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Opinion

Fundamental questions?

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I often think about certain basic questions about the universe and our place in it. To these questions either we have no answers at present, or our answers are incomplete and imperfect. We have steadily progressed in our knowledge of reality over the last one hundred and fifty years. We have now begun to understand the structure of an atom, the fundamental building blocks of matter. Most of an atom is empty space with particles concentrated in an extremely small area. If the fundamental building block of matter is mostly empty why does our world feel so solid? Why do materials around us have the properties they exhibit? How do changes in the number of fundamental particles within an atom change its properties? How do atoms come together to form molecules? How do molecules form other structures? How do complex structures form? What keeps them together? A recent article mentions that each dramatic new discovery in physics has revealed new features of the universe and new mysteries [1]. Among these are also why nature is comprehensible to humans and how is the cosmos related to humanity? [2].

These questions require trans, inter, and multidisciplinary investigations. Exploring and proving the theories about the universe requires a significant investment of resources and expertise. As an example, the standard model of particle physics predicted the existence of the Higgs boson however, the total cost involved in finding the particle was about USD 13.25 billion [3]. The practical benefits and payoffs from fundamental research are also enormous. The entire modern field of electronics developed from fundamental research into the structure of atoms at the beginning of the last century. As humans, we have always been curious to answer these fundamental questions, and these are linked to the very fabric of our intellectual and even technological progress.

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Is there a creator of this universe? As humans, we often approach this question according to our cultural and religious backgrounds. From a Christian or even a Semitic viewpoint, God has been mentioned as being patient, creating an exuberant fullness, and providing freedom to his creation. God uses causal links and seemingly random events to steer the course of his creation [4]. I have been fascinated by the Kardashev scale of civilizations and especially by a type 7.0 civilization that is more God than human and can control the entire metaverse [5]. Is this something humanity can achieve far in the future? Most current models of cosmology do not rule out a creator. The anthropic principle states that the values of many important physical constants seem to favour the origin of life and may have been specially created to support.

At a very basic level, I often wonder about the differences between living and non-living objects. In school, we studied the characteristics of living things and an important one mentioned was they grow and reproduce. But what happens at the level of a molecule or an atom that results in life? Is there a spark, a fundamental information that gives rise to life? What change happens at the atomic and subatomic levels? How do all the atoms in a complex life form interact? At the level of subatomic particles, we know there are several strange phenomena like the uncertainty principle, the particle being in multiple states at once, and quantum superposition. When atoms come together and form a living being or a non-living object why do we no longer see these phenomena? Why can a person not be in two places at once? Why do objects not suddenly vanish and appear in some other place or time? Why are we able to measure both a person's position and his/her velocity if the person is moving?

A very fundamental question is what is consciousness? Is consciousness a phenomenon shown only by humans and other anthropoid apes? Or is consciousness also shown by other life forms? Are lower life forms conscious? Does consciousness imply a sense that a person is separate from the universe around him/her? When does a human child become conscious? Is it a gradual phenomenon (a developmental one)? The atoms and molecules that form the basis of everything on Earth may have been created in stars over billions of years. On Earth, we mainly rearrange and recombine atoms to form new molecules. What is our connection with the universe? How are we related to the cosmos? Have we lost the connection that we may have once shared?

How does a baby develop? How are all these molecules and structures produced? How does a child grow? Why do we look like our parents? What is the role of the genetic code and of epigenetics in determining who we are or who we will become? We know bits and pieces here and there, but our knowledge is incomplete. Modern cosmology may have come around to accept and incorporate some of the ideas and concepts put forward by our South Asian ancestors. The mind can play an important role in determining the structure of the universe. There are multiple theories, and some talk about multiple universes and multiverses. Sages and yogis had claimed to change the structure of matter through thought. There have been phenomena like travel across vast distances, time travel, and occupying the body of another individual described in many epics and other accounts. Modern cosmology still in development may

not rule out these phenomena. Our world may be much stranger than we think and has infinite possibilities.

Modern Western philosophy reduces a complex structure to its component parts. The premise is that by breaking down a structure into its parts and studying their interactions we may be able to understand the whole. While there have been notable successes and our lives have improved, with the increasing complexity of science, this understanding is becoming increasingly difficult. The human body has billions of atoms and molecules that constantly interact with one another. It seems nearly impossible that we will be able to gain knowledge of a human being by studying these complex interactions.

What exactly do we mean by understanding? What role will Eastern philosophical systems that stress the holistic nature of reality and perception of the whole, play in our current and future understanding? Are there other ways of understanding reality other than linear Western thought? Western philosophy has become more accepting of other knowledge systems as reality is increasingly revealed to be richer and more complex.

What is health? What is illness? How do we treat sickness? What happens when we ingest a medicine? What changes at the atomic and molecular level does this foreign molecule cause? We have tried to provide a simplified picture and mention most medicines act either through receptors or through enzymes. This is an oversimplification. What happens at a quantum level? Is it important for us to know? If we remove a visible tumour or an infective locus, is the person cured? Does illness produce changes to the structure of atoms and subatomic particles throughout the body? Are illness and health determined by quantum effects? What is the connection between the mind and the body? Can the human mind cure illnesses? Our knowledge of the human brain has just begun developing. We still know very little about the brain's functioning and how to maximize its potential.

Universal love is an expression of the harmony of everything and everyone in the universe. What is universal love? When does love become universal? Can we love universally or can love only be selective? What are the characteristics of universal love? What are the symbols of universal love? Why is universal love important? At a very fundamental level, we are all the children of the stars. I was a great fan of the television series 'Cosmos' hosted by the famous astronomer, Carl Sagan. He mentions how the material that forms all of us, humans, animals, plants, and all forms of life was formed within the core of stars during successive nuclear reactions and was released during the explosion accompanying their death. At a very fundamental level, we are all related closely to each other. Universal love makes perfect sense considering our shared history and our origins. As an individual you are a part of everything; each person you know and each person you meet are connected to one another. We are all spiritual beings in human form with an abundance of love, energy, and universal knowledge [6]. A universal love scale to measure universal love has been developed and the authors mention universal love as an experience of unity with others and the whole of existence [7].

What is death? Is death the end of life? What happens at the time of death? What happens

after death? Is there rebirth? Is heaven or hell real? Is there a soul that is separate from the physical body? What is the soul? If the soul is immortal why do we not remember the knowledge and skills that we had learned in our past lives? Why is there a loss of information if rebirth is indeed a possibility? Can we prevent or reduce this loss of information? Can we lengthen life? Is immortality a possibility?

These are questions that everyone should ponder. Our health and well-being are intimately linked to the universe and the fundamental structure of our bodies. Knowledge of the basic structure of the universe and of our body's functioning can open new doors and bring about rapid technological advances. The theory of everything is the ultimate theory of the universe and is a set of equations that will describe every phenomenon that has or will be observed [8]. However, a group of authors mentions the central task of theoretical physics today is no longer to write down the ultimate equations but rather to catalogue and understand emergent behaviour in its many guises, including potentially life itself. And this can be called the study of complex adaptive matter [9]. In the human body, the adipose tissue can be recognized as an active endocrine organ secreting adipocytokines. More adipocytokines are being discovered and are considered important surrogate markers to reflect cardiovascular risk and as a good biomarker in atherosclerosis, systemic inflammation, obesity, and diabetes. They are associated with insulin resistance, obesity, lipid profile, tumour pathogenesis, endothelial dysfunction, etc., and may be involved in the pathophysiology of a wide spectrum of diseases and can open novel clinical diagnostic and therapeutic options [10].

Thus, we are making steady and increasingly rapid progress but whether we can answer these fundamental questions remains open. Another troubling question to me is why many of the ancient civilizations did not continue to develop science. Why did their progress plateau and in many cases regress? If modern science developed on earth in the past we do not yet have an indication of it in the fossil and other records. Is progress inevitable or are civilizations cyclic with steady growth, a long peak, and then an inevitable decline? So many questions and so few answers!

Author's Contribution

Conceptualizing the manuscript, doing the review of literature, writing the manuscript, and revising it for critical intellectual content. He has approved the final published version of the manuscript- ***PRS***

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