Science and New Sciences

Consciousness research: where to revive

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Abstract

Ask this big question, why mainstream scientists have not engaged the studies of consciousness for so many decades? Although I have only attended a few seminars and symposia on consciousness research, my extensive reading and in depth searching in this field may have positioned me to identify critical pathways that may provide insight toward solving the mystery of consciousness. In this essay I reporte my personal experience of learning: 1, the opinions from mainstream scientists who are not engaging the research but envisioning negative future of consciousness study, e.g. genetics and experimentalism; 2, scientists or philosophers who are engaging consciousness research with very diverse and positive opinions; and 3, some recent work at DNA level that related to my research. My proposed definition of biological consciousness, or in short, bioconsci, and described innovative method to study it, may help to evolve consciousness studies come to mainstream. To revive consciousness research, I believe we should take these two steps, namely to refine the concept of consciousness and to apply new ways of observation, hence to adapt or even advance mainstream research. Bioconsci has also explained mental consciousness critically, through evolutionary biology, eg, from virus (DNA or RNA) through all ranks to human. I also propose that it is about time to recognize some fundamental truth, such as consciousness, including spirit and belief is a physical existence, a reality with purpose. The hard problem of consciousness may be explained based on this new view. It is about the time to prepare ourselves for fundamental advances in science, philosophy and other related fields.

What is the current status of consciousness research? Where and how to revive consciousness research? Let me begin with the mainstream scientists' opinions.

Opinions from mainstream scientists

Nobel laureate Sydney Brenner has delivered a clear message: "I think consciousness will never be solved but will disappear. Fifty years from now people will look and say, 'What did they think they were talking about?'" I personally heard his comment the past spring at MIT symposia on May 3, 2011. I also had a few words of chat with him after one symposium. Dr. Brenner is not alone with his negative opinion on consciousness research (there will be more report on this

topic in this essay). Although in his bibliography I could not find any of his research directly related to consciousness, Dr. Brenner's recent article of proposal to model complex biology system at cellular level seems to me indirectly related to consciousness research.[1] Furthermore, Dr. Brenner's getting versed in the consciousness study could be quite simple and easy. Would he only follow up with his life time pal Dr. Francis Crick, who made up his mind to tackle the mystery of the consciousness since 1960s, or simply asked him every once a while, what's new? No problem for an update from Dr. Crick. Dr. Crick died in 2004, with his manuscript on brain research in his hand that he was trying to finish and make corrections.

Dr. Crick's and many other scholars' conclusions on consciousness research influenced academic policy makers to decide consciousness study to be a philosophical discipline. Therefore, for many years, biology books, including current standard biology textbooks, including books of cellular and molecular biology, do not have chapter or even a few words dedicated to consciousness studies. In the same time, philosophical journals, books, often with large volumes on the studies of consciousness have been published over the years.

Although many scientists, including experimental scientists (for example Crick himself), psychiatrists, psychologists and other clinicians have also worked on consciousness research, they were not recognized by mainstream scientists, especially, experimentalists. An exception is that the clinical related research (not basic research) on consciousness has been well recognized by mainstream science. Traditional dogma states that consciousness is mental activity, not a physical or material entity. Mental and physical have bee always separated. Spirituality or belief is also separated with mentality or physicality. Both materialism and physicalism reject spiritualism. The study of consciousness not only has problems for its definition, namely no consensus opinions on the definition of consciousness, but also more importantly, methodological issues. Consciousness is determined through subjective events such as reporting, awareness or experiencing. Though reflecting objective outside world and internal world, consciousness itself has been not considered objective activities. Over the past two decades or so, further efforts have been made to study consciousness toward a science, not philosophy. Very diverse opinions as well as many studies in great details on consciousness have been accumulated. In the same time, deep problems were exposed and attempts to solve issues between mental activity and spiritual issues were made, but no convincible consensus opinions were emerged. Nevertheless, researchers focusing on consciousness, either from scientific or and philosophic perspective may continuously become tenured faculty in academia. A few tenured faculty would claim that consciousness is well studied, though majority researchers believe consciousness research, in general, has been no where to go.

Around early 2010, or earlier, I began to attend MIT neuroscience seminars that are open to the general public. By now I have gone there for almost two years. In the first few seminars, a new face of mine attracted to a number of attendees, most of them are from MIT with a few from other institutions. I asked around if anyone they knew were studying consciousness. They told me, none here since it belongs to philosophy. When I told them my conclusion that consciousness exists in all life forms and virus can be used to study consciousness, a simplest form of consciousness, they did not know how to comment or continue the chat. But they should remember what I told them and kept thinking about it. Over the past two years or so, my

interactions with many neuroscientists at both MIT and Harvard all expressed similar conclusion that as far as they know consciousness research is not of their interests.

Then let me tell what the consciousness researchers' opinions are and how I learned them.

Opinions among consciousness researchers

Later last year, a student group invited Dr. Giulio Tononi came to MIT to talk about his research on consciousness. Attending Dr. Tononi's lecture was the first one I ever had on current consciousness research, and so were many MIT researchers as they told me. I learned with interest that Dr. Tononi developed the theory of integrated information of consciousness (TIIC) to define consciousness,[2] which was endowed by Dr. Kristof Koch,[3] another pioneer, also a fellow and long time collaborator of Dr. Crick. An MIT professor introduced Dr. Tononi at the seminar, and I chatted with him found out that him self do not study consciousness and he would not know any neuroscientists studies consciousness at MIT. He introduced Dr. Tononi on behalf of the student group that sponsored and invited the seminar. After the seminar one research fellow came to me told me that he could not get what Dr. Tononi had talked and he was confused, was it a science or philosophy. Afterwards, Dr. Tononi met with the students group and I happened to be there for a short time.

This year, MIT seems more interested in consciousness study. During its celebration of 150th anniversary of MIT, several scientists or philosophers were invited to the panels of its symposia, "Brains, Minds and Machines". I attended three of them and heard diverse opinions. I first heard Dr. Breener's comments on consciousness research that was mentioned early in this article. Then I heard Dr. Koch addressed consciousness study at the Keynote Panel. At the keynote panel reception, I introduced myself, and talked to Dr. Tomaso Poggio, who was one of the two moderators. I told him that my work, theoretically, may have connected consciousness to genome, at DNA level, and he told me that him self do not study consciousness. Then he introduced me to Dr. Koch, "this man thinks he solved consciousness problem". The smiling Dr. Koch showed us, two or three people around him, a clip on his cell phone, in which a dog plays a red ball with mouth, the dog can open its mouth, and when the ball begins to fall it can timely pick it up again with its mouth to prevent losing the ball. We were definitely amused. I immediately asked him, "do you think dog has consciousness?" He did not give me an answer but turned to answer other people's question. I also found chance to talk to Dr. Robert Desimone, another keynote panelist, who mentioned that fundamental questions in neuroscience remain unsolved, which impressed me. So I reflected, "The most complicated and most efficient system such as brain must follow some most simple mechanism". And I mentioned some of my work to him. In the third panel I heard from three Panelists, Dr. Ned Block, a philosopher and psychologist, Dr. Koch and Dr. Tononi, both are experimentalists. Since myself an experimentalist, and only recently happened to do inquiries into some theoretic issues in science and religion, I tried not to get into philosophic studies on consciousness, rather to focus on the solutions through genetic approaches. All three scholars presented highlights of their research. I was impressed by Dr. Block's presentation of two pictures, human vs bacteria and the words under the pictures are that human has consciousness but bacterium does not. I believe some of my work over the past few years may have advanced the concept of consciousness. So I would not endow his definition of unconsciousness of bacteria. He probably needs to know my work.

After the panel discussion, I came up to greet Dr. Block on the stage, told him that I learned several interesting ideas from his talk, and I then asked him, "Do you subscribe Dr. Tononi's definition of consciousness, integrated information theory?" He answered, "No, I do not." (Reflecting a major disagreements among researchers) Then I asked, "What is your one sentence definition of consciousness?" He answered, "I do not have. There is no way to define it in single sentence." His answer reminded me of his theory of two consciousnesses, phenomenal, or P-consciousness, and access, or A-consciousness, which might explain why he would not define consciousness in one sentence.

Seminars of neurobiology I attended over the past two years at Harvard seldom touch consciousness study, except the most recent one given by Dr. Emery Brown, an anesthetist, who presented his study on unconsciousness under general anesthesia. I remember he showed us his study in a rat. Under general anesthesia the rat lost its consciousness and given medicine Ritalin to it will make the rat come back to conscious and active. After the talk I asked him did he believe that rat has consciousness, Dr. Brown, had to think a bit, (or a struggle with dogma?) and then said, "Yes". Others around were kind of with an expression weird. But I went to further to ask him, "How low in the lower animals would you think they have consciousness?" He said "I leave the question for the students to answer."

I read abstracts of several annual conferences and found they might reflect current status of consciousness study. One is of TSC, Toward a Science of Consciousness. Another is of ASSC, Association for the Scientific Study of Consciousness. Each annual meeting collect several hundreds of research abstracts. For example this year the two meetings presented a total of 500-600 abstracts.[4,5] A review on the TSC 2011 by Dr. Charles Whitehead is also available in the Journal of Consciousness Studies.[6] It is interesting to see researchers have evolved consciousness concept into cosmology, based on which I could conclude that everything has consciousness. Of cause the consciousness whoever defined is a limited one. Due to such diverse views, it could be seen as a huge mixture or sort of mess in the studies of consciousness.

Heated debates were reported as well. For example, Dr. Whitehead reported the debate between Dr. Deepak Chopra[7] and Dr. Leonard Mlodinow.[8] Dr. Mlodinow co-authored "Great Design" with Steven Hawking, one principle which claimed no 'need' to believe in God, and which endowed a string theory, particularly M-theory a theory of everything. But according to Dr. Whitehead, Mlodinow admitted that "he thought consciousness might never be explained". So Whitehead concluded, "So it's official – a Theory of Everything (as understood by physicists) is not really a theory of everything (as understood by more literal minded people like myself)."[6]

According to Dr. Whitehead, even on the definition of consciousness one could hear much heated debate. "What is consciousness?" Every speaker was asked to answer this question to begin a talk in one session moderated by Dr. Annika Dopping. When an anesthetist, Dr. Nick Franks, who supposed to know very well what is consciousness from his profession, but "he simply said he didn't know and didn't really care", which seeded a heated debate in his talk.[6, see details at page 14-15].

So we know that consciousness research is not as some researcher claimed as well – studied both in science and philosophy, but with serious issues. On the other hand, it seems presenting some opportunities for making breakthrough discoveries. Here I use DNA level research as an example to address the challenges in consciousness research.

Some work at DNA level and beyond over the past few years

The interest to connect memory with DNA could be traced back at least to 1984 when Dr. Crick published his comment.[9] Over the past quarter of a century, there were a few scholars expressed the similar views with further development, [10, 11, 12, 13, 14] though which were not directly related to consciousness but focused on memory only. Also though experimental neurogenetic studies have long proved that alterations of genes affect memory and learning etc cognitive functions, direct connecting DNA work with consciousness research seems, as mentioned above evidence, not a common practice. I noticed there were proposals of direct connecting DNA with consciousness recently. For example, Richard Steiner reported his view, "DNA: Conscious to unconscious memory", [15] which proposed DNA designed brain and memory, as much as DNA design other organs of human body, and which can be inherited through DNA passing on to next generations. He also used computer memory as a model to explain brain memory as well as consciousness. I tried to communicate with the author through email to see if there is recent work done, but I have not got a response. I noticed a few abstracts in TSC 2011 publication, which presented DNA level work with or without direct connections to consciousness. For examples, Dr. Giuseppe Vitiello presented "DNA: On the Wave of Coherence",[16] which introduced publications by Dr. Luc Montagnier et al in 2009 and his collaboration with Dr. Montagnier et al in 2010. Some bacterial and viral DNA can emit low frequency electromagnetic waves in high dilutions within an electromagnetic ambient, and its no-lineal signal transmission was explained with Quantum Field Theory. Dr. Montagnier presented "DNA, Waves and Water".[17] Within the same ambient, a tube with water can receive electromagnetic wave signal from the next tube with high dilute DNA. The mechanism of water's receiving and retaining such biological signaling was explained with the theory of biphasic water. Though these work was presented in the consciousness study meeting, it seemed to me no establishment of direct connection with consciousness. The author pointed out that the DNA wave is at 7 Hz and the brain activity is also at around 7Hz. It is interesting that the authors were with an intention to explore.[18] Dr. Guy J Ale presented "It is in our DNA to sense how long we can live",[19] who predicted that in the future, we can sense our lifespan based on the view of evolution of cosmic consciousness. Dr. John Grandy presented "DNA consciousness", [20] which proposed DNA consciousness as a subspecialty in the science of consciousness, described DNA molecule "autopoietic, dynamic and evolving", influencing neuron-based consciousness, and with main conclusion that DNA consciousness is different from human neurological consciousness.

Dr. Montagnier and his colleague's work has caught media attention for the past couple of years and often in much heated debat, or even verbal attacks from disbelievers. According to Dr. Whitehead,[6] at the TSC presentations, "The first such outburst occurred during a talk by Giuseppe Vitiello, following one by Luc Montagnier, who shared a Nobel Prize for discovering the AIDS virus." Dr. Whitehead heard "several scathing comments about this. At least three delegates walked out in disgust, and one very rude person shouted 'A load of b*****s!'"

Here I want to point out that a radical new idea being attacked is not rare. Just this past summer, at an MIT conference, I heard Nobel laureate and physicist Dr. Jerome Friedman presented a long list of quotes from various resources that did not praise or actively engage discussion with him on his experimental proof of quarks, but attack or deny his early stage of completed finding and presentations.

My recent years' study on faith through scientific approach has genuinely led me to explore consciousness, which was quite unexpected to me. Neither my training nor my past achievement had been in the field of consciousness research. I am an experimentalist, doing mainstream research in life science for many years, and I never expected myself heavily into theoretic research until 2008. In late autumn 2008 the concept of faith practice evolution came into my mind and faith evolution was eventually concluded in my research. I realized that the concepts of faith and consciousness often interchangeable. Faith is consciousness. Faith may be the basic blocks of consciousness. I wrote several small essays in 2008. First I described faith as an objective activity, not just subjective ones. I described that a dog or gorilla believed something through my and others' observation of their behaviors.[21] Not by asking a dog or gorilla to answer such as "Are you aware, do you report, do you experience or do you believe…?" I also described cells' behaviors, either in cultural medium or natural environment, their various well-defined behaviors, which were studied through cell and molecular biology.[22] Finally I described behaviors of virus (DNA or RNA) demonstrated viral consciousness. I concluded, "Consciousness exists in all life forms". "Consciousnesses undergo evolution".[23] Consciousnesses have evolved from virus to human. In 2009, I wrote a piece of literature style, "Observation and consciousness".[24] Later that year, I realized that a conclusion can be achieved, "human evolution is mainly consciousness evolution".[25] Traditional research and teachings concluded that virus are the fastest evolving species, and human evolution has been very slow or even ceased, which should be corrected or amended. Human consciousness evolution is the fastest evolution. In 2010, I wrote an essay, "DNA defines consciousness",[26] which proposed the mechanism of biological consciousness at DNA or genome level. In contrast to the traditional theory of genome that must be replicated accurately in each life cycle, I proposed two regions of DNA, stable regions and adjustable ones that defined all kinds of different life forms, which explains biological consciousness including mental consciousness. An RR principle, recording and relating were also proposed. DNA defines the capacity to record internal and external information; recording can be at many levels, DNA, RNA and protein etc, also defines the capacity to relate the recorded information. The extended inquiry has led me to propose additional three new concepts in the field of molecular biology, namely complement of central dogma of molecular biology,[27] DNA transtruction [28] and protein RNA signal transduction.[29]

It is the first time in this essay that I used a new word, bioconsci, which combines their first parts of two words, biological consciousness. This concept may have important functions.

Consciousness research comes to, or even to advance mainstream

What is consciousness? What is faith?

Let me ask the following seven questions and you may give your answers.

If a baby knows crying to ask for feeding, does it suggest the baby's consciousness and faith?

If an animal of domestication remembers its host after being in the wild for years, does it prove its consciousness and faith?

If a fish swims thousands of miles from sea to fresh water for reproduction, does it implicate its consciousness and faith?

If a butterfly migrates from Mexico to Canada through several generations, does it display its consciousness and faith?

If an ant knows how to tell its crowd where the food is, does it notify its consciousness and faith?

If a bacterium can develop drug resistance, does it demonstrate its consciousness and faith?

If an influenza virus can change its antigens to avoid vaccine against it, does it define its consciousness and faith?

If your answer to all the above questions is yes, you should agree with the definition of bioconsci. If your answer is not yes, what is your answer? How do you explain them all in an easy, simple and sensitive concept?

Life is defined by DNA, (or RNA for a small number of RNA virus). It is all based on the different combinations of ACGT (DNA codon), or ACGU (RNA codon). All the various combinations define various consciousness of life. Generally we are in the same world as other species, but we see things differently from other species, like dogs, cats, birds, ants etc. Different species, even differently individuals in the same species, see things different, react or behave differently in the same natural environment. What defines the difference? DNA (or RNA in small portion). Therefore, to develop the concept of bioconsci will certainly advance our understanding of life at a new level. In fact, bioconsci adds a new definition of life.

Furthermore, as we review the concept of consciousness in the field of philosophy, we know everything has consciousness, or the consciousness of the universe (in the sense of a highly ordered complex universe). Bioconsci will not conflict with the concept of consciousness of the universe but as a part of it. On the other hand, mental consciousness is part of bioconsci. Bioconsci should be of interest of mainstream science, like evolutionary biology etc. Through evolutionary approach, applying the principle of bioconsci, mental consciousness may be explained through mainstream effort.

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This is not a comprehensive list of all contributed authors, rather examples for proof of points of ideas.

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