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After humanity

Biotechnology could be a tool of evolutionary improvement

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With the publication of his article "The End of History" in 1989, Francis Fukuyama, then a little-known official in the US state department, suddenly became one of the world's most influential writers. His account, in what later became a book, of the end of the cold war as the triumph of liberal capitalism was perfectly timed and artfully constructed. Since then successive books on trust and social order have maintained Fukuyama's reputation for combining cogent argument with a sound use of social science and a sharp sense of how to make ideas newsworthy.

The End of History attracted an avalanche of criticism. The argument which hit home most powerfully with Fukuyama himself was the claim that history could not end if science was continuing to make dramatic new discoveries. His new book, *The Posthuman Future*, is an attempt to make amends. It is about how science, particularly biotechnology, is not only making history but also remaking humanity, and why we should be afraid of what is coming.

What most concerns Fukuyama is the prospect that biotechnology will transform what it means to be human. Three sets of changes stand out, each of which will cast profound doubt on some of our most cherished political beliefs: the effects on our personalities of various new kinds of drug; the radical extension of the life span; and the ability of genetic medicine to change and improve human beings.

The first set of changes is almost upon us. Before long, biotechnology will be able to change not only our moods but also the very structure of our personalities. Something of its potential power can be gauged from the influence of drugs like Prozac, Zoloft and Paxil, which have together been taken by some 10 per cent of Americans. Prozac works by increasing the levels of serotonin in the brain and has proven a remarkable cultural as well as medical phenomenon-albeit one on which the evidence is still contested-turning nervous and depressed people into confident, happy and assertive extroverts. Ritalin is another character transformer: the wonder-drug solution to attention deficit disorder. So successful is it that it is now used, usually illegally, by millions of students to increase concentration and energy levels and to fuel

feelings of euphoria.

The advocates of both drugs argue that there is a biological cause and a chemical solution to personality problems, and it is true that pharmaceutical remedies to psychological problems have (to the chagrin of some) proved much more effective than many non-pharmaceutical therapies in treating conditions as varied as manic depression and some forms of schizophrenia. The problems arise when you try to draw a line between an illness needing treatment, and an everyday human flaw. Depression, like the inability to concentrate, affects most people to varying degrees. There is nothing intrinsically wrong with redefining such relatively normal problems as pathologies which require therapy. For example, meditation techniques which teach people how to discipline their minds can be effective at holding low-level mental illnesses at bay. But it is all too easy for therapy to turn into social engineering. Fukuyama writes that "there is a disconcerting symmetry between Prozac and Ritalin. The former is prescribed heavily for depressed women lacking in self-esteem; it gives them more of the alpha-male feeling that comes with high serotonin levels. Ritalin on the other hand is prescribed largely for young boys who do not want to sit still in class because nature never designed them that way. Together, the two sexes are gently nudged towards that androgynous median personality, self-satisfied and socially compliant, that is the current politically correct outcome in American society."

Current policy justifies restrictions on drug use mainly on the basis of harm. A truly safe drug that simply makes people feel better, without side-effects, could, paradoxically, be much harder to cope with. Huxley's *Brave New World* is a dystopia precisely because we are so suspicious of chemical routes to happiness, and would like to believe happiness should be at least distantly related to virtue. For the same reasons, we are suspicious of chemical remedies for low self-esteem. Self-esteem should bear some relationship to real qualities of character and achievement (although some people enjoy unreasonably high self-esteem without either achievement or drugs).

The second big impact of biotechnology is likely to be a further radical extension of life itself. The rise in life expectancy over the last century already ranks as one of the great achievements of modern science. When Europe's pension systems were created, very few could hope to live long enough to enjoy them. Now well over 80 per cent of people can expect to live to 65, and well over a quarter are likely to be alive at 85. Combined with falling birth rates, the effect is a big demographic shift: according to the demographer Nicholas Eberstadt by 2050 the median age will be 54 in Germany, 56 in Japan and 58 in Italy.

Much has been written about the impact of these shifts on pensions systems and labour markets; rather less on politics. As Fukuyama points out, the character of

societies is likely to be changed by ageing, with more rigidity and resistance to change. Elderly women in particular will emerge as one of the most important blocs of voters and their views-less supportive of defence spending and using force abroad, according to US surveys-will gain in influence.

These arguments can be overdone. In the 1960s, swinging Britain was the oldest society in the world; conservative Japan one of the youngest. There is no simple correlation between age and politics. Yet just as it is intuitively likely that the rising importance of social order and inflation (which causes more harm to older savers than younger borrowers) over the last 20 years reflects ageing societies, so is it reasonable to expect that a further "greying" of society will change the political agenda-for example bolstering the constituency for higher spending on healthcare.

The forecasts on ageing, dramatic as they are, take no account of possible medical advances which could achieve a further sharp rise in life expectancy. Scientists have already identified some of the genetic foundations of mortality: the SIR2 gene, isolated by Leonard Guarente at MIT, plays a decisive role in the longevity of yeast and could possibly lead to ways of extending human lives. Stem cells created through therapeutic cloning could, in theory, be used to generate entirely new body parts identical to the cells in the host body, and so free from immune reactions.

Some scientists doubt whether anyone will ever find a simple key to the ageing process. But even if they are right, governments look certain to be condemned to hard choices. The continuing debate about whether the retirement age should rise in step with longevity may prove to be one of the easier issues. Much tougher ones will include how to manage access to new medical technologies, especially if they turn out to be very expensive, and how to strike the right balance between keeping people alive and keeping them lively (what of the prospect of an extra 50 years of life but no cure for Alzheimer's disease?).

The third big area of advance, and potential difficulty, is genetics. In recent years it has had a largely benign impact on political debate-notably stressing the genetic homogeneity of the human race. But much that may become known in the future will not be so comfortable. The most obvious example is the heritability of intelligence. Although this remains a complex issue because of the interactions of culture and biology, there is now a fairly wide consensus that some 40-50 per cent of many characteristics, including intelligence, are in some sense heritable, which if true has huge implications for how we think about social mobility and opportunity.

Another example is crime. It is easy now to mock the 19th-century Italian professor Cesare Lombroso, who identified a criminal physical type with a sloping head that was a throwback to an earlier stage of human evolution. But this does not mean that

criminal behaviour, or characteristics that are associated with it such as impulsiveness, have no genetic basis. The idea that there might be genes for crime has been discredited, not least for ignoring the extent to which crime is socially determined. Yet there is a growing body of evidence which is harder to discount, such as a large study in Denmark which found that identical twins had a 50 per cent chance of sharing criminal behaviour, versus 21 per cent for non-identical. If this sort of finding is accepted, it will be hard to ignore its implications for crime prevention and punishment. One of its effects could be a further challenge to the idea of free will and personal responsibility: for criminals there may be grounds for claiming diminished responsibility, the "genetic defence"; for states there may be grounds for taking pre-emptive action to restrain prospective criminals.

The way we think about sexuality is also likely to change. Imagine, Fukuyama says, that in 20 years time there is reliable evidence that exposure to certain levels of testosterone in the uterus correlates with homosexuality, and that mothers could take a pill to significantly reduce the chances of a child becoming gay. How many parents would take it? How many governments would let them?

Millions of parents have already used amniocentesis and sonograms to diagnose Down's syndrome or cystic fibrosis. Geneticists expect that in the foreseeable future mothers will be able to produce dozens of embryos, screen them for genetic profile and choose the characteristics they want. Cloning may eventually be possible. This spring it was rumoured that three women were pregnant with cloned embryos. If this is true, the children have only a slim chance of survival. But what sounded like science fiction only a few years ago is starting to sound almost commonplace.

Genetic engineering poses huge risks especially given how little we know about how genes interact with each other. For some, this confirms the virtue of the precautionary principle: we should avoid tinkering with complex ecologies that we barely understand. But there will be competing pressures. Parents will often do whatever they can to maximise their children's life chances. Global markets are likely to find legal or illegal ways of linking scientific supply to what may be desperate demand. Governments may conclude that, far from banning the technologies, they should use them to reduce inequalities or raise the IQ of their people.

The above are just a few examples of how biotechnology could change us. They suggest how hard it is likely to be for societies to find their way amidst a confusing scientific and moral landscape. The first half of Fukuyama's book works well, providing a clearly written description of this landscape. Unfortunately, in the second half, as he tries to provide a moral compass, his clear-headed confidence dissolves. The central thesis is straightforward enough: that human nature is so fundamental to our notions of justice, morality and the good life, that any attempts to modify it will have

disastrous consequences. Yet each successive step of the argument takes him further from solid ground.

His first challenge is to define human nature. Fukuyama argues that "human nature exists, is a meaningful concept and has provided a stable continuity to our experience as a species." Behavioural genetics and cross-cultural anthropology have, indeed, together done much to paint a picture of a human race that shares many more common traits than earlier generations of relativists allowed. So far, so good. The problems arise however when he tries to load a moral weight onto this picture. The ability to speak, the tendency to bring children up in families, and even belief in God, may all be typical of the human species and not explicable solely in cultural terms, but that does not make them in any strong sense constitutive of human nature. Nor is it clear why we should want to preserve all of these behaviours. Fukuyama weakly concludes that what he calls Factor X, our "essential humanness," is a cluster of characteristics that go to make up a whole.

At no point does Fukuyama answer the most powerful implicit claim of the biotechnologists. If we could-and it is a big "if"-change the behaviour and characteristics of some human populations in ways that were widely accepted as morally advantageous (perhaps with more optimistic, cooperative and less impulsive people on average) would this be a bad thing? After all, our inherited natures were shaped in a radically different environment, and have left us often ill-suited for modern life. There are many reasons for being nervous about any serious attempt to change our nature. But to defend our inherited makeup as the last word in evolution is just dogmatic.

Fukuyama criticises much Enlightenment thinking for having ignored human nature, and rightly argues that no political philosophy can be entirely credible without a coherent view of it. However, he is quite wrong to criticise today's political philosophies on these grounds. Much traditional conservative philosophy has a very clear view of human nature: our vulnerability to evil is the justification for a strong authority to hold us in check. Much socialist and liberal political philosophy is founded on a clear view of human beings as inherently benign and cooperative, just as neoliberalism (and neoclassical economics) is founded on an equally clear view of human beings as primarily self-interested. In none of these cases is the problem the lack of a view of human nature. The problem is rather that these views of human nature are simplistic caricatures, and devoid of any reference to the now very substantial empirical evidence we have about human psychology.

Moreover, it is by no means clear that our deepest understandings of justice, equality and morality are firmly founded on human nature. A more accurate claim would be that our deepest understandings of justice, equality and morality have arisen not as

reflections of human nature, but rather from the tension between ideals and reality, between our ability to imagine a more perfect world and the "crooked timber" of real people. This tension is dynamic, not static; what Norbert Elias called the civilising process is a story of how some aspects of our nature-impulsive behaviour, violence-have been reined in, while others-discipline, sociability, loyalty to the group, honesty-have been rewarded.

In essence, Fukuyama's argument is a secular version of Pope John Paul II's acknowledgement in 1996 that the church could accept that humans are descended from non-human animals, but that there is an "ontological leap" that occurs somewhere in this process, a point at which the soul is created.

The idea of such a leap is flattering. It implies that we are safe from competition from the computers and artificial intelligence systems which a generation ago might have been expected to challenge our monopoly on recognition and rights. And it provides protection from the claim that animals, particularly those like gorillas which are genetically very close to humans, should be treated as having rights. Unfortunately, despite much effort, it turns out to be very hard to construct a convincing argument in favour of this "leap." As the animal rights theorist Peter Singer has repeatedly shown, if our ideas of rights are founded on a view of human beings' moral capacity then it is illogical to exclude animals that are very similar to us from the domain of rights, just as it is illogical to treat a severely mentally incapacitated adult, or a foetus, as having the same rights as a fully formed adult.

Fukuyama at one point concedes that Singer's position is probably logically stronger than his own, but attacks it instead for where it leads. He argues that if we give up the idea that humans are unique, and that all humans share equally in this uniqueness, or if we allow some people to use genetic engineering to alter their biological nature radically, then we risk destroying the very ideas of equal rights and dignity on which much that is best in our civilisation rests.

This is a big claim which left me unconvinced. Equal dignity and rights are not, and never have been, empirical facts. Some of the authors of the American constitution and the declaration of the rights of man may have believed that all men were literally created equal. But these ideas are much better understood as valuable fictions which encourage people to respect each others' needs and interests, guarantee our protection from oppression and hold diverse communities together. It is quite possible to believe in them, while also recognising how very unequally people are endowed. Greater genetic variability might make it harder to sustain arguments for equal rights, equal treatment or equal opportunity. But it is not self-evident that they would. In any case, it is just as likely that genetic engineering will reduce genetic diversity as that it will increase it, just as it is likely that societies with greater genetic knowledge will do

more, rather than less, to pool risks. The fact that increased insight into each individual's genetic distinctiveness opens up the prospect of more personalised health care, will strengthen not weaken the case for socialised medicine because the alternative, in which everyone would buy their own insurance based on their own genetic predispositions, runs so counter to any sense of fairness or community. Such an outcome does not require anyone to believe that people are equal; instead it would reflect a majority choice that we would rather live in a society which treats people as if they are of equal worth.

Fukuyama's central claim is that biotechnology will be uniquely dehumanising. In a literal sense he is right; biotechnology will change our nature. But when we describe something as dehumanising we mean that it will destroy our most cherished values, and people's capacity to act as moral beings. This distinction matters because for nearly two centuries successive generations of critics have warned that technologies-the railway, the telephone, the television and the computer-would be dehumanising. Yet when we look back, each of these technologies has done far more to enrich life than to impoverish it, and the worst crimes against humanity have been committed by all-too-human institutions, often with scant support from technology. The very human nature which Fukuyama extols is as likely to threaten us in the future as any technology that we may create.

Fukuyama might have been on stronger ground if he had warned that the effects of biotechnology are likely to be as unequally distributed as those of previous industrial revolutions. But as in his other work, he hardly mentions words like "power" or "interest."

This absence is particularly evident in a final group of chapters which turn to the policy implications of the new technologies. Each year legislatures and politicians devote much time to the task of establishing the rules of a game that few fully understand. A great deal of the argument is polarised between laissez faire advocates of scientific progress, and sceptics whose primary purpose is to impede the new technology at all costs. Usually the battles take place in obscure committees and commissions. But the experience in Europe over GM crops shows how quickly issues at the intersection of science, economics and values can burst to the surface.

Most of the pressure for greater regulation is likely to come from consumer groups and environmentalists. However, some of it could come from pragmatic business leaders. Monsanto, for example, asked the first Bush administration to introduce stronger regulatory rules for genetically engineered products, including labelling. The proposal was subsequently dropped, but might have saved them from the disastrous backlash in Europe.

Governments wanting to regulate utilities or financial institutions can make use of an extensive body of theory and years of experience. In biotechnology, by contrast, governments and legislatures are making it up as they go along, mainly guided by the prevailing national climates of opinion. These are surprisingly varied. Britain, for example, has generally opted for cautious optimism, and has legalised therapeutic cloning and the use of stem cells harvested from human embryos. In the US, the religious right has made common cause with the radical left to oppose biotechnology in general and stem cell research in particular. In Germany, the unhappy history of eugenics has led to a very restrictive stance, while many southeast Asian countries have taken a liberal approach, primarily for economic reasons.

The principles which should guide regulators in the future are worryingly elusive. Take for example the argument that therapeutic technologies should be acceptable, whereas technologies for enhancing desirable attributes (like intelligence) should not be. This seems attractive, yet on closer inspection the distinction melts away: why for example should the enhancement of intelligence be so much less acceptable if it takes place in a clinic than in a school?

Fukuyama gives up on the attempt to define the boundaries. "As in other areas of regulation, many of these decisions will have to be made on a trial and error basis by administrative agencies based on knowledge and experience not available to us at present." Instead, he suggests, we should be thinking about how decisions are made. One decision-maker held up as a model is Britain's Human Fertilisation and Embryology Authority. Its main role is to regulate such things as IVF and donor insemination. Its strength is that it brings together the many incommensurable dimensions of human biotechnology—scientific, medical, economic and ethical—in one institution which is responsible for controlling research and regulating what can be done. Crucially, too, it combines lay members, doctors and scientists in a transparent approach to making decisions.

I doubt whether members of the HFEA would share Fukuyama's conclusion that "we want to protect the full range of our complex, evolved natures against attempts at self-modification" and that "we do not want to disrupt either the unity or the continuity of human nature, and thereby the human rights that are based on it." So far they have taken a pragmatic, but ethically sophisticated approach, to ensure that we maximise the benefits and minimise the risks associated with biotechnology. That is surely the best position to take. To describe research on fertility, the preservation and extension of life as dehumanising will strike most people as odd. Similarly, the idea that we should block whole fields of technology just because of what they might do at some point in the future, flies in the face of the rather successful ways in which societies have managed to regulate and shape past technologies, from nuclear power to television.

But many observers will share Fukuyama's anxiety. The new technologies elicit a sense of vertigo, perhaps appropriately since far from coming to an end, history may only just be gathering speed, as humanity learns how to control its own evolution, not just culturally but biologically too.

In the end Fukuyama's argument peters out. No guiding principles are offered, no firm conclusions drawn. Yet for all its flaws his book is a brave attempt to grapple with some profoundly difficult issues.