

# A Turning Point

## Human Life Science Demands Unifying Sciences of Body Mind Spirit

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*Abstract:* - The biological research in the last century has taken the approach of the dissection of systems into parts, study the parts in a defined setting with controlled parameters, gather information of the parts in separate settings, identify the functions of the parts in the defined settings following a defined hypothesis, and then draw conclusions regarding the function and functional mechanisms of the parts in the defined system. Such a mechanical approach is based upon the assumption that we can decipher the life phenomenon of human being via gathering more and more data on the molecules, using more and more advanced detection technology and computational technology. However, when we peak into the amazing world of the molecules, we realize that we are observing a cosmic drama in the microcosm, with the molecules as the living beings. The ultimate understanding of the health and illness of a human body demands the understanding of the laws that underlie the deeper connection between human body, mind and human spirit.

*Key-Words:* - mind, body, spirit, biology, Falun Dafa, Falun Gong

The biological research in the last century has taken the approach of the dissection of systems into parts, study the parts in a defined setting with controlled parameters, gather information of the parts in separate settings, identify the functions of the parts in the defined settings following a defined hypothesis, and then draw conclusions regarding the function and functional mechanisms of the parts in the defined system. For example, to understand the biology of bone, bone as an organ is first reduced to the level of tissue, which can be examined under microscope after sections and staining. Different bones can be grouped based upon the difference at the tissue level. To understand how bone is formed, the studies of the morphology of bone at the tissue level are not adequate. So bone tissues are further studied by examining the parts that form the bone tissues: the different types of cells, such as the bone-forming osteoblasts and the bone-absorbing osteoclasts. To study these cells, the osteoblasts and osteoclasts are then isolated from the bones, placed into petri dishes that contain defined concentrations of inorganic and organic compounds. The properties of these cells in such a defined artificial environment are studied. The studies at the cellular

level are also driven by defined hypothesis. For example, a researcher first would raise a hypothesis such as: Compound A can alter the ability of osteoblasts to make bone matrix. Then the studies will be carried out to specifically test the ability of the compound to alter the amount of bone matrix, in a defined setting with specific concentrations of chemical compounds. In such a defined setting, researchers further ask the question: how the osteoblasts receive the instruction of compound A from outside of the cell and then relay such a signal from compound A to the cell to tell the cell to make new bone matrix? To understand this question, the researchers would then study what cell is made of. By breaking open the cells, researchers then find that cells are made of lots of molecules, which form different micro-systems (organelles), each consists of a distinct structure, composition and functions. The make-up of each micro-system, the organization of each system and the rules of the operation of each system are approached again by breaking these systems up and study each system in a defined setting. For example, to study how osteoblasts can respond to compound A to make a bone matrix component, cells are broken up and

then proteins that can bind compound A are sorted after. Once the “receptor” for compound A is found, then the next question is: how the receptor functions to talk to the rest of the proteins in the cell. Such studies belong to a new field called Signal Transduction. Since cells are immersed in a “protein soup”, each of which can initiate signal transduction, which is very complicated (see below), different research labs generally focus upon one extracellular signal molecule. The current state of biological research can be described as different research stations working on different molecules and different pathways. Each molecule works through talking to several other proteins, via protein-protein interaction, which appears to be dictated by their intrinsic affinity attributed by their composition. Such interactions, either transient or permanent, occur in a highly ordered fashion along the axis of time and within a defined space. Any pair of protein-protein interaction leads to some degree of transient or permanent imprint and thus serves as a new manifestation of the signals upstream. For example, some protein-protein interaction induces a quite significant change of the shape of a protein (conformational change), which then has a new gained affinity to bind to proteins that it could not bind prior to the interaction. Such an “imprint” would be very transient if the dissociation of the interaction at the first place would allow recovery of the original conformation of the protein. It would be rendered less transient if the interaction of the third protein stabilizes the new conformation. In another case, the interaction of one protein (A) with a second protein (B) could lead to a chemical reaction that adds a phosphate group to (or take off a phosphate group from) the protein (A). The change can be again more or less transient, dependent upon the availability of the enzymes that can reverse the original modifications. In a third case, the interaction of one protein (A) with a second protein (B) could lead to a chemical reaction that renders the addition of another protein, such as the well known ubiquitin protein, which is a small protein that made in high abundance. Such a modification, called ubiquitination, can lead to alteration of the ability of the protein A to interact with other proteins, the alteration of the localization of the protein, or the ultimate destruction of the protein, depending upon several different ways the ubiquitin protein is added onto protein A. The change can be again more or less transient (except the destruction of protein A, which is final), dependent upon the availability of the enzymes that can reverse the original modifications. So, for any given protein, they have the following states: 1)

newly made, original state; 2) participates in interaction with another protein but unmodified; 3) modified; 4) degradation. In an interesting way, these stages are very similar to the life stages of a human being. For a specific protein, it can interact with many different proteins, but whether such interaction occurs or not, is regulated by many extracellular and intracellular factors. Again, for any protein, it can be modified in many different ways, and these are also regulated by many different factors from inside and outside. The protein levels and localizations are also dynamically regulated by these factors. Because of this, the communications between different proteins are dynamically regulated and ever changing. For example, protein A, at concentration 1 can interact with protein B when signal 1 is present. However, at concentration 2, it can interact with B and C when signal 1 is present. At concentration 3, it can interact with only C and D when signal 2 is present. At concentration 4, it can interact with B and D if signal 1 is present.... All these will again be different when signal 2 is present. All these again will be altered when signal 3 is present... All these will again be different when signal 1 and 2 are together present...All these will be different if signal 1 occurs before signal 2...All these will again be different in a different cell type since the interaction partners for A is different in the different cell types...Imagine a cell is immersed in one hundred different signals, whose level is also constantly changing, with more than 100 receptors on the cell, whose level is also subjected to changes, and the receptors are connected with immediate interaction partners, whose levels and interactions are also subjected to dynamic regulations, and these immediate interactors again interact with secondary interactors, which again interact with tertiary interactors....To add on top of the complexity of the regulation of different molecules, there is another factor that escalate the complexity to a new level: the involvement of a same protein in multiple regulations, such that the change of one molecule will simultaneously lead to the change of a net work of molecules, thus rapidly spread out into changes in many different molecular events of the entire cell. Now, if we remember to place such a complex picture of a cell back into where it belongs in a tissue, which involves the communication between a large group of different cell types, and then remember to place the tissue back into an organ, which involves the co-ordinate communication between different tissues, and then place the organ back into the body, which involves the communications between each organs, then we

should have a sense of the immense and almost infinite complexity of the biological system at the level of an organism.

For human body, the complexity is further escalated to a uniquely high level. At the level of a human body, the communication signals are no longer easily detectable by physical means. These human-unique communication “signals”, such as word, music, painting, number, are sent and received between human individuals in various forms. Human being has a set of high organs that can decipher meanings from symbols. The reception of these symbols triggers cascades of events that quickly manifest at all levels, from organ, to tissue, to cell, and to intracellular molecular events. The “readouts” of these signaling events are only known to the individual who experiences the processes and can be described by the individual as abstractive concepts, such as love, hate, fear, anger, sad, happy, which currently belong to the category of social, psychological and spiritual realms of studies. The “Signal Transduction” at the human body level is dynamic and extremely powerful and complex, but the studies of the nature of the “Signals” and the nature of the “readouts” are currently belong to many other different fields in a fragmented way and are almost totally placed outside of the field of Biology, or the field of Conventional Science. In fact, most of our current knowledge in the field of Biology is derived from studies of non-human subjects and using artificial man-made systems. This then raises an important question about what approaches we shall take to study Human Biology and the directly relevant field of Human Medicine.

Currently, the overall direction we are taking appears to be a mechanical one. This approach is based upon the assumption that we can decipher the life phenomenon of human being via gathering more and more data on the molecules, using more and more advanced detection technology and computational technology. For example, the highly vested human genome project and the post-genome science aim to decipher life phenomena through the understanding of all functions of all human proteins. How such a grand task can be accomplished? If the function of a gene correlates with a fixed function of its encoded protein, then there is a hope for us to understand the functions of all genes. However, what we have learned in the past ten years have already clearly pointed that each protein is multifunctional. Furthermore, the function of a single protein is almost meaningless, if it is taken out from the context of its interaction with other

proteins in different cell, at different time, and under different conditions. That is, the function of a protein is not an absolute one, but only manifests in a specific time-space. If we view life phenomena to be a beautiful piece of music, then the function of each music note cannot be understood by isolating it from the rest. Another way to understand this point is to consider each protein to be a Chinese Character. While each Chinese character has a specific meaning, but the character can be used in many different combinations with many other characters to create new meanings that are not innate to the original character. Thus, a mechanical approach suffers from a fundamental flaw: a life phenomenon cannot be reduced to a life-less one. This is the very foundation for a system approach to all life phenomena.

In everyway, the science of biology has been a science of description of life phenomena with an attempt to understand the laws that govern these phenomena. Our approach has been a reductionism-based mechanical approach. Many of the phenomena we have described and we have used to formulate our current understanding of the laws that govern the life phenomena in fact are artificially created and mostly are not validated to apply to the understanding of the life phenomena of human beings. It has become more and more clear that the later is vastly different from that of animals. The life phenomena of human beings are predominantly regulated by signals that cannot be understood by a reductionism-based approach, since these signals are not “chemical”, “physical”, “biochemical” or “mathematical”. Many of these signals are invisible to our eyes and difficult to be quantified by physical instruments. These signals are sent and received by human beings via different vehicles. Written language in different forms is one of the most well recognized vehicles. Many of the artistic expression of human spirits can be viewed as vehicles of signals: music, painting, sculpture. If we view a human body as a cell in the big picture of human society, then these abstractive signals of language, music, painting or sculpture, serve the role of cytokines in the “tissue” of the human society and constantly and dynamically regulating the various phenomena of life at the society level. One level above, which corresponds to the level of an “Organ”, would be the Earth system with many different “Tissues”, such as those formed by microbial, plants and animals, other than those formed by human beings. The level above the Earth system is our galaxy. The level above the galaxy is what we might call a Universe. So, if we truly take

the system view all the way, the life phenomena of human beings is an integral part of a cosmic drama. Can any super computer simulate such a drama?

As seekers of the Truth of life phenomena and the laws that govern the life phenomena of human beings, biologists have walked a long journey of reducing life phenomena all the way to that at the level of molecules. But when we peak into this amazing world of the molecules, we realize that we are observing a cosmic drama in the microcosm. The molecular activities of a human being are controlled by so many layers of signals, each are regulated by the level above and together are an integral part of a cosmic system. This reminds me of an old saying from the ancient time of China: “The heaven and a human being are One” (Tian Ren He Yi). This is the insight gained by ancient Chinese sages who reach out to universal Truth through a much different approach: a direct spiritual encounter via a path of self-reflection and self-perfection via ardent self-discipline. We are living in a special time when the Science of the West of modern time is meeting the Science of the East of ancient time. The former took a long journey of seeking truth from observing and dissecting our external physical world via an intellect-based, technology-based reductive approach while the latter took a system approach and directly faced the nature of human mind and heart. As stated in the main teaching of Falun Gong ([www.falundafa.org](http://www.falundafa.org)), an ancient cultivation practice well known for its amazing health benefits, “Ancient China’s Science was different from the science we’ve learned from the west in modern times. It took a different path and could bring about a different scenario. So we can’t use our current ways of understanding things to understand ancient China’s science and technology, because it focused on the human body, life, and the universe, they studied these things directly, so it took a different path. Back then school students put value in meditation, they emphasized good posture in sitting, and it was considered important to control the breathing and direct qi when they picked up their brush-pens. People in every line of work made a practice of cleaning the mind and adjusting the breathing, and the whole society went by that.” (“Zhuan Falun”, Lecture Seven, second to last paragraph”.)

If we agree that the molecular events of a human being are regulated by signals that are primarily understood and perceived by human mind, then we shall predict that human mind is the primary regulator of human molecular events. The quality of

human mind, as we know, is influenced by human emotions, desires and many other aspects of human-unique factors that together can be categorized in the realm of human spirit. Thus, the studies of the role of human spirituality in human life phenomena, even reduced to the level of the molecule, are urgently needed. Many of the current key problems we are facing in the area of human diseases and human health care clearly reflects such a need and may only be resolved from incorporating human spirituality into the current paradigm.

So the future of human life science and human medicine will need to face some fundamental questions that have been raised in Religion, Metaphysics and Cosmology. After all, it is the fragmented human mind that creates different fields. If we wish to take a system approach to human biology, we need to take a system approach to life, in general. This means that the study of human biology cannot stand independent from the study of human spirit. The ultimate understanding of the health and illness of a human body can only come from the understanding of the laws that underlie the deeper connection between human body, mind and human spirit. Such a goal, therefore, calls for the end of the old paradigm of the separation of the science of human body from human mind and spirit. The field of human life science might be the ideal field for the unification of all scientific disciplines, which, only by working together as one “body”, could make a leap forward towards the understanding of the fundamental law of life itself.