

An aftermath of the Human Genome Project: identify and nurture the geniuses

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A natural extension of the Human Genome Project is the identification of geniuses for solutions of problems requiring integrative and innovative approaches. China, a country of about similar size and population and similar problems as India, has launched a programme to identify and 'breed' geniuses. Perhaps India should follow China.

While I was sailing in the turquoise waters of the Caribbean Sea in January 2002, I found myself thinking about what to do after sequencing the human genome.

– J. Craig Venter¹

The 16 May 2013 issue of *Nature* published a photograph of a group of children, under the heading² 'Chinese project probes the genetics of genius'. Another news item 'Project Einstein' in *Nature*³ informed that 400 MIT scientists have offered their DNA samples for identification of genes for mathematical aptitude. Countries are trying to identify geniuses for evolving and applying a supply-chain approach to gain an advantage over their competitors. With no precise definition, suffice to say that a genius is one with ideas and their applications. Is the 'genius quality' or 'geniusness' determined solely by genes? Or, does the environment too have a role? In which of the 46 human chromosome(s) are the *genius* genes located? Are the *genius* genes active all the time? If not, how are they activated at moments and silenced most of the times? These are some of the intriguing questions.

DNA sequence data

About 20 years ago a controversy erupted when two Harvard Nobel laureates, James D. Watson and Walter Gilbert, urged the US Government to initiate a Human Genome Project (HGP) that would determine the order of nearly 6 billion nucleotide base pairs in a diploid human cell endowed with 46 chromosomes. The HGP was closed in the 2000 year after the genome sequences of the team leaders, Watson⁴ (sponsored by the federal government, either the National Institutes of Health or the US Department of Energy) and Venter¹ (sponsored by Celera Genomics; Figure 1) had been deciphered. Besides advances in techno-

logy, what was learnt from this 'big' science project was that genomes of any two individuals are 99% alike, and that the man and mouse genomes are nearly similar^{1,4}. Since HGP closed in AD 2000, genome sequences of more than 100 organisms, archaea, eubacteria, plants and animals have been determined. Based on the degree of either similarity or dissimilarity, the DNA sequence data have vindicated the evolutionary tree of life constructed on morphology. Recent data (*Nature*, doi:10.1038/nature.2013.14016) tell us that a region of DNA in mice, including the gene *SHANK3* makes the mice schizophrenic. Since man and mouse genomes are nearly identical, a worrying thought is about the inclusion of the digitized data in an 'Aadhar' or 'Unique Identification Data (UID)' card. Additionally, it may disclose the personality of any job applicant – whether a schizophrenic, a potential terrorist, a dumb or a genius. *Nature*² has expressed concern whether the forced current specialization has a chance of making the

novel combinations that characterize a genius than a scientist knowledgeable about several disciplines as in earlier times. The Neanderthals too must have had their own geniuses to invent ways of coping with climate and inventing agriculture⁵.

Hundred per cent geniuses

It remains unclear whether genome sequencing is the only way to identify geniuses. They were identified long before DNA was known. We all know the tale of a king who suspected contamination of a metal in his gold crown. The king asked the ablest mind in his court – Archimedes (287–212 BC) – to find the purity of gold in the crown. While taking bath in a tub Archimedes had a spark on volume–density relationship. In another eureka moment he proclaimed: 'Give me a place to stand on, and I can move the earth' – he had an insight of the lever mechanics. Yet another insight led him to invent the Archimedes screw for

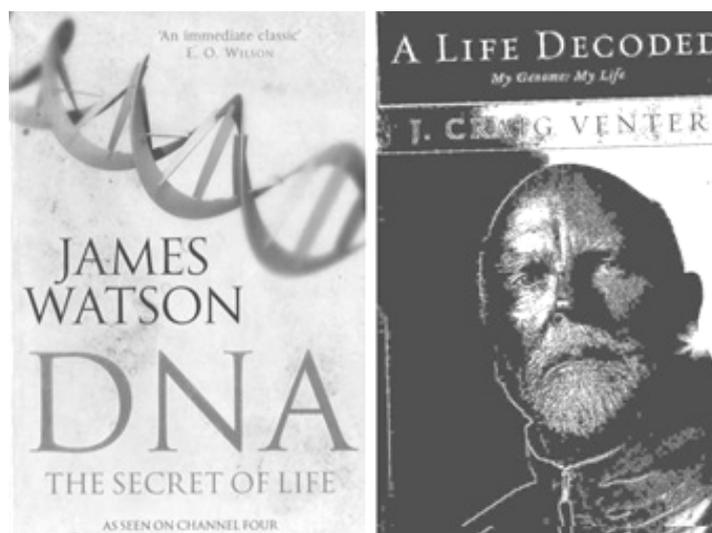


Figure 1. Cover of autobiographical works of J. D. Watson and J. Craig Venter who led projects on human genome sequencing.

transferring water from a low body of water into irrigation ditches. Probably he made more inventions, but the above-mentioned example is suffice to rate him a 100% genius. Even if rated so, genius moments may come from far between. Where would we place Thomas Alva Edison (1847–1931) with a world record of 1093 patents for inventions, including the light bulb and phonograph? Gelb⁶ is of the opinion that Leonardo da Vinci (1452–1519), the Italian polymath (painter, sculptor, architect, musician, mathematician, engineer, inventor, anatomist, geologist, cartographer, botanist and writer) is the greatest genius. A page in Gelb's book has embossed only a part of a forehead with a metal-rimmed spectacle – unmistakably Mohandas Gandhi. Some regard him as one of the greatest geniuses, who showed a totally new way of solving the trickiest of social problems in crisis-like situation through non-violence and at great personal risk. I find that great many geniuses have left a footprint based on their thoughts and writing style. Genius can be in any field.

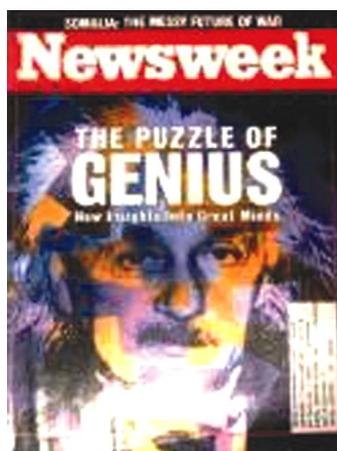


Figure 2. Einstein is regarded as the archetypical genius of the 20th century. His brain is preserved for analyses of 'genius' (Source: *Newsweek*).

Some people rate Newton (1642–1727) and Einstein (1879–1955; Figure 2) as the archetypical geniuses⁷. Pondering over an apple which fell on the ground before his eyes, Newton formulated the laws of gravity and motion. Whereas Einstein, while aboard a running train, formulated his general theory of relativity leading him to declare that energy equals mass times the velocity of light squared or $E = mc^2$: a concept critical to the development of atom bomb. Biologists would place the monk Gregor Mendel (1822–1884) in the same category. Mendel had studied biology and mathematics. By merely recording the numbers of hybrid progeny from crosses between plants differing in just one or two characters (factors), he predicted the existence of genes before the chromosomes had been visualized or the structure of DNA known. Darwin (1809–1882) was another 100% genius. He saw degrees of variations in plants and animals as he circled around the world in *Beagle* and formulated the theory of natural selection by the survival of the fittest. Darwin's example is a testimony of integration of ideas and thoughts from different fields.

Others

Some writers regard Steve Jobs (1955–2011) as a genius, referring to his invention of the Mac computer, iPhone and iPod. I e-mailed a polymath who lives in Japan and has made it his vocation to probe geniuses, especially Einstein. He responded saying that Steve Jobs was just a businessman with specific skills with computers. Some say that Michael Jackson (1958–2009) was a genius, though he, like Steve Jobs, had specific skills – with his hip, legs and vocal cord; and therefore not in the genius category. It might have helped identifying geniuses if blood samples of a pedigree of a family were to be available for analyses. The

only pedigree I can think of is the four generations in the Nehru family. If blood samples are not available for members who have passed away, ashes of members of this rare pedigree might serve to identify the putative *genius* gene. On the other hand, mitochondrial DNA is a stable molecule – having been retrieved from skeletons of a Neanderthal hominid⁸. I wonder if mitochondrial DNA of a pedigree comprising the dead and living persons can be analysed for transmission of the *genius* genes by PCR and Southern analysis.

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