

## Editorial

# Where Is The Reality?

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There is no reality in this world. The sub-atomic world does not conform to linear mathematical laws being followed by medical researchers. It is time we changed to the new science of non-linearity to get better results in medical research. We need to follow the path taken by quantum physics in the last half a century. The “doctrine of probabilities” plays a leading role in human affairs. Human body works as a whole.

Where is the truth? What is the reality? These are the two million-dollar questions that modern medicine begs for an answer. As in any other field, the simplistic reductionist scientific answer would be that there is no reality. However, medical science differs from other sciences in that it directly affects human health and our very existence on this planet. From that point of view what we do in medicine should be as close to reality as is possible. Medical interventions should be regularly audited, lest it should damage human health instead of promoting it. Audits in many areas did show us in poor light lately! Rather, they have thrown up the possibility that we may even be harming human health in certain areas.

Modern medicine, in its present form, was accepted as a science in the European Universities in the twelfth century. Ever since that time medicine has been riding piggyback on natural sciences. The latter depend on linear mathematics. All that science does is to make mathematical models of the happenings of this universe to explain them and then hope the formulae, thus derived, would work in real life situations. This happens very rarely in reality. Mathematical formulae are accurate in themselves, but when applied to the dynamic universe they go wrong. This is the bane of modern medical science and research. However, among the sciences there has been an exception in the case of physics in that it deviated from this normal linearity of conventional physics to the quantum level in the latter part of the twentieth century. This has been a quantum jump. The new physics of quantum mechanics had many

detractors. Albert Einstein was one of the leaders of the latter group right up to the time of his death. Medical sciences, however, remained with other natural sciences and their linear mathematics.

### Pascalians Vs Cartesians:

When medicine started as a science in the European universities, it followed the Pascalian model of “Doctrine of Probabilities”. Blaise Pascal, a parish priest, came up with these “doctrines” when asked to arbitrate in a game of “dice.” All other natural sciences were also following the same logic. However, in the seventeenth century, a brilliant French mathematician, Rene Descartes, changed all that with his proclamation of the *cogito ergo sum*. He cut off the human body (*res extensa*) from the human mind (*res cogitans*) and declared that everything depends on logic and not on probabilities. Even scientists accepted this as the last word. Most people became converts to this new line of thinking.

However, in one area of science, physics, things changed for the better in the early part of the last century with the advent of the new quantum mechanics. This was very much resisted by the big names in the field at that time. Albert Einstein, who swore by his ‘Theory of Relativity’, would not, and could not, get himself to agree with the new thinking. “Anyone who is not shocked by quantum theory has not understood it,” wrote Niels Bohr. Without quantum physics, chemistry would still be alchemy, molecular biology will not make sense, and the DNA would have been of no use to us.

Erwin Schrodinger, an Austrian, brought in the new thinking, in the mid-1920s. His “cat hypothesis” was a brilliant exposition of an exceptional brain: an imaginary cat is kept in a closed space along with a decaying atom, which as and when it decays, sends out a signal to a phial of poison to kill the cat. Unfortunately, the probability of the cat getting killed is only fifty-fifty. Without looking into the box all that one could predict is

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that either the cat is dead or alive. In other words, it is impossible to know in advance and to predict the decaying rate or otherwise of a radioactive atom. "According to the theory, neither of the two possibilities open to the radioactive material, and therefore to the cat, has any reality unless observed," wrote John Gribbin in his celebrated book *In Search of Schrodinger's Cat*<sup>[1]</sup>.

If that were so in an atom, what of a dynamic system like the human body? Doctors have been predicting the unpredictable future of a human being assuming linear relationships, based solely on certain parameters of the human body, ignoring the mind and the genes! More dangerous have been our interventions to alter those initial states, in an otherwise healthy person, with the hope that changing the initial state would maintain the benefit over a period of years and decades. Here is the crux of our problem in medicine. Most of such interventions in healthy people have not borne fruit in real life situations! Lowering healthy people's raised blood pressures and blood sugars have not been useful in the long run in apparently healthy asymptomatic people. Recent audits have shown that this kind of linear interventions have done more harm than good!

The probability of the raised blood pressure in a healthy young man damaging his organs in the long run, is fifty-fifty like that of the 'cat in Schrodinger's hypothesis'. In the human body, apart from the probability scores mentioned above, there are many other imponderables that come into play in the final outcome of any intervention, very much akin to the "Butterfly Effect" of Edward Lawrence.

Using the deterministic predictability model of Newtonian physics and Einstein's theory, we have been conducting research both in diagnosis and interventions. We have been carrying on for so long. Conventional physics of inertia, acceleration, action-reaction relationships and the law of gravity has helped many innovations like the jet engine, rockets to outer space and many others. But the new quantum physics has turned this whole universe of scientists upside down. Similarly, conventional natural sciences did help medicine to grow to a certain degree but not beyond a particular point. If medicine were to learn its lessons from quantum physics, we would have had a quantum jump in our understanding of the human body and its functions.

One or two examples might be in order. We presume that blood pressure is a product of cardiac output and peripheral resistance, based on the Ohm's law of fluid flow. This law applies only to flow in straight tubes. There are no such tubes in the human body. Many drugs that we devised to

control raised blood pressure based on this definition eventually failed to deliver the goods in the long run. Alpha-beta blockers should have been the best panacea for raised blood pressure; but, alas, they failed. On the contrary, beta-blockers, which raise the peripheral resistance, work well to lower raised pressures<sup>[2]</sup>!

Emergency interventions do work wonders in medicine. Modern medicine has been a boon to mankind in this area. When we come to long term predictions and interventions based on the latter; we have failed miserably. A recent doctors' strike in a far away country for higher pay, wherein they agreed to work only in emergency situations and avoid interventions of any kind in non-emergency set-ups, did lower death rate and morbidity in society remarkably. Let us learn our lessons from quantum physics to look at the human body as a whole. We should avoid long-term predictions in healthy people using a few body parameters. Getting to know the physiology of the human body as a whole, and taking into consideration the environmental factors influencing the body, would get us on the way to progress.

Dynamic systems have rhythms that run their physiology-the circadian, ultradian and the infradian. They depend on organs working in tandem, inter-linking one with the other. This concept is called "mode-locking" in modern particle physics. Many such studies have been carried out in the recent past. Our group has been studying the heart rhythm-breathing relationships, hereinafter called the heart rate variability (HRV), for well over three decades. The initial results have been very encouraging and more effort in this direction, using the "Doctrine of Probabilities", would take us further down the road to scientific accuracy in human affairs<sup>[3]</sup>.

There would be stiff resistance from the drug and the technology lobbies as their "rice-bowl" would be threatened by this direction of research<sup>[4]</sup>! Even when quantum physics realized the folly of conventional physics and came up with the Cat Hypothesis, the all time "great" Einstein himself ridiculed it and kept on refusing to accept it till he died. He wrote: "God does not play dice with the world." He was probably referring to the "probability model" of quantum physics. He thought physics was going back to the wisdom of Blaise Pascal. "History repeats itself," wrote Cicero, the great Roman thinker. "If you do not learn from history, you will have to relive history" he added. How true! Science has come one full circle from the time of Blaise Pascal back to his old theory of probabilities. How I wish we medical scientists could understand this for the good of humanity at large.

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