

Stem Cell Conference 2019_ From the RNA world to protein and human mass societies: Self similarity and giant T patterned strings as candidate organizational principles_ Magnus S Magnusson_ University of Iceland_ Iceland

Magnus S Magnusson

University of Iceland, Iceland

This talk concerns spatial and temporal self-similarity across more than nine orders of magnitude, implicating a self-similar fractal-like pattern, called T-pattern, a natural or pseudo-fractal pattern, recurring with statistically significant translation symmetry. The T-pattern, the core of the T-system of structural concepts is a result of an ethological (i.e. biology of behavior) project started in the early 1970's primarily on social interaction and organization in social insects and primates including humans inspired mainly by the ethological work of Lorenz, von Frisch and Tinbergen for which they shared a Nobel Prize in Medicine or Physiology in 1973. Notably, during this context, their smallest subjects were social insects and thus no consideration of self-similarity. The present project has focused on developing time pattern definitions with corresponding detection algorithms resulting in the T-pattern type and the dedicated THEME software, which has allowed their abundant detection in many kinds of animal and human behavior and interactions and later in neuronal interactions within living brains, thus showing T-patterned self-similarity of temporal interaction between and within brains. The RNA world invented its evolving external memory as the purely informational giant T-patterned DNA strings and now there is only a DNA world. RNA typically is a single-stranded biopolymer. However, the presence of self-complementary sequences within the RNA strand results in intrachain base-pairing and folding of the ribonucleotide chain into complex structural forms consisting of bulges and helices. The three-dimensional structure of RNA is critical to its stability and performance, allowing the ribose sugar and therefore the nitrogenous bases to be modified in numerous alternative ways by cellular enzymes that attach chemical groups (e.g., methyl groups) to the chain. Such modifications enable the formation of chemical bonds between distant regions within the RNA strand, resulting in complex contortions within the RNA chain, which further stabilizes the RNA structure. Molecules with weak structural modifications and stabilization could also be readily destroyed. Similarly, billions of years later, humans invented their evolving external memory as the purely informational T-patterned strings (T-strings) of written language that have made possible, in a biological eye-blink, the development of modern science and technology and the creation of extremely populous and complex human mass-societies, the only mass-societies among large-brained animals and recent discoveries of the nanoworld of cells and molecules. Protein and human mass-societies seem to be the sole ones using such durable giant T-strings external to their citizens. Human and protein masssocieties create their specialized citizens using various sub-sections of such T-strings, not found,

notably in social insect societies. Extensive temporal and spatial self-similar patterning thus seems to exist in form and function from nano to human temporal and spatial scales suggesting structural, functional and organizational principles.

Biography

Magnus S Magnusson, Research Professor. PhD in 1983, University of Copenhagen. He is the author of the T-pattern and the T-systeem model, initially focused on the real-time organization of behavior, which forms the basis of his corresponding dedicated pattern detection software THEMEm. He has co-directed a two year DNA analysis project. He has published numerous papers and given invited talks and keynotes at international mathematical, neuroscience, proteomics, A.I., bioinformatics and science of religion conferences and at leading universities in Europe, USA, and Japan. Deputy Director 1983-1988, Anthropology, National Museum of Natural History, Paris. Then he has repeatedly invited temporary university Professor in psychology and ethology (biology of behavior) at the University of Paris (V, VIII & XIII). Since 1991, founder and director of the Human Behavior Laboratory, University of Iceland. He Works in formalized collaboration between now 32 European and American universities based on "Magnusson's analytical model" initiated at University René Descartes Paris V, Sorbonne, in 1995.

This work is partly presented at 11th World Congress and Expo on Cell & Stem Cell Research on March 25-26, 2019 held at Orlando, USA