There is a vast variety of subjects in life sciences that a physics-based approach and thinking can contribute in a meaningful way. Examples include experimental techniques such as those used in crystallography and in single molecule spectroscopy - either optical or involving measurement of force. Other examples include numerical simulations at the molecular level as well as modelling of biological systems in the spirit of networks and complexity theory.

EPL has published on many topics in life sciences. For instance, the EPL papers have used the network-based approach to subjects such as dynamic behavior of neuronal networks in the context of diseases (Parkinson’s disease, seizures, etc.) or regular neuron spiking activities. Related network models have been designed in EPL papers on the cardiac signals, spread of epidemics and infections, genetic expression patterns, chemical reactions, transport (including polaronic) etc.

Another important EPL-covered area is understanding of the mechanisms of swimming at micro and nano scale: how are symmetries of a dynamical system broken to provide propulsion?

Even though physicists tend to view the life related matters in terms of molecules, EPL has published on many subjects that pertain to macroscopic modelling (ecology, sociobiology, evolution and fitness, functioning of hearing, growth of tissues) and basic issues of thermodynamics (the entropy production, fluctuation-dissipation relations in living cells, action of molecular machines, validity of the detailed balance in ecosystems).

Molecular-level studies, both experimental and theoretical, have revolved around the issues of single-molecule manipulation of proteins, DNA, and simple polymers. There has been a substantial coverage of topics involving the DNA: the DNA complexation with histones, denaturation, interactions with lipids histones, closure of DNA bubbles, intron-exon segregation, conversion of B-DNA to Z-DNA, looping. There have also been studies of conformational changes in proteins such as occurring during folding and of the protein-protein interactions.

The biggest draw of EPL has turned out to be in the area of the biomembranes, considered both within molecular and continuum vesicle-like models/systems. The biomebrane-related topics included: protein-membrane interactions, protein translocation through pores in membranes, adhesion, transformations during cell motion, formation of ripples, properties of water near membranes, ion pumps and so on.

EPL has truly become a journal which covers important subjects in biophysics and medical physics. Even though it carries both experimental and theoretical papers, it gets more submissions in the latter. It is hoped that the future will bring in more balance in this respect.

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