

Siddhartha Mukherjee

The Gene. An Intimate History

*Il Gene.
Il viaggio dell'uomo
al centro della vita*

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In philosophy there is an old conundrum regarding whether an intelligent organism can ever learn how to read its own instruction manual. As humans, the genome is now at our disposal. How we will use it, however, is quite another matter.

Siddhartha Mukherjee's new book, *The Gene*, is a well-timed and sharp reflection on the fascinating history of genetics and its future implications. Mukherjee takes readers on a gripping 150-year, 500-page journey of thrilling genetic discovery. From the garden pea experiments of monk Gregor Mendel, who revealed the existence of heritable traits, readers will travel through time until contemporary gene-editing techniques, which allow researchers to modify the genetic profiles of humans and almost all other biological organisms. Mukherjee recounts the history of genomics by emphasizing events he considered most relevant while glossing over others – an editorial aspect for which he has been harshly criticized by commentators. Thus, Mukherjee's work fails to serve as a rigorous and objective reconstruction of the history of genetics in the traditional sense.

The Gene is a testament to the astonishing beauty of the genome. Mukherjee insists on the relationship between our genome, our identity, and the world surrounding us by highlighting how genes do not produce stereotypical responses to different environments: otherwise we would be automatons. As Mukherjee points out in this book, «genes leave exactly enough room for the vagaries of chance to stick. We call this intersection fate. We call our responses to it choice».

In the era of direct-to-consumer genetic testing, in which companies like the American 23andMe use slogans like "Welcome to you", Mukherjee's account has the merit of not falling into the mistake of considering our genes as the sole basis for our own identity. In order to do so, he discards widespread assumptions on genetic heredity and nudges readers away from thinking that genes are the only factors that determine who we are - where this "who" is then understood in the terms of our physical, emotional, and cerebral selves.

The Gene is also a passionate celebration of progress but, at the same time, it raises thorny concerns about how genetics may impact the way we conceive ourselves, the way we think about others and how we may interact with them.

Scientists are working on techniques to alter genetic makeup in humans affected by serious diseases, and soon we might be able to manipulate our own genetic future, thus becoming, in a sense not too far from the truth, the masters of our own destiny as a species. The great question that confronts our current era is what happens when the power of that choice devolves to the individual. What happens when we trace the boundaries of normality using the frames provided by molecular biology and genetics? What are the implications for medical choices to intervene when something is ab-normal and determine the nature of "justifiable interventions"? Who will establish what procedures are ethically acceptable and to whom they should be addressed?

Who will draw the line?

Against this backdrop, Mukherjee urges the need for a manifesto – at least a "hitchhiker's guide", as he refers to it – for a world in which the modification of genomes is a concrete possibility. He leaves us with a 13-point guideline, which represents a great starting point for reflection. Though, given Mukherjee's accomplished giftedness in exploring the ethical and social implications of genetic advances, a more thorough analysis of the precepts outlined in the manifesto would have been more reassuring. Mukherjee leaves us with a sense of unsettling vagueness, that makes it impossible to finish this book and then simply forgetting about it.

Today, "gene editing" technologies allow scientists to alter the human genome apparently remarkable precision. Advances in science such as stem cell technologies, nuclear transfer, epigenetic modulation, and gene-editing methods have already made it possible to manipulate the human genome by screening for genetic deficiencies. The resulting post-human scenario is fascinating at first sight, but it soon evokes a moral disgust that should make us imprint in our minds one of the most insightful reflections Mukherjee shares in his book: «Illness might progressively vanish but so might identity. Traumas might be erased but so might history. Mutants would be eliminated, but so would human variation. Chance would become mitigated, but so, inevitably, would choice».

It is not genetic purity that our DNA is designed to preserve, but genetic diversity - life's only insurance against an unpredictable future. After all, normalcy is nothing but the antithesis of evolution.