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SEPTEMBER 2009

CONSIDER THE GENES OF OUR FUTURE

FRANKEN FOODS

REPLACING TOOTHBRUSHES WITH APPLES

THE DEBATE OVER DESIGNER BABIES

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customizing your children,
eating apples instead of brushing your teeth,
enjoying a hamburger that was fed gm food before slaughter...

...WHAT'S NEXT?

You may think that controlling the future of genetic modification is competely out of your control, however, you are in for a big surprise.

The first step is becoming aware. Aware that in the mind of a scientist, GM foods, animals, and humans are the answers to world hunger, higher productivity, and preventing disease.

However, with the opinions and facts presented in this issue, you will become closer to the answers that may change your life. From the apples you find delicious, to the ham you put on the dinner table.

I'm sure you've heard of the term, 'designer babies.' Having the power to chose the attributes of your future child: their haircolor, intelligence, talents, and even where their future will take them. However are you willing to risk the well-being of your future bundle of joy, just to make them the cream of the crop?

I'm not asking you to completely change your way of life. I'm just hoping you will be more aware of what is happening behind the scenes.

Genetic modification is occuring everyday, without our permission and without our awareness. You could very well be eating genetically modified fruit everyday. And even if you aren't eating GM apples, the cow that was killed so you could enjoy your cheesburger could have been fed GM food, without your knowlege.

Until food is accurately labeled, you never can be too sure what you are putting inside your body. Next time you make your rounds at the grocery store, think before you purchase.

JUST THINK.

NOVA ASKUE
EDITOR-IN-CHIEF

SHOULD PARENTS BE ALLOWED TO **CUSTOM BUILD THEIR CHILDREN?**

WRITTEN BY
JANET SWISS

Some couples are not able to have children because their children will have a genetic disease and die before they are born or when they are very young. Techniques used to change the genetic make-up of the embryo allow these parents to have a child.

If we want the best for our children why shouldn't we design our own babies? Using genetic techniques we can help prevent certain genetic diseases. This both saves the children from suffering and reduces the cost and emotional strain of looking after an ill child. Will this lead to happier children and parents?

Spare part children? In a few cases where parents have had one child with a serious blood disease, they have used IVF to select embryos so that they can have a second child that can act as a future, tailor-made blood or bone marrow donor. In these cases when the child is born he or she will be healthy and can help their older brother or sister stay well.

YES
DESIGNER BABIES
NO

Is this right? In these cases, parents and doctors are creating a child to act as an organ-donating factory. How will the child feel? The child may feel that they were only born to be a help to their older brother or sister. Children should be loved and cherished for themselves and not what they can do for others.

These genetic techniques are very expensive. Why should only rich people be able to eradicate genetic diseases? This could lead to imbalances between rich and poor people.

Will we breed a race of super-humans who look down on those without genetic enhancements? Even today people who are born with disabilities face intolerance. Will discrimination against people already born with disabilities increase?

We could get carried away 'correcting' perfectly healthy babies. Once we start to eliminate embryos because they have the gene for a disease, what is to stop us from picking babies for their physical or psychological traits?

At the moment we can screen human embryos to choose only those embryos without the 'bad' genes. But is it right to add new artificial genes, or take away other genes? These genetic changes will be permanent and be contained in every single cell of the baby.

Alterations made by genetic engineering would be passed on from one generation to the next. What right have parents to choose what genetic characteristics are best for their children, and their children's children. Will the children react against the genetic changes that their parents have chosen for them?

Who is responsible for genetic modification of a child? The parents? The doctors? Or the Government?

DESIGNER BABIES VERSUS **NATURAL BABIES**
the introduction of genetically altered humans, brings a handful of negative energy.

PHOTO BY
LILLIAN SMITH

GM PIGS ARE BOTH **MEAT AND VEG**

WRITTEN BY
PETER DONALD

Pigs implanted with spinach genes have been created by Japanese scientists, according to unconfirmed local newspaper reports. The team claims it is the first to successfully insert a plant gene into an animal. The pigs reportedly contain a gene called FAD2, which converts saturated fat into an unsaturated fat called linoleic acid. Akira Iritani, at Kinki University in western Japan, who led the research, says the genetically modified pigs contain 20 per cent less saturated fat than normal pigs - and so could be healthier to eat.

"I know genetically-modified food has met with poor public acceptance, but I hope safety tests will be conducted to make people feel like eating the pork for the sake of their health," said Iritani.

The pigs were born three and a half years ago. Iritani says he wanted to be sure the genetic modification would be passed down through offspring before revealing details of his work. To date, the modification has been confirmed in three generations of pigs and seven generations of mice, he says.

Animal health groups in the UK have been quick to condemn Iritani's work. "We are absolutely staggered by the reports of this research," said Vicky Robinson of the UK's Royal Society for the Prevention of Cruelty to Animals. "It is totally disgraceful."

However, Iritani is yet to publish his research, and numerous animal biotechnology experts contacted by New Scientist say they have had no previous hint of the experiments.

CROWDED SPACES
In order to be more economically productive, slaughter houses are in favor of GM livestock.

PHOTO BY
NEIL WALSH

WHAT DO THOSE **NUMBERS MEAN?**

WRITTEN BY
DAVE KNAPP

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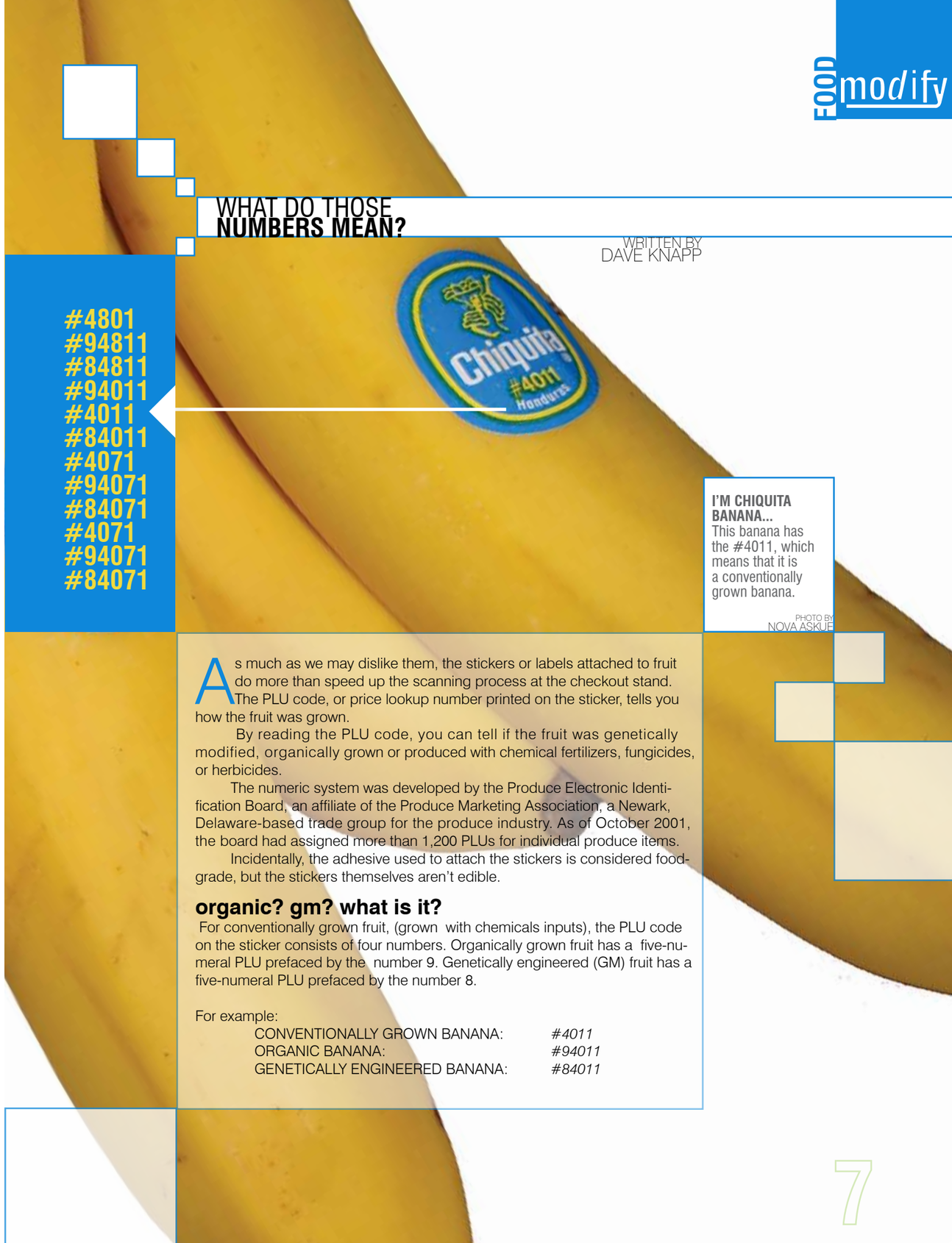

I'M CHIQUITA BANANA...
This banana has the #4011, which means that it is a conventionally grown banana.

PHOTO BY
NOVA ASKUE

As much as we may dislike them, the stickers or labels attached to fruit do more than speed up the scanning process at the checkout stand. The PLU code, or price lookup number printed on the sticker, tells you how the fruit was grown.

By reading the PLU code, you can tell if the fruit was genetically modified, organically grown or produced with chemical fertilizers, fungicides, or herbicides.

The numeric system was developed by the Produce Electronic Identification Board, an affiliate of the Produce Marketing Association, a Newark, Delaware-based trade group for the produce industry. As of October 2001, the board had assigned more than 1,200 PLUs for individual produce items.

Incidentally, the adhesive used to attach the stickers is considered food-grade, but the stickers themselves aren't edible.

organic? gm? what is it?

For conventionally grown fruit, (grown with chemicals inputs), the PLU code on the sticker consists of four numbers. Organically grown fruit has a five-numeral PLU prefaced by the number 9. Genetically engineered (GM) fruit has a five-numeral PLU prefaced by the number 8.

For example:

CONVENTIONALLY GROWN BANANA:	*#4011*
ORGANIC BANANA:	*#94011*
GENETICALLY ENGINEERED BANANA:	*#84011*

apple A DAY KEEPS THE DENTIST AWAY?

WRITTEN BY PHIL LEMPERT

SCIENTISTS GENETICALLY ENGINEERING APPLES & STRAWBERRIES TO PREVENT TOOTH DECAY.

GENETICALLY MODIFIED FOODS (GMOS) ARE THE BUZZ THESE DAYS. It's good buzz and bad buzz. Good buzz is that we can create foods that are healthier, may cure disease, reduces use of pesticides and are cheaper. But the unanswered questions about GMOs about the safety, the ethics, the regulations, the long-term health and environmental ramifications have the bad buzz flowing.

Everyone from scientists to conservationists to the religious to the common consumer seem to be concerned with what Prince Charles calls "frankenfoods" for various reasons. The fear of this technology stems from the fact that genetic engineering is a new experiment, not a practice that has had decades of testing to prove its long-term safety to our health and the environment.

The battlefield is the shelves of our supermarkets. The casualties may well be the consumers who can benefit most from these innovations. The problems are many. Labeling, which at the time of this writing seems as if it will not be required, is at the top of the list for many. But the selection of GMO foods that are being discussed is probably as much cause for controversy than the foods themselves. Tomatoes with fish genes, and other cross-species GMOs raise eyebrows and questions.

prevent tooth decay?

The introduction of this new nutritional science to the American consumer has been a public relations disaster, which has not improved over time. If we want people to understand the benefits of GMOs let's keep it simple and keep it labeled.

Scientists from Britain want us to buy genetically engineered fruit that can help prevent tooth decay; and this might just be the product that can change the image and understanding of GMOs. The genes of apples and strawberries would be modified with a gene for a peptide protein that prevents dental caries. The immunologists at Guy's Hospital in London discovered the gene to the peptide, which helps control the growth of bacteria that causes tooth decay. Researchers at the Horticultural Research Institute (HRI) in Kent, England, are trying to find ways to get the peptide into the fruit.

Consumers will weigh the benefits and drawbacks of these GMO apples and strawberries. The fruit will certainly be more expensive, but how much are we willing to pay? Do we want our children eating these apples, which are not the same as the good old apples that nature intended? Will the introduction of these fruits discourage the habit of regular brushing and flossing? How effective will the fruits be, and is ingesting a questionable substance with limited testing worth the risk? Lot's of questions that will need honest and easy-to-understand answers before this new generation of 'super foods' can be a commercial success.

There is concern for the safety of consuming any genetically modified food. When a new gene is introduced into a plant's DNA, other undetectable changes to the fruit may occur, and it may not be till years after the food is introduced to the market that the problems may surface. For example, no one knows how the new plant will affect the ecosystem, as it is not a plant that mutated gradually in nature. And by inadvertent fertilization with other plants, the new food could cause irreparable environmental damage. Also, people who were not previously allergic to these natural foods may find themselves in life threatening situations if the genetically modified food has been introduced with proteins from other sources. Children are often more susceptible to protein allergens than adults.

Though there should first be extensive testing of this new food to ensure its safety, the new genetically modified fruit may be rushed to the market soon. Because foreign competitors are producing cheaper fruit, the apple orchard farmers of the Garden of England are being undercut. Researchers at HRI predict that unless the English farmers are able to produce the GE apple, they may be driven completely out of business within the next twenty years. Having recently faced problems in exporting food products because of mad cow disease and hoof and mouth disease, the English need a profitable commodity to revive their depressed trade situation. With the advantage of this exclusive genetically engineered apple, England could export the product globally, and pull itself out of economic disaster.

As with any food product, consumers must have the information to know what they are eating, which is why labeling of all GMO foods is so important. However, the United States Department of Agriculture has still not decided to require these labels as mandatory, and it doesn't look as if labeling will happen any time soon. What we as retailers and consumers must do is be willing to accept this new scientific data and be open to having them on our shelves, but not without labels.

DO YOU REALLY KNOW WHAT YOU'RE EATING?

TODAY,
7 OUT OF EVERY *10* ITEMS ON GROCERY STORES SHELVES CONTAIN INGREDIENTS THAT HAVE BEEN GENETICALLY MODIFIED.

HOW EFFECTIVE WILL THE FRUITS BE, AND IS **INGESTING A QUESTIONABLE SUBSTANCE** WITH LIMITED TESTING **WORTH THE RISK?**

THE MANY ISSUES CONCERNING **GENETICALLY ENGINEERED** FOOD

FRANKENFOODS

WRITTEN BY
SAMANTHA
JONES

ILLUSTRATIONS BY:
NANHEE
HWANG

THE GENETIC ENGINEERING OF PLANTS AND ANIMALS IS LOOMING AS ONE OF THE GREATEST AND MOST INTRACTABLE ENVIRONMENTAL CHALLENGES OF THE 21ST CENTURY. Already, this novel technology has invaded our grocery stores and our kitchen pantries by fundamentally altering some of our most important staple food crops.

Genetic engineering (GE) is the process of transferring specific traits, or genes, from one organism into a different plant or animal. The resulting organism is called transgenic or a GMO (genetically modified organism). 70% of processed foods in American supermarkets now contain genetically modified ingredients.

This process is different from traditional cross breeding, where genes can only be exchanged between closely-related species. With genetic engineering, genes from completely different species can be inserted into each other. For example, in the 1990's scientists attempted to insert a fish gene into a tomato to make the tomato resistant to frost.

The majority of genetically modified crops grown today are engineered to be resistant to pesticides and/or herbicides. These modified crops can withstand being sprayed with weed killer while all the other plants in the field die. This concerns many people because the weeds can grow resistant to pesticides, leading farmers to spray even more on their crops.

GE proponents claim genetically modified crops use less pesticides than non-GE crops, when in reality they can use even more chemicals. This causes more environmental pollution, exposes the food to even more toxins, and causes more safety issues for the farmer.

Some GE crops are actually classified as a pesticide. The New Leaf potato, which has since been taken off grocery store shelves, was genetically engineered to produce the Bt (Bacillus thuringiensis) toxin in order to kill any pests that attempt to eat it. The actual potato has been deemed a pesticide and is regulated by the Environmental Protection Agency (EPA), not the Food & Drug Administration (FDA) which regulates food. Because of this, safety testing for this product was not as strict as with food, even though consumers ate these potatoes.

NO ONE KNOWS IF OR HOW
EATING MUTATED FOOD
COULD AFFECT US.

future solutions

SCIENTISTS ARE CURRENTLY WORKING ON WAYS TO GENETICALLY ENGINEER FARM ANIMALS. In an effort to speed up slaughter lines and increase profits, research is underway to genetically engineer hogs that are all the same size and shape. Work is also being done to try to create animals that have odorless manure or hogs that don't have any waste at all!

Adequate research has not been done on any effects from eating animals that were fed genetically-engineered grain, nor have adequate studies been done on the effects of directly consuming genetically engineered crops like corn and soy. There is concern that we, and our families, are being experimented on by the companies who created GMO.

Much concern has been raised over the inadequate testing of the effects of genetic engineering on humans and the environment. Genetic engineering is still an emerging field, and scientists do not know exactly what can happen from putting the DNA of one species into another. The introduction of foreign DNA into an organism could trigger other DNA in the plant or animal to mutate and change.

And once released into the environment, these genetically engineered organisms cannot be cleaned up or recalled. In addition, researchers do not know if there are any long-term or unintended side effects from eating GE foods. Opponents to genetic engineering state that GE foods must be proven safe before they are sold to the public because safety has not yet been shown.

GENE MUTATION: There is concern that we, and our families, are being experimented on by the companies who created GMO.

WORK IS ALSO BEING DONE TO TRY TO CREATE
ANIMALS THAT HAVE ODORLESS MANURE
OR
HOGS THAT DO NOT HAVE ANY WASTE AT ALL!

CONCERNS
OVER GENETIC ENGINEERING

■ ALLERGIC REACTIONS: There are two concerns regarding allergic reactions. The first is with known allergens. A gene from a Brazil nut was inserted into soybeans, which led to severe reactions in some people with nut allergies. So, there is concern that people with known allergies might not be aware that the food they are eating contain substances they are allergic to. The second concern is over the possibility of new allergies. The new combinations of genes and traits have the potential to create new allergic reactions.

■ GENE MUTATION: Scientists do not know if the forced insertion of one gene into another gene can destabilize the entire organism, which would encourage mutations and abnormalities. No one knows if or how eating mutated food could affect us.

■ GENES BEING TURNED ON AND OFF: Genes are turned on or off under certain circumstances. Researchers do not know if genetic modification could sometimes turn a gene on or off in an inappropriate circumstance.

■ DAMAGE TO THE ENVIRONMENT: Insects, birds and wind can carry genetically altered pollen to other fields and forests, pollinating plants and creating new species that will carry on the genetic modification.

■ ANTIBIOTIC RESISTANCE: GE food could make disease-causing bacteria resistant to antibiotics, which could increase the spread of disease and illness throughout the world. Almost all GE food contains antibiotic resistance marker genes that help producers know whether the new genetic material was transferred to the host plant or animal.

■ LOSS OF NUTRITION: Genetic engineering can change the nutritional value of food.

■ GENE POLLUTION CAN NOT BE CLEANED UP: Once released into the environment, genetically modified organisms cannot be removed. So, unlike chemical and nuclear contamination which can at least be contained, genetic pollution can not be isolated and separated from the environment in which it is spreading.

■ INCREASED CHEMICAL USE: Many GE plants are bred to be resistant to herbicides, or weed killer, so a farmer can spray an entire field and kill only the weeds. In time, the weeds develop resistance to the herbicide, thus forcing the farmer to spray even more chemicals onto the fields. A study of over 8,200 university field trials showed that farmers growing GE soybeans use 2 to 5 times more weed killer than farmers growing natural varieties.

■ SUPERWEEDS. GE crops can cross-pollinate with weeds, potentially creating superweeds that could become difficult to control.

■ TERMINATOR SEEDS. GE seeds have been created that will only grow once. In many parts of the world, saving seeds from season to season is how farmers are able to survive and continue growing food. With this technology, seeds are sterile, forcing farmers to buy seed each year from a major corporation.

MANY YEARS AGO... WE WERE TOLD THAT BY THE TURN OF THE CENTURY WE WOULD LIVE IN DOMED CITIES WITH ROBOT MAIDS AND TRAVEL TO WORK BY JETPACK. NOW WE ARE TOLD THAT A WORLD OF GENETICALLY ENHANCED HUMANS IS JUST AROUND THE CORNER.

DESIGNER BABIES VERSUS **NATURAL BABIES** with the introduction of genetically altered humans, negative energy will arise.

CUSTOMIZING OUR CHILDREN

WRITTEN BY
STEPHEN PINKER
ILLUSTRATIONS BY:
MIE TSUTSUMI

ARGUABLY THE MOST EMOTIONALLY CHARGED DEBATE IS OVER THE PROSPECT OF HUMAN GENETIC ENHANCEMENT OR "DESIGNER BABIES."

It's only a matter of time, many say, before parents will improve their children's intelligence and personality by having suitable genes inserted into them shortly after conception.

A few commentators have welcomed genetic enhancement as just the latest step in the struggle to improve human life. Many more are appalled. They warn that it is a Faustian grab at divine powers that will never be used wisely by us mortals. They worry that it will spawn the ultimate inequality, a genetic caste system. In his book Our Posthuman Future (just released in paperback), the conservative thinker Francis Fukuyama warns that genetic enhancement will change human nature itself and corrode the notion of a common humanity that undergirds the social order. Bill McKibben, writing from the political left, raises similar concerns in his new jeremiad Enough: Staying Human in

inevitable

WHETHER THEY WELCOME OR DECRY IT, ALMOST EVERYONE AGREES THAT GENETIC ENHANCEMENT IS INEVITABLE IF RESEARCH PROCEEDS ON ITS CURRENT COURSE. In America, genetic enhancement is a major concern of the president's Council on Bioethics; its chairman, Leon Kass, and several of its members, including Fukuyama, are outspoken worriers.

As it happens, some kinds of genetic enhancement are already here. Anyone who has been turned down for a date has been a victim of the human drive to exert control over half the genes of one's future children. And it is already possible to test embryos conceived in vitro and select ones that are free of genetic defects such as cystic fibrosis.

But when it comes to direct genetic enhancement - engineering babies with genes for desirable traits - there are many reasons to be sceptical. Not only is genetic enhancement not inevitable, but it is not particularly likely in our lifetimes. This skepticism comes from 3 sources: the limits of futurology, the science of behavioural genetics, and human nature itself.

invalid predictions

THE HISTORY OF THE FUTURE SHOULD MAKE US RAISE AN EYEBROW WHENEVER THE EXPERTS TELL US HOW WE WILL LIVE 10, 20, OR 50 YEARS FROM NOW. Not long ago we were assured that by the turn of the century we would live in domed cities, commute by jet-pack, and clean our homes with nuclear-powered vacuum cleaners wielded by robot maids. More recently we were promised the paperless office, interactive television, the internet refrigerator, and the end of bricks-and-mortar retail. It's not just that these developments have not yet happened, many of them, like domed cities, never will happen.

Why are technological predictions usually wrong? Many futurologists write as if current progress can be extrapolated indefinitely - the fallacy of climbing trees to get to the moon. They routinely underestimate the number of things that have to go right for a development to change our lives. It takes more than a single eureka!; it takes a large number of more boring discoveries, together with the psychological and sociological imponder-ables that make people adopt some invention en masse. Who could have predicted the videophones of the 1960s would sink like a stone while the text messaging of the 1990s would become a teenage craze?

Finally, futurologists tend to focus their fantasies on the benefits of a new technology, whereas actual users weigh both the benefits and the costs. Do you really want to install software upgrades on your refrigerator or reboot it when it crashes?

MORE RECENTLY WE WERE PROMISED THE **PAPERLESS OFFICE, INTERACTIVE TELEVISION, THE INTERNET REFRIGERATOR,** AND THE END OF BRICKS-AND-MORTAR RETAIL.

Many prognosticators assume that we are in the midst of discovering genes for talents such as mathematical giftedness, musical talent and athletic prowess. The reality is very different. The achilles heel of genetic enhancement will be the rarity of single genes with consistent beneficial effects.

consistency

BEHAVIOURAL GENETICS HAS UNCOVERED A PARADOX. We know that tens of thousands of genes working together have a large effect on the mind. Twin studies show that identical twins (who share all their genes) are more similar than fraternal twins (who share half their genes, among those that vary from person to person), who in turn are more similar than adopted siblings (who share even fewer of the varying genes). Adoption studies show that children tend to resemble their biological relatives in personality and intelligence more than they resemble their adopted relatives.

But these are effects of sharing an entire genome, or half of one. The effects of a single gene are much harder to show. Geneticists have failed to find single genes that consistently cause schizophrenia, autism or manic-depressive disorder, even though there is overwhelming evidence that these conditions are substantially heritable. And if we can't find a gene for schizophrenia, we're even less likely to find one for humour, musical talent, or likeability, because it's easier to disrupt a complex system with a single defective part than to improve it by adding a single beneficial one.

The 1998 report of a gene that was correlated with a four-point advantage in IQ was recently withdrawn because it did not replicate in a larger sample - a common fate for putative single gene discoveries. So don't hold your breath for the literary creativity gene or the musical talent gene. The human brain is not a bag of traits with one gene for each trait. Neural development is a staggeringly complex process guided by many genes interacting in feedback loops. The effect of one gene and the effect of a second gene don't produce the sum of their effects when they're simultaneously present. The pattern of expression of genes (when they are turned on or off by proteins and other signals) is as important as which genes are present.

Even when genes should be at their most predictable - in identical twins, who share all their genes, and hence all the interactions among their genes -we don't have foregone conclusions. Identical twins reared together (who share not only their genes but most of their environments) are imperfectly correlated in personality measures such as extroversion and neuroticism. The correlations, to be sure, are much larger than those for fraternal twins or unrelated people, but they are seldom greater than 50%. This tells us there is an enormous role for chance in the development of a human being.

“WOULD YOU OPT FOR A **TRAUMATIC AND EXPENSIVE** PROCEDURE THAT **MIGHT** GIVE YOU A SLIGHTLY HAPPIER AND MORE TALENTED CHILD, **MIGHT** GIVE YOU A LESS HAPPY, LESS TALENTED CHILD, **MIGHT** GIVE YOU A DEFORMED CHILD, AND PROBABLY WOULD **MAKE NO DIFFERENCE?”**

downsides

IT GETS WORSE. MOST GENES HAVE MULTIPLE EFFECTS, AND EVOLUTION SELECTS THE ONES THAT ACHIEVE THE BEST COMPROMISE AMONG THE POSITIVE AND THE NEGATIVE ONES. Take the most famous candidate for genetic enhancement: the mice that were given extra copies of the NMDA receptor, which is critical to learning and memory. These poster mice did learn mazes more quickly, but they also turned out to be hypersensitive to pain. Closer to home, there is a candidate gene in humans that appears to be correlated with a 10-point boost in IQ. But it is also associated with a 10% chance of developing torsion dystonia, which can confine the sufferer to a wheelchair with uncontrollable muscle spasms.

This places steep ethical impediments to research on human enhance ment. Even if some day it might be possible, could you get there from here? How can scientists try out different genes to enhance the minds of babies given that many of them could have terrible side effects?

Genetic enhancement faces another problem: most traits are desirable at intermediate values. Wallis Simpson said that you can’t be too rich or too thin, but other traits don’t work that way. Take aggressiveness. Parents don’t want their children to be punching bags or doormats, but they also don’t want Attila the Hun either. Most want their children to face life with confidence rather than sitting at home cowering in fear, but they don’t want a reckless daredevil out of Jackass. So even if a gene had some consistent effect, whether the effect was desirable would depend on what the other tens of thousands of genes in that child were doing.

The third obstacle to re-engineering human nature comes from human nature itself. We are often told that it’s only human for parents to give their children every possible advantage. Stereotypical yuppies who play Mozart to their pregnant bellies and bombard their newborns with flash cards would stop at nothing, it is said, to give their children the ultimate head start in life.

But while parents may have a strong desire to help their children, they have an even stronger desire “not to hurt” their children. Playing Mozart may not make a fetus smarter, but it probably won’t make it stupider or harm it in other ways. Not so for genetic enhancement. It is not obvious that even the most overinvested parent would accept a small risk of retardation in exchange for a moderate chance of improvement. Another speed bump from human nature consists of people’s intuitions about naturalness and contamination. People believe that living things have an essence that gives them their powers and which can be contaminated by pollutants. These intuitions have been powerful impediments to the acceptance of other technologies. Many people are repelled by genetically modified foods even though they have never been shown to be unsafe or harmful to the environment. If people are repulsed by genetically modified soybeans, would they really welcome genetically modified children?

Finally, anyone who has undergone in-vitro fertilization knows that it is a decidedly unpleasant procedure, especially in comparison to sex. Infertile couples may choose the procedure as a last resort, and some kooks may choose it to have a child born under a certain astrological sign or for other frivolous reasons. But people who have the choice generally prefer to conceive their children the old-fashioned way.

It is misleading, then, to assume that parents will soon face the question, “Would you opt for a procedure that would give you a happier and more talented child?” When you put it like that, who would say no? The real question will be, “Would you opt for a traumatic and expensive procedure that might give you a slightly happier and more talented child, might give you a less happy, less talented child, might give you a deformed child, and probably would make no difference?” For genetic enhancement to “change human nature” not just a few but billions of people would have to answer yes.

My point is not that genetic enhancement is impossible, just that it is far from inevitable. And that has implications. Some bioethicists have called for impeding, or even criminalizing, certain kinds of research in genetics and reproductive medicine, despite their promise of improvement in health and happiness. That is because the research, they say, will inevitably lead to designer babies. If genetic enhancement really were just around the corner, these proposals would have to be taken seriously. But if the prospect is very much in doubt, we can deal with the ethical conundrums if and when they arise. Rather than decrying our posthuman future, thinkers should acknowledge the frailty of technological predictions and should base policy recommendations on likelihoods rather than fantasies.

WHAT TYPE OF BABY WOULD YOU LIKE?
It isn’t before long that we will be able to chose the traits of our children. Is this a good thing? Or a bad thing?

CONSIDER OUR FUTURE

MODIFY.COM