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## Getting a Rise out of Genetic Engineering

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“No!” The sudden and peremptory issuing of that simple command is one of the most startling moments in *Rise of the Planet of the Apes*. Caesar, the genetically enhanced chimpanzee who resulted from the ethically questionable experiments stands up against one of his human tormentors and shouts “No!”

Should we do the same about the whole forthcoming enterprise of biological enhancement of the human race? Or should we instead embrace it to boldly go where no human or chimp has gone before?

One reason to lean toward banning enhancement may be that it is unnatural, even ungodly. The whole idea seems to violate what God or natural selection ordained for us, to be an exercise in the kind of hubris that the ancient Greeks constantly used as the underlying theme for their tragedies, of which *Rise* can be seen as a modern incarnation.

In the movie, Will Rodman, the charming scientist who works at the Gen-Sys company to develop the drug ALZ-112, is trying to cure Alzheimer’s, one of the most devastating of human diseases, which he knows first-hand because his father is afflicted with it. But, just as in any good Greek tragedy, the road to hell is paved with good intentions, and Rodman’s doings lead first to a revolt of a band of apes, then to death and destruction, and finally—in an obvious setup for the sequel—to the destruction of the entire human race by means of an out of control virus, originally designed by Rodman himself as a better delivery vehicle for the cure. Sophocles and Euripides would have been pleased!

## But It's Unnatural, Especially for Chimps!

The “God/natural selection didn’t want this” objection, however, cuts very little philosophical ice these days. The reason’s the same regardless of whether you’re a religious believer or not. The history of human science, technology, and medicine is a history of defying whatever constraints have been imposed on us by gods or nature, so unless you’re also willing to stop cooking your food, flying on airplanes, or taking advantage of vaccines, you do not have much of a philosophical leg to stand on.

That last example (vaccines) is particularly interesting from the point of view of discussions of biological enhancement. One of the more thoughtful objections raised to the idea of enhancement is that it is somehow more problematic—ethically or otherwise—than the standard business of medicine: curing diseases. But the difference between cure and enhancement may not be quite so straightforward. As Eric Juengst has pointed out in a 1997 issue of the *Journal of Medicine and Philosophy*, getting vaccinated doesn’t cure anything, it increases your chances of avoiding a future disease by enhancing the natural capacities of your immune system. Granted, this kind of enhancement—unlike Caesar’s stunning intellectual abilities—is not passed to your offspring, who will have to acquire it anew by means of vaccination. But this is a distinction without much of an accompanying ethical difference.

Here is perhaps an even better way to appreciate the problem, this one proposed by Norman Daniels in his 1985 book *Just Health Care*. He compares the imaginary cases of two boys who are both destined to reach a very short physical stature as adults. In one case, let’s say Peter’s, this is because of a deficiency of human growth hormone, resulting from an otherwise benign brain tumor. In the second case, say Johnny’s, the problem is instead caused by the fact that the boy simply has short parents, and has therefore inherited a genetic set that does not allow for much growth.

One way to look at the difference between Peter and Johnny is that solving Peter’s problem requires curing a disease, in this case the tumor that is blocking the release of growth hormone. Johnny, however, will actually require a genetic engineering intervention that amounts to an enhancement, since there is no disease to cure. But there seems to be an inconsistency here:

in both cases what we are trying to achieve is a normal height for the boy in question. What difference does it make what is causing the abnormal growth? Whatever it is, we want to get rid of it to help both boys have a normal life. Whether we call it a cure or an enhancement seems to be verbal hair splitting, not a real issue.

Then again, just because one can imagine scenarios where there's no difference, or only a difference of degree, between cures and enhancements, that doesn't mean the point is moot. Consider this famous paradox, attributed to Eubulides (a contemporary, and harsh critic, of Aristotle): a man with a full head of hair is obviously not bald; losing a single hair will not turn him into a bald man; yet, if the process is reiterated a sufficiently high number of times (as unfortunately is the case for a lot of us), he will be bald.

We all acknowledge the difference between bald and non-bald men (don't we?), and yet we can't tell where exactly baldness begins or ends. The same could be true for the difference between cure and enhancement: the fact that such a difference is anything but obvious in the case of Peter and Johnny doesn't mean that the difference itself doesn't exist in principle, or that it does not matter in practice. For instance, should we one day be able to implant gills in a human being so that she can breathe underwater, there would be no disputing that the gills are a most definite example of enhancement, not any kind of cure.

As it turns out, our hero, Will, appears to be aware of the difference between cure and enhancement. In explaining his actions to his girlfriend, Caroline, he says "I designed [the procedure] for repair, but Caesar has gone way beyond that." And later on to Gen-Sys CEO Steven Jacobs, in order to convince him to back his research again after an initial failure: "My father didn't just recover, he improved." Indeed, while Will's father had been (temporarily, as it turns out) cured of the disease and then had gone beyond simple recovery, Caesar was, of course, not sick at all to begin with: genetic engineering, in his case, had made it possible for a chimpanzee to think, and eventually talk, in a way that no member of its species had ever been able to do before. Clearly a case of enhancement, if you believe that having the ability to think and talk is a good thing.

## What's the Big Deal?

But, you could ask, what exactly is the problem with enhancing the human race? Having set aside concerns about violating divine or natural laws (because we do that all the time anyway), what reasonable objection can be raised?

Well, an obvious concern arises from several bits of dialogue in the movie. At one point, for instance, Jacobs, Gen-Sys's CEO, admonishes Will to "Keep your personal emotions out of it, these people invest in results, not dreams." A bit later on, Robert Franklin, a passionate technician who works with Rodman, brings up the issue of animal welfare, saying that "There are lives at stake here. These are animals with personality, with attachments." To which Jacobs harshly responds: "Attachments? I run a business, not a petting zoo."

Or remember this bit of patronizing explanation from Jacobs to his chief scientist: "I'll tell you exactly what we are dealing with here. We are dealing with a drug that is worth more than anything else we are developing, combined. You make history, I make money." (I have to admit that it is therefore very satisfying to see, toward the end of the movie, one of the mistreated apes plunging Jacobs and the remains of his helicopter into San Francisco Bay from the top of the Golden Gate Bridge.)

In other words, a major worry about giving free rein to research on human genetic enhancement is that it will likely be dominated by greed and industry secrecy. Well, that's just capitalism, we could reply, and the system has worked well enough for all sorts of products that have enhanced our lives, from cheap and durable cars to phones that appear to be smarter than some of their users.

Still, there are a number of philosophical reasons to worry about letting the free market run amok with altering our species's genome—other than the apocalyptic end-of-the-world scenario hinted at toward the end of *Rise*. For instance, Michael Sandel, in his 2012 book, *What Money Can't Buy: The Moral Limits of Markets*, argues that we as a society ought to impose limits on what can and cannot be commercialized, perhaps including the manipulation of the human genetic heritage. While Sandel's claim may sound radical in this era of hyper

market liberalism (at least in the United States), a moment of reflection will show that we already do not allow for the sale of a number of things—votes and babies come to mind—on the sole ground that we think that commercializing those things is simply ethically unacceptable. It then becomes a matter of not whether there should be restrictions, but what they should apply to and how.

François Baylis and Jason S. Robert, in their 2004 article, “The Inevitability of Genetic Enhancement Technologies,” published in the journal *Bioethics*, provide an extensive list of additional objections that have been advanced against enhancement (the title of their article notwithstanding). These include: unacceptable risk of harm to human subjects (remember, in *Rise*, Rodman’s father and lab tech die, and as of this writing, it’s a safe prediction that there are plenty more casualties to come in the sequel, *Dawn of the Planet of the Apes!*); the possibility of a threat to genetic diversity (because everyone will end up wanting the same popular enhancements); the undermining of our genetic heritage (assuming one should really be concerned about such thing—though we’re clearly preoccupied with preserving the genomes of other species to conserve biodiversity); counter-productive societal results (let’s say we “cure” aging: how do we deal with the resulting population explosion, given that people will presumably still want to have babies?); the fact that enhancement may not be the best use of our resources (after all, we still have widespread famine and poverty throughout the globe); a widening of the already large gap between haves and have-nots (think of another sci-fi masterpiece: *Gattaca*); the resulting promotion of social conformity; the undermining of people’s free choices (if most people are genetically engineering their children to be taller, your parents will be in a bind if they refuse to go along, since that puts you at a disadvantage); the moral worth of the means by which we achieve our goals (if all athletes are genetically engineered for top results, why give them medals, and why bother watching their performances?). As you can see, it is a long list, and although some of the items may pose less serious problems than others, it clearly shows that there are, indeed, problems to be reckoned with.

## **Three Primates: Kant, Mill, and Aristotle**

Ethics is a way of reasoning about certain types of problems. It's a tool, just like math or logic. It starts with certain assumptions, or premises and it works out their logical consequences as they illuminate whatever moral problem we're considering. If we start with different premises we may arrive at different conclusions, and there may be no sensible way by which we can judge some conclusions right and other wrong, unless we can show that there's a problem with either the premises or with the reasoning itself.

This, however, doesn't mean that anything goes. Let's consider first an example by analogy with math. If you say that the sum of the angles of a triangle is  $180^\circ$ , are you right or wrong? It depends. If we are working within the axioms (which is what mathematicians call their assumptions) of Euclidean geometry, then you're correct. But if we are operating within the framework of spherical geometry then no, you would be wrong. Either way, however, if you claim that the answer is not  $180^\circ$  within a Euclidean space, you are most definitely wrong.

Will Rodman decides to test ALZ-112 on his father, after his research program at Gen-Sys has been shut down (having in the meantime inadvertently caused permanent enhancements in Caesar). We can look at this decision from the starting assumptions of three standard ethical theories: consequentialism, deontology, and virtue ethics, working our way from those assumptions through the ethical consequences that follow from them.

Consequentialist ethics begins with the assumption that—as the name clearly hints at—what matters in moral decision-making is the consequences of one's action. Nineteenth-century philosopher John Stuart Mill is one of the most influential consequentialists, and for him a good action has the consequence of increasing overall happiness, while a bad action has the consequence of increasing overall pain. So, for Mill it does not really matter what Will's intentions were (they were good, we assume, as he was both concerned with his father's health and with a potential cure for Alzheimer's for all humankind), what matters is what happened as a result of his action. And what happened was a disaster. Not only did his father actually die of the disease, but Will's attempt to solve the problem that led to

the failure of his cure will eventually condemn the human race to extinction. That's as bad as consequences can possibly be, I'd say. There is a caveat, however. If the totality of chimp happiness outweighs the pain caused by humanity's extinction, Will may still be vindicated on consequentialist grounds. That, unfortunately, isn't going to help Will or anyone he cared for, except perhaps Caesar.

Deontological ethics is the idea that there are universal rules of conduct that govern our ethical judgments. Religious commandments are an example of a deontological moral system. The most important secular approach to deontology is the one devised by Immanuel Kant in the eighteenth century, and is based on his idea that there is only one fundamental moral rule, which he called the categorical imperative (it's not only an imperative, but no exceptions are allowed!). In one version, the imperative essentially says that we ought to treat other people never solely as means to an end, but always as ends in themselves. In other words, we must respect their integrity as moral agents distinct from but equal to ourselves.

It's not exactly clear how Kant would evaluate Will's actions towards his father. On the one hand, Will attempted the cure on his father because he was genuinely worried about the latter's health, so Will clearly valued his father as an individual for his own sake. On the other hand, if part of Will's goal was to find a general cure for Alzheimer's, then by using his father as an experimental subject, he was using him as a means toward a further end. Moreover, he did so without obtaining his father's explicit consent—indeed, he never even attempted to inform his father about the treatment before or after it was administered. For a deontologist, the consequences aren't what determine the rightness or wrongness of an action at all, so even if Will had succeeded in liberating humanity from Alzheimer's (instead of starting a chain of events that eventually leads to the extinction of the entire species), he would still have done the wrong thing. You can see why Kant was well known for being a bit too strict of a moralist.

Finally, we get to virtue ethics, an idea that was common in ancient Greece and was elaborated in particular by Aristotle. Virtue ethicists are not really concerned with determining what's right or wrong, but rather with what kind of life one ought to live in order to flourish. This means that Aristotle

would consider neither the consequences of an action per se, nor necessarily the intentions of the moral agent, but would look instead at whether the action was the reflection of a “virtuous” character. “Virtue” here does not mean the standard concept found in the Christian tradition, having to do with purity and love of God. Aristotle was concerned with our character, as manifested in traits like courage, equanimity, kindness, and so on.

Was Will virtuous in the Aristotelian sense of the term? Did he display courage, kindness, a sense of justice, compassion, and so on? It seems to me that the answer is an unequivocal yes. He clearly felt compassion for his father (and for Caesar). He had the courage to act on his convictions, which were themselves informed by compassion for both humans and animals. And he was kind to people around him, beginning with his father and with Caesar, and extending to his girlfriend, among others.

All in all, then, we have three different views about Will and what he did. For a consequentialist, his actions were immoral because they led to horrible outcomes. For a deontologist the verdict is a mixed one, considering that he both did and did not use his father as a means to an end. For a virtue ethicist, Will was undeniably on the right track, despite the fact that things, ahem, didn’t exactly work out the way he planned them.

Now, one could reasonably ask: okay, but given that the three major theories of ethics give us different results in the case of Will’s decision, is there any way to figure out if one of these theories is better than the others? That would be a separate discussion into what is called meta-ethics, that is the philosophy of how to justify and ground ethical systems. However, remember the analogy with math: it’s perfectly sensible to say that there is no answer as to which system is better, because their starting points (consequences, intentions, character) are all reasonable and cannot necessarily be meaningfully ranked.

Just to come clean here, I lean toward virtue ethics, and I suspect most viewers of the movie do too—whether they realize it or not. If you saw Will as a positive character, felt the compassion he had for his father, and shared his outrage at the way Caesar was being treated, you cannot reasonably fault him for what happened. He tried his best, and Aristotle was well aware



of the fact that sometimes our best is just not enough. Life can turn into a tragedy even for the individual endowed with the best character traits we can imagine.

### **Is It Inevitable?**

We've seen that there clearly are a number of ethical issues to consider when we contemplate human genetic enhancement, and that our conclusions about such issues depend on which set of moral axioms we begin with. But is any of the above relevant anyway? When it comes to new technologies like genetic engineering we often hear the argument to end all arguments: technological change, some say, is simply inevitable, so stop worrying about it and get used to it. François Baylis and Jason S. Robert, mentioned earlier, give a number of reasons to believe in what we might call techno-fate. Yet, holding something to be inevitable may be a way to dodge the need for tough ethical decisions, with potentially dire consequences, so it's probably wise to take a closer look.

Baylis and Robert base their "inevitability thesis" on a number of arguments.

To begin with, they claim that capitalism rules our society, and bio-capitalism is going to be just one more version of the same phenomenon.

Second, they quote Leon Kass as observing that the ethos of modern society is such that there is a "general liberal prejudice that it is wrong to stop people from doing something," presumably including genetic engineering of human beings.

Third, say Baylis and Robert, humans are naturally inquisitive and just can't resist tinkering with things, so it's going to be impossible to stop people from trying.

Fourth, we have a competitive nature, and we eagerly embrace everything that gives us an edge on others, and that surely would include (at least temporarily, until everyone has access to the same technology) genetic enhancement.

Lastly, it's a distinctive human characteristic to want to shape our own destiny, in this case literally taking the course of evolution in our own hands.

This seems like a powerful case in favor of inevitability, except for two things. First, we do have examples of technologies that we have developed and then abandoned, which makes the point that technological “progress” is a rather fuzzy concept, and that we can, in fact, reverse our march along a particular technological path.

For instance, we have given up commercial supersonic flight (the Concorde) for a variety of reasons, some of which were economical, other environmental. We used to make industrial use of chlorofluorocarbons (in refrigerators and aerosol cans), but we have eventually curbed and then banned their production because they were devastating the environment, creating the infamous ozone hole. And we have developed the atomic bomb, but have refrained from using it in a conflict after the devastating effects of Hiroshima and Nagasaki, and indeed are trying to ban nuclear weapons altogether. (Well, okay, according to the 1968 movie we will apparently end up using it again, in the process causing our own extinction and giving the planet to the apes. But hopefully that’s a timeline that does not actually intersect our own future. . . .)

The second objection to the “inevitability thesis” is that most of the attitudes described by Baylis and Robert are actually very recent developments in human societies, and are restricted to certain parts of the globe, which means that there is no reason to think that they are an unavoidable part of human nature. Capitalism is a recent invention, and it is actually managed and regulated one way or another everywhere in the world. The “liberal prejudice” is actually found only among the libertarian fringe of the American population and almost nowhere else on the planet.

We may be a naturally inquisitive species, but we are also naturally endowed with a sense of right and wrong, and the history of humanity has been characterized by a balance—admittedly sometimes precarious—between the two. Our alleged competitive “nature” is, again, largely a reflection of a specific American ethos, and is balanced by our instinct for cooperation, which is at least as strong. As for shaping our destiny, we would be doing so whether we did or did not decide to engage in human enhancement, or whether—which is much more likely—we decided to do it, but in a cautious and limited way.

The danger inherent in the sort of techno-inevitability espoused by Baylis and Robert is that it undercuts the need for deliberation about ethical consequences, attempting to substitute allegedly unchangeable and even obvious “facts” for careful ethical reasoning. This sort of capitalism-based hubris is captured in *Rise* when CEO Steven Jacobs tells our favorite scientist, Will Rodman: “You know everything about the human brain, except the way it works.” Except, of course, that the (lethal) joke is on the ultra-capitalist Jacobs, since he is the one who plunges into the cold waters of San Francisco Bay a few minutes later into the movie.

Whether we are talking about human genetic enhancement (*Rise*) or the deployment of nuclear weapons (the 1968 *Planet of the Apes* movie) these are not issues we can simply deputize to scientists or captains of industry. Rather, they’re the sort of thing that requires everyone to come to the discussion table, including scientists, technologists, investors, philosophers, politicians, and the public at large. The price of abdicating ethical decision making is the risk of forging a future like the one that brought Heston’s George Taylor to exclaim in desperation: “Oh my God . . . I’m back. I’m home. All the time it was . . . we finally really did it. YOU MANIACS! YOU BLEW IT UP! OH, DAMN YOU! GODDAMN YOU ALL TO HELL!”