

Transhumanism: a dangerous and unacceptable project

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In February 2001, the sequence of the human genome was published jointly in the British journal *Nature* in which were reported the results obtained by an academic consortium of laboratories from 18 countries (including American, British, French, German, Japanese and Chinese) and the same week, in the American journal *Science*, the results of a private company, named Celera, founded by Craig Venter, a former NIH researcher (National Institute of Health).

This double publication orchestrated by American power in the person of the President of the United States, ended an adventure started 10 years earlier. These two sequences of the human genome were both incomplete and plagued with a number of errors. However, since then, near completion of the sequence has been achieved and a majority of the errors have since been corrected. Nevertheless, as they were, they opened an era rich in discoveries that have profoundly affect many fields of science, medicine and biology first but also history and the police to name but a few. Finally, computer analyses of these sequences put an end to a question that had long agitated scientists, namely, the number of genes present in the human genome. At the time, estimates of the number of genes in a human genome ranged from 50,000 to 100,000. So, what astonishment, even stupor, when deciphering of the human sequence revealed that it counted hardly more than 30,000, a number that has decreased to approximately 22,000 protein encoding genes, plus a few hundred genes, encoding ribosomal and transfer RNA, essential elements of the protein synthesis cellular machinery.

Is a human reducible to his genes? In other words, his future, his physical and intellectual capacities, his emotions, empathies, antipathies, even his conscience, as we often hear or as the proponents of transhumanism seem to believe, are they fully inscribed and programmed in the sequence of his own genome? This is obviously inaccurate if we stick to these few thousand genes.

On the other hand, more recently, numerous sequences of the human genome have been identified as coding tens of thousands of RNA of small or large sizes. All of these RNA, whose inventory is far from being completed and the role in the regulation of the expression of genes still at its beginning, singularly increase the capacities of expression of the human genome. Therefore, the question "Is a human reducible to his genes?", which has little meaning, should be at least reformulated to "Is a human reducible to his genome?". Thus formulated, the answer is more uncertain, even though the behavior and fate of true twins, reared separately, argue for non-reducibility of a human to his genome, especially since the environment to which each of us is exposed is a source of chemical modifications by the addition of chemical radicals on different nucleotide bases, modifying the level of expression of the corresponding genes through a phenomenon called epigenetics. In fact, a subtle balance exists between the importance of the genome and the genetic heritage of everyone and the environment, a balance that is currently impossible to quantify.

What is certain is that the roles played by these RNA, encoded outside the protein coding genes, in the regulation of expression of the latter are extremely complex and far from being perfectly deciphered since the entanglement of their interrelations is great and their effects multiple. Thus, if the ability to modify the nucleotide sequence of a protein coding gene altered in its function by a mutation is possible and fully relevant to the field of medicine in the case of disabled proteins and diseases, the modification of the sequence encoding any of these RNA is not conceivable owing to unpredictable consequences. This renders transhumanist dreams utopian. At this point, one must recall that the aim of transhumanism is to modify the sequences of genes to make them more efficient and not to correct the deleterious effects of somatic or germinal mutations, despite some proselytes of the movement who propose both abolition of suffering and improvement of the physical and intellectual human performances. Here, one can also wonder if this double strategy is not intended to have the greatest number of people approve of the strictly transhumanist project of increasing human capacities by inserting in their project the end of disease and suffering.

As humans, we all share the same genes, regardless of geographic origin, ethnicity or race if the term has not become taboo. On the other hand, the two copies of each gene, inscribed in the sequence of our genome, one inherited from our mother, the other from our father, are slightly different, owing to the presence of some nucleotide changes, inheritance of random mutations, but generally not causing any pathological disorder. However, it is because of the combination of all these two copies, called alleles, that we are each unique, different with more or less strong resemblances with members of our siblings.

The incessant progress made in the knowledge of genes and their implication in the occurrence and development of numerous diseases, added to the progress made in the modification of nucleotide sequences combining precision and relative operational facility as in the case of the method known by its acronym CRISPR-Cas9, make it possible to consider the correction of deleterious mutations in order to return to a sequence encoding a normal protein.

Long before the advent of the CRISPR-Cas9 technique, significant results had been achieved, particularly with the curing of dogs suffering from the mutation of the RPE65 gene responsible for retinitis pigmentosa that results in a progressive loss of the vision until complete blindness. Since then, many therapeutic trials have been conducted, some successfully, in humans to treat or prevent the development of many genetic diseases but also other conditions such as cancer. This movement must be supported and amplified.

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The goal of transhumanism is quite different. It is no longer a question of treating or relieving pain, but of modifying one or more genes to give them superior properties and to endow the recipient with new and extraordinary capacities. The Finnish cross-country skier Eero Mäntyranta, who won seven Olympic medals, naturally produced some 20% more red blood cells because of a mutation in the EPO gene that regulates globin synthesis. Since then, the genetic analysis of top-level athletes, has been able to identify several dozen genes, made of rare alleles, giving them outstanding performances. Grafting such alleles and others conferring extraordinary abilities is the goal of transhumanism.

Should we wish it? Should we worry about it?

Two trends exist within society. On one hand, proponents of the transhumanist vision argue that there are no major reasons for refraining from improving physical, intellectual performances and even longevity to tend toward eternity. On the other hand, others are totally hostile to this transhumanist vision or even against any sequence modification aimed at correcting a disabling mutation. The arguments put forward against the transhumanist vision are that man cannot set himself up as a demiurge and that the evolution that has shaped us over millennia cannot be disturbed at the risk of losing our humanity. As important as these arguments are, they are impenetrable to the proponents of transhumanism, which can only see an incessant pursuit of the growth of knowledge and the capacities it engenders. Moreover, it should be noted that we cannot cry sacrilege for the modification of the sequence of a protein coding gene when we also rebelled against the idea that we would be reducible to our genes.

However, there are pragmatic arguments, understandable by all, which make the transhumanist project unacceptable. Without referring to the scientific difficulties and the lack of certainty that the modification of the sequence of a gene in order to code a more efficient protein would be sufficient on its own, the rest of the genome sequence not being modified, the problem of the cost of this gene modification would come into play. Indeed, who will bear this burden? Certainly not the national healthcare systems whatever the country, not even personal health insurance, insofar as this gene modification would not be regarded as a medical treatment but a personal wish. The financial burden would therefore be supported by the applicants only. Therefore, a small fraction of the population could have access to it, creating *ipso facto* a caste of super humans who can act to the detriment of the rest of the population and which over time and mutations causing superior abilities, would dominate all commoners. A totally unacceptable situation, especially since these super humans would manage to impose that these same mutations and possibly others will also be made on their germ cells to ensure the same benefits to their descendants. Regarding the wish and the quest for immortality, it would pose an unbearable demographic problem to the earth that is already literally falling under the numbers.

Conclusion

While the progress of science and our ability in the near future to cure or even eradicate serious genetic diseases are to be welcomed, we must not fall into the foolish view of transhumanism.