

## Editorial

### **Father of the Genetic Code: Thoughts on the Life and Death of Marshall W. Nirenberg**

As I sat last week at the funeral of Nobel laureate Marshall Nirenberg, who at the age of 34 had discovered how DNA guided the formation of proteins (or as the scientific community called it, “cracking the genetic code”), I was reminded once again that the world is largely unaware of the grief and sense of loss a physician feels at the death of a beloved patient. We doctors are left to console ourselves, and so I did by reviewing the details of my unique experience of this man, who was my patient in the last few years of his life. When I asked him shortly before his death if he believed in an afterlife, he answered, after a pause, “No. We don’t exist after death, except in the memory of the people who’ve known us.” It was clear from the elegance and beauty of the comments delivered at the funeral, most notably those of Dr. Francis Collins, director of the National Institutes of Health (NIH) and head of the Human Genome Project, that Dr. Nirenberg’s immortality was secure. I understood suddenly that, in a very real sense, he would continue to enrich and instruct the lives of all who knew him.

Nicholas Wade’s obituary for Nirenberg in *The New York Times* told the story of how young he was when he made his stunning discovery and, even more remarkable, how isolated he was from the colony of famous, sophisticated, and well-supported investigators pursuing the exciting field of genetics in the 1960s.<sup>1</sup> They included some of the brightest, most prominent scientists the world had to offer at the time: the elegant, urbane Severo Ochoa (who was one of my own professors at New York University’s College of Medicine), and Francis Crick, of whom his colleague, Thomas Watson, wrote: “I have never seen Francis Crick in a modest mood.”<sup>2</sup> Wade’s account of the 34-year-old investigator—presenting his groundbreaking findings to a nearly empty room at a 1961 Moscow conference on molecular biology—amazed me; I had not known about Dr. Nirenberg’s relative obscurity then. Undoubtedly he was unassuming, and in contrast to most of the academic community, understated. To the very end of his life, it was the science and not his reputation that intrigued him. It was almost as though, in his pell-mell pursuit of the ideas that poured from his mind, he had no time to think about whether or not he was famous. Crick once told Nirenberg that the latter’s problem was that he did not publicize himself: “Crick told me I was stupid because I never was after the limelight.”<sup>3</sup>

His discovery sparked a period of intense competition with Ochoa, in what was called “the coding race,” to expand our knowledge of the segments of DNA that govern the manufacture of specific proteins.<sup>4</sup> Dr. Nirenberg told me the story himself, stressing the fact that many NIH investigators joined him in the effort to complete the work, and said that Ochoa, realizing the importance and scope of Nirenberg’s achievement, conceded the field to the NIH group. I can still remember the tall, silver-haired Ochoa lecturing to our medical class about the Krebs cycle, and to our delight, pronouncing “fructose” as “fractose.” I wish I had been aware of the revolution taking place in our understanding of how we become what we are; as a first-year medical student, I could never have imagined that one day I would attend a central player in that drama.

Dr. Nirenberg was a man of great personal dignity and rectitude. His diction was perfect and his speaking voice quite beautiful, ideally suited to teaching. He made the most complex ideas comprehensible, accurately judging the capacity of his listeners to understand what he was explaining. He said of himself: “I’m shy, retiring. I like to work, and I’ve never gone out of my way to try to publicize myself.”<sup>2</sup> I did not find him shy as much as I found him deeply interested in the world around him and in the people to whom he was speaking. Nothing and no one escaped his notice or failed to engage his attention.

One of the last meetings at which Dr. Nirenberg spoke was a conference held at the Vatican in Rome, sponsored by the Pontifical Academy of Sciences, entitled: “Scientific Insights Into the Evolution of the

Universe and of Life.” He shared with me a copy of his talk, which expressed one of the most important insights of his life:

“Despite the small variations that have been found, the genetic codes used by all forms of life on this planet that have been studied are very similar. These results strongly suggest that the genetic code appeared very early during biological evolution, that all forms of life on Earth descended from a common ancestor and therefore, that all living things on Earth are related to one another.”<sup>5</sup>

He told me that that realization had given him a sense of kinship with all life on the planet, which was a source of wonder and joy for him. It was characteristic of him that 3 days before his death, he gave me a signed copy of his speech for my daughter, whom he knew was a theologian. “I thought she would like to have this,” he said, gently.

As I left his funeral, I thought that occasionally in our lives we are privileged to meet truly extraordinary individuals, extraordinary in this case not only because of the incredible power of his intellect and the science he developed, but because of the personal qualities of empathy, a deep fascination with and reverence for the beauty of the universe, and an almost complete lack of self-interest. In the hall of his home, his wife had hung his handwritten copies of his data describing the genetic code. As Nirenberg put it himself:

“The molecular language is used to solve the problem of biological time. It is easier to construct a new organism than it is to repair an aging malfunctioning one. The messages in DNA that we inherit from our parents contain wisdom gradually accumulated over billions of years. The messages slowly change with time, but the translation of the language remains essentially constant.”<sup>5</sup>

Some losses are more costly and certainly more painful than others. I thought again, perhaps for the thousandth time, that no matter how valuable an individual life is, we cannot immortalize and preserve it forever. The most we can hope to do is build on the accomplishments and wisdom of men like Dr. Nirenberg, weaving his stunning insights into the new ones that will come, forever expanding and improving our understanding of the universe and all things that live within it.

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## REFERENCES

1. Wade N. Marshall Nirenberg, biologist who untangled genetic code, dies at 82. *The New York Times*. January 21, 2010.
2. Watson JD. *The Double Helix: A Personal Account of the Discovery of the Structure of DNA*. Collector's ed. Norwalk, Conn: Easton Press; 2009.
3. Yam P. Marshall Nirenberg, forgotten father of the genetic code, dies. *Scientific American*. January 22, 2010.
4. Wikipedia. Marshall Warren Nirenberg. [http://en.wikipedia.org/wiki/Marshall\\_Warren\\_Nirenberg](http://en.wikipedia.org/wiki/Marshall_Warren_Nirenberg). Accessed January 22, 2010.
5. Nirenberg M. The genetic code and evolution. Presented at: Plenary Session on Scientific Insights Into the Evolution of the Universe and of Life; Vatican City, Italy; October 31–November 4, 2008. [http://www.vatican.va/roman\\_curia/pontifical\\_academies/acdscien/2009/acta\\_20\\_pas\\_01of07.pdf](http://www.vatican.va/roman_curia/pontifical_academies/acdscien/2009/acta_20_pas_01of07.pdf). Accessed January 22, 2010.