role of the electronic properties of molecules in their biological function, further substantiating the emerging field of Electronic Biology (http://electronicbiology.org).

Conclusion

This revolutionary shift from molecular biology to electronic biology leverages untapped knowledge that is crucial for accelerating advancements in life sciences, pharmacy, and biomedicine. This change in perspective promises to unlock new avenues of research and development, setting the stage for unprecedented discoveries and applications.
By bringing attention to these pivotal studies and discoveries, we invite scientists, researchers, and industry experts to partake in this significant shift that will redefine our understanding of biological systems and allow breakthroughs in the development of new drugs and therapeutic approaches.

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