



# The Oncoming Challenge of Homo Superior

| Stephan A. Schwartz |

In 2006, in the second issue of the second year of this journal I wrote an essay, *Homo Superior*, and said, “What could be more natural than wanting a healthy beautiful baby? Has there ever been a time in history when parents, even in the midst of disasters and despair, did not wish to be delivered of a healthy child? And who wouldn’t want to have a son or daughter who was as smart as Einstein, as athletic as Michael Jordan, and as attractive as well, name the person whose looks you find most appealing? What could be more natural? But this deep-seated drive when linked to the onrushing train of genetic medicine is creating a trend that will shape—both literally and figuratively—the future of our species”.<sup>1</sup>

For most of our history as a species, we sapiens of the genus *Homo* have shared the planet with other hominid species. We know this because genetic science, by extracting DNA from ancient bone fragments, has transformed paleoarchaeology from speculation to certainty. This new research, which is amended and extended almost weekly, tells us we still retain, you retain, genes resulting from encounters *Homo Sapiens* had in Deep Time with *Denisovans* and *Neanderthals*.

In historical terms, there being only a single hominid species is an anomaly. One that is ending almost without public awareness, not because of normal

evolutionary processes, but because of what we are doing to ourselves. We are about to face a world in which there are two species in the genus *Homo*—*Homo Sapiens* and *Homo Superior*.

It is a world not imposed but being created as the result of CRISPR, a new genetic technology formally known as *Crispr-Cas9*, that allows scientists to edit genomes, including humans, with a precision unimaginable just a few years ago. The British newspaper, *The Guardian*, describes it this way, and I can’t improve on it. “*Crispr*, or to give it its full name, *Crispr-Cas9*, allows scientists to precisely target and edit pieces of the genome. *Crispr* is a guide molecule made of RNA, that allows a specific site of interest on the DNA double helix to be targeted. The RNA molecule is attached to *Cas9*, a bacterial enzyme that works as a pair of ‘molecular scissors’ to cut the DNA at the exact point required. This allows scientists to cut, paste and delete single letters of genetic code”.<sup>2</sup>

CRISPR is the lever; it is with this technology that we have begun to create *Homo Superior*, although for most researchers that is not the immediate goal. Most, but not all, are trying to eliminate systemic chronic inherited diseases. But CRISPR has a shadow, the ethical challenge of creating *Homo Superior* without any real consideration as to what that means. But let’s start with the easy part, the end of hereditary disease, because that’s what motivated most researchers. The *Homo Superior* issue was mostly a concern of medical ethicists. The big issue was adding human genes to animals, and the question: how many human genes does it take to make a being human?

America initially led the way in much of this research, and then it all came crashing down. From August 2001 until March of

2009 when President George W. Bush, in response to lobbying from the conservative religious demographic, banned federal funding for genetic research, particularly STEM cell research. The result was that much American research withered for lack of funding. America went from leader to follower, or all too often just observer in this area of medicine. It was not until President Obama came into office that the work really began again.

Other countries, not saddled with the conservative religious issues that have shaped American science, continued the work with exciting if controversial results. Long before CRISPR took medicine down to literal gene-editing, in 2008, a 27-year-old British woman made history by conceiving and delivering the first girl baby guaranteed to be free of ever contracting breast cancer. The mother had volunteered to participate in the research because her husband had tested positive for the gene that is associated with breast cancer, and because for the past three generations, every single woman in her husband’s family had contracted breast cancer as early as 27 and 29.

Six of the couple’s embryos were tested; two were found not to have the genetic marker, and they were implanted.

The couple’s doctor, Paul Serhal, medical director of the Assisted Conception Unit at University College London Hospital, said: “Women now have the option of having this treatment to avoid the potentially guilty feeling of passing on this genetic abnormality to a child. This gives us the chance to eradicate this problem in families”.<sup>3</sup>

As I write in August 2017, *Nature* has just published the work of an international interdisciplinary team that makes what Dr. Serhal said more real than he may even

*The Schwartzreport tracks emerging trends that will affect the world, particularly the United States. For EXPLORE it focuses on matters of health in the broadest sense of that term, including medical issues, changes in the biosphere, technology, and policy considerations, all of which will shape our culture and our lives.*

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have imagined less than a decade earlier; it is a measure of how fast this field is moving. The paper, "Correction of a pathogenic mutation in human embryos"<sup>4</sup> reports on research using CRISPR to correct in human embryos a genetic mutation associated with hypertrophic cardiomyopathy, a disorder of the heart. The mutation causes heart muscle cells to enlarge. Not always, but frequently this results in thickening of the ventricles and the blockage of bloodflow, or the mitral valve is affected. When this happens a whole spectrum of cardiovascular problems arise. So being able to precisely edit, as one might remove a flawed pixel from an image replacing it with an undamaged equal, is a very big deal.

Thanks to changes made during the Obama administration, America now has a more robust research effort, and Shoukhrat Mitalipov of Oregon Health and Science University was part of the international team. They were able to do the largest editing of one-cell embryos using CRISPR that had ever been attempted.

None of the embryos by protocol were implanted which, of course, makes the work controversial in the U.S. But the number means that the technology has now reached a stage where it will be possible to operationalize it.

In many ways this is a great blessing, particularly because it is coming online just as antibiotic medicine is being driven into crisis with the rise of "Superbugs" which themselves have evolved in large measure because of the overuse of antibiotics in industrial husbandry of animals, fish, and fowl.

But although the bulk of the research is focused on diseases, the Homo Superior trend continues apace as well. Jennifer Doudna, a microbiologist at the University of California—Berkeley, and the co-discoverer of the CRISPR procedure is quite straightforward about it. She now leads the Innovative Genomics Institute, a UC San Francisco UC—Berkeley partnership, that has already published a paper in *Nature Biotechnology* showing how CRISPR can be used to edit the DNA of mice brains, producing immediately change.<sup>5</sup> Her team's goal is Huntington's disease, and using gene-editing to correct mutations, providing immediate benefit.

Doudna stresses that her research does not involve germline change, which means the fix is passed on from one generation to the next. But she and all other researchers realize that's where it's headed.

As Doudna told *Newsweek*, "People say it won't happen in the U.S., but what about China? I am asked this question at cocktail parties. What about Asia? What about places that have fewer restrictions, and perhaps fewer cultural feelings against germline editing? It's entirely possible that there will be use of germline editing in those jurisdictions. I encourage the scientific and clinical communities around the world to not rush CRISPR to clinical research because I think it would be a shame if a powerful technology gets a black eye in the public perception, at least in terms of using it inappropriately."<sup>6</sup>

It's time now to confront Homo Superior, and China is a good place to start. Aleks Eror reported that at BGI Shenzhen, the largest genetic research center in China, "scientists have collected DNA samples from 2000 of the world's smartest people and are sequencing their entire genomes in an attempt to identify the alleles which determine human intelligence. Apparently they're not far from finding them, and when they do, embryo screening will allow parents to pick their brightest zygote and potentially bump up every generation's intelligence by five to 15 IQ points."<sup>7</sup>

A number of Americans were asked to participate in the Chinese project and Eror interviewed several of those who had donated their DNA; one was evolutionary biologist Geoffrey Miller at New York University. Miller said he got an email inviting him to participate and decided to do it. He told Eror, "As soon as Deng Xiaoping took power in the late 70s, he took the whole focus of the Chinese government from trying to manage the economy, to trying to manage the quality and quantity of people. In the 90s, they started to do widespread prenatal testing for birth defects with ultrasound, and more recently, they've spent a lot of money researching human genetics to figure out which genes make people smarter."<sup>8</sup>

Pause for a moment and think about that statement. A government committed to raising the intelligence of its population. Between 2002 and 2006, Richard Lynn, a British Professor of Psychology, and Tatu Vanhanen, a Finnish Professor of Political Science, conducted IQ studies in more than 80 countries. The average I.Q. worldwide is 100; in the United States, which ranks 9th it is 98, in Hong Kong and Singapore, which tie for 1st, it is 108.<sup>9</sup> Suppose you could raise your nation's I.Q. by 5 to 15 points. What are the social implications of that? Lynn and Vanhanen in *IQ and the Wealth of Nations*, argue there is a "causal relationship between the average national intelligence (IQ) and the gap between rich and poor countries by empirical evidence."<sup>10</sup>

And it's not just brains. Using CRISPR, Chinese researchers are also interested in genetically engineering physical prowess, and have already produced a line of super dogs. David King director of Human Genetics Alert (HGA) went on record saying, "It's true that the more and more animals that are genetically engineered using these techniques brings us closer to the possibility of genetic engineering of humans."<sup>11</sup>

I first picked up the Homo Superior Trend in 2005 from a paper in a genetics journal and have been following it and writing about it since then. The momentum of this trend is increasing, as I hope I have made clear, and it is my belief that within perhaps as little as 10 years—CRISPR was only developed five years ago—humanity will be faced with an existential crisis, the creation of Homo Superior, a new species that will be smarter, stronger, healthier, and free of chronic diseases compared to Homo Sapiens.

Because we are a culture based on greed and profit I think it is safe to presume that because it will be expensive the rich will be the ones to first avail themselves of this new technology and, because it includes germ-lining, all of their children and their children's children will share those benefits of health and intelligence. This, in turn, will further exacerbate the growing neo-feudalism trend in which there is a tiny

uber-rich cohort, a small middle class, mostly professional people such as lawyers, doctors, and engineers, and a vast wage-dependent peasantry. The evidence also suggests that because of differing cultural views the rich of Asia will have access to these technologies first. The implications of this fork in humanity are barely discussed, but will soon be upon us.

Kazuo Ishiguro, a Japanese by birth and now one of Britain's most celebrated writers, puts it very well I think when he says of these new genetic technologies, "We're going into a territory where a lot of the ways in which we have organized our societies will suddenly look a bit redundant. In liberal democracies, we have this idea that human beings are basically equal in some very fundamental way. We're coming close to the point where we can, objectively in some sense, create people who are superior to others."

Don't you think it would be a good idea to think about this, and talk it over before the only option is the choice of reaction to an established reality?

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