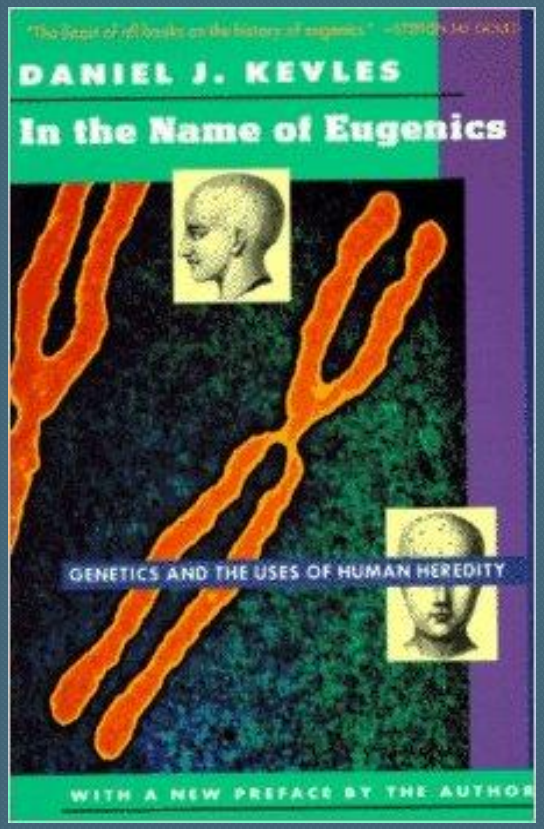
Should We Worry About a New Eugenics?

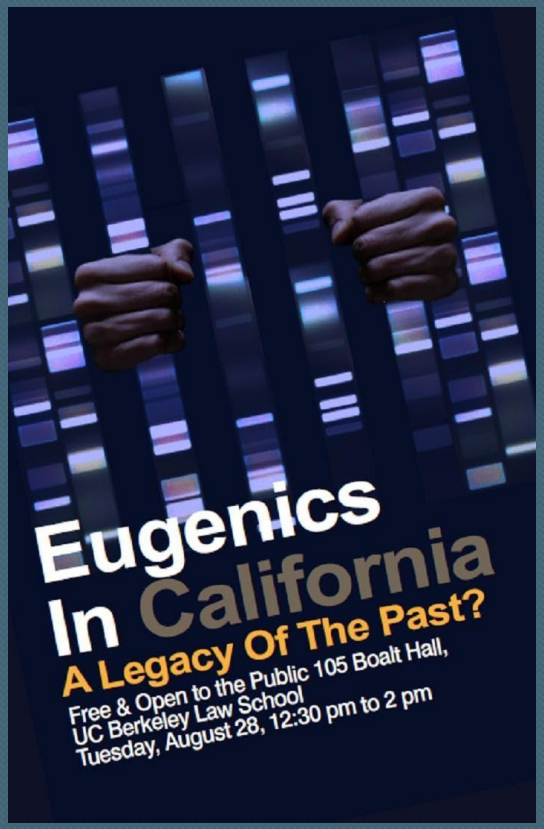
Facing History and Ourselves 2015

Race & Membership in American History:
The Eugenics Movement

Marcy Darnovsky
Center for Genetics and Society

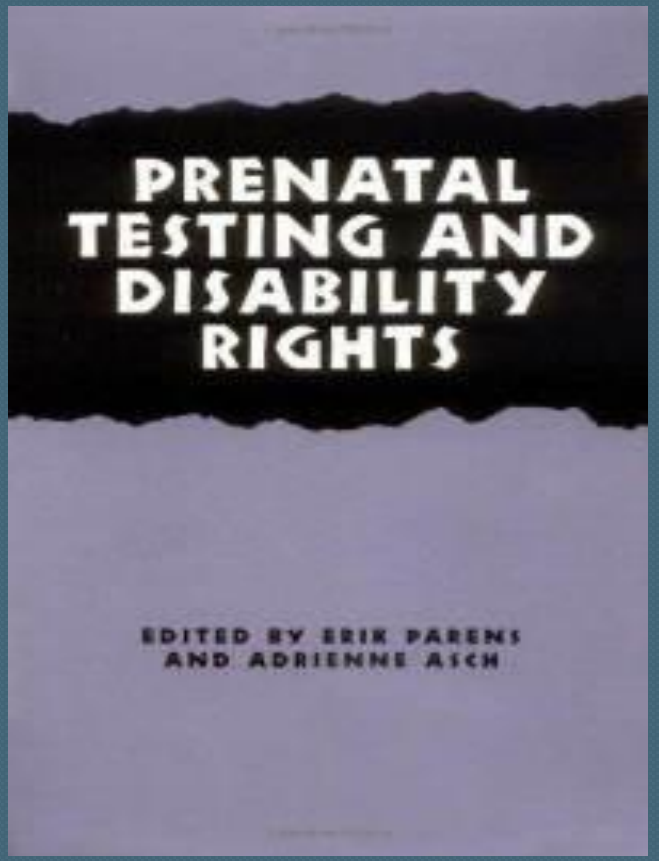
Eugenics past, present, future





Viking sperm, doctoral donors

Selection technologies



New selection technologies

"Get Ready for the Flood of Fetal Gene Screening…The spectre of eugenics will loom over the whole discussion."

Nature, Jan 2011

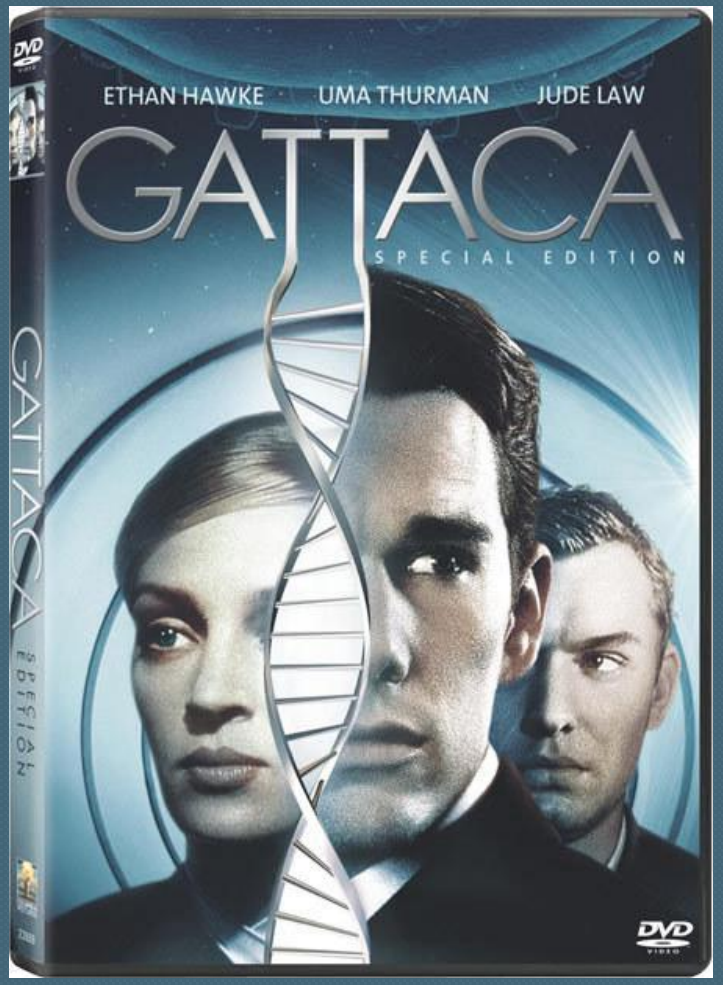
Embryo Screening for…

LA fertility clinic offers embryo screening for hair, eye and skin color.

"Others are frightened by the criticism but we have no problems with it."

Genetic testing

GATTACA: "Valids" &"in-valids"



Designer babies & "Gen-Rich"

THE FUTURE OF MEDICINE

Parents can now pick a kid's sex and screen for genetic illness. Will they someday select for brains and beauty too?

Designer Babies

By MICHAEL D. LEMONICK

UNTIL JUST A FEW YEARS AGO, MAKING A BABY BOY OR A BABY GIRL WAS PRETTY MUCH A HIT-OR-miss affair. Not anymore. Parents who have access to the latest genetic testing techniques can now predetermine their baby's sex with great accuracy—as Monique and Scott Collins learned to their delight two years ago, when their long-wished-for daughter Jessica was born after genetic prescreening at a fertility clinic in Fairfax, Va.

And baby Jessica is just the beginning. Within a decade or two, it may be possible to screen kids almost before conception for an enormous range of attributes, such as how tall they're likely to be, what body type they will have, their hair and eye color, what sorts of illnesses they will be naturally resistant to, and even, conceivably, their IQ and personality type.

In fact, if gene therapy lives up to its promise, parents may someday be able to go beyond weeding out undesirable traits and start actually inserting the genes they want—perhaps even genes that have been crafted in a lab. Before the new millennium is many years old, parents may be going to fertility clinics and picking from a list of options the way car buyers order air conditioning and chrome-alloy wheels. "It's the ultimate shopping experience: designing your baby," says biotechnology critic Jeremy Rifkin, who is appalled by the prospect. "In a society used to cosmetic surgery and psychopharmacology, this is not a big step."

The prospect of designer babies, like many of the ethical conundrums posed by the genetic revolution, is confronting the world so rapidly that doctors, ethicists, religious leaders and politicians are just starting to grapple with the implications—and trying to decide how they feel about it all.

They still have a bit of time. Aside from gender, the only traits that can now be identified at the earliest stages of development are about a dozen of the most serious genetic diseases. Gene therapy in embryos is at least a few years away. And the gene or combination of genes responsible for most of our physical and mental attributes hasn't even been identified yet, making moot the idea of engineering genes in or out of a fetus. Besides, say clinicians, even if the techniques for making designer babies are perfected within the next decade, they should be applied in the service of disease prevention, not improving on nature.

But what doctors intend is not necessarily what's going to happen. Indeed, the technology that permitted the Collinses lovingly to pick the sex of their child was first used to select for health, not gender per se. Adapting a technique used on livestock, researchers at the Genetics & IVF Institute in Fairfax took advantage of a simple rule of biology: girls have two X chromosomes, while boys have one X and one Y. The mother has only Xs to offer, so the balance of power lies with the father—specifically with his sperm, which brings either an X or a Y to the fertilization party.

As it happens, Y chromosomes have slightly less DNA than Xs. So by staining the sperm's DNA with a nontoxic light-sensitive dye, the Virginia scientists were able to sort sperm by gender—with a high rate of success—before using them in artificial insemination. The first couple to use the technique was looking to escape a deadly disease known as X-linked hydrocephalus, or water on the brain, which almost always affects boys.

But while the technique is ideal for weeding out this and other X-linked disorders, including hemophilia, Duchenne muscular dystrophy and Fragile X syndrome, most patients treated at Genetics & IVF want to even out their families—a life-style rather than a medical decision. The Fairfax clinic has been willing to help, but such a trend doesn't sit well with some other practitioners. "Our view at the moment," says Dr. Zev Rosenwaks, director of the Center for Reproductive Medicine and Infertility at Cornell Medical Center in New York City, "is that these techniques should be used for medical indications, not family balancing."

But now that parents know that the technology is available, and that at least some clinics will let them choose a child's gender for nonmedical reasons, it may be too late to go back. In a relatively short time, suggests Princeton University biologist Lee Silver, whose book *Remaking Eden* addresses precisely these sorts of issues, sex selection may cease to be much of an issue. His model is in vitro fertilization, the technique used to make "test-tube" babies. "When the world first learned about IVF two decades ago," he says, "it was horrifying to most people, and most said that they

WHAT PEOPLE THINK

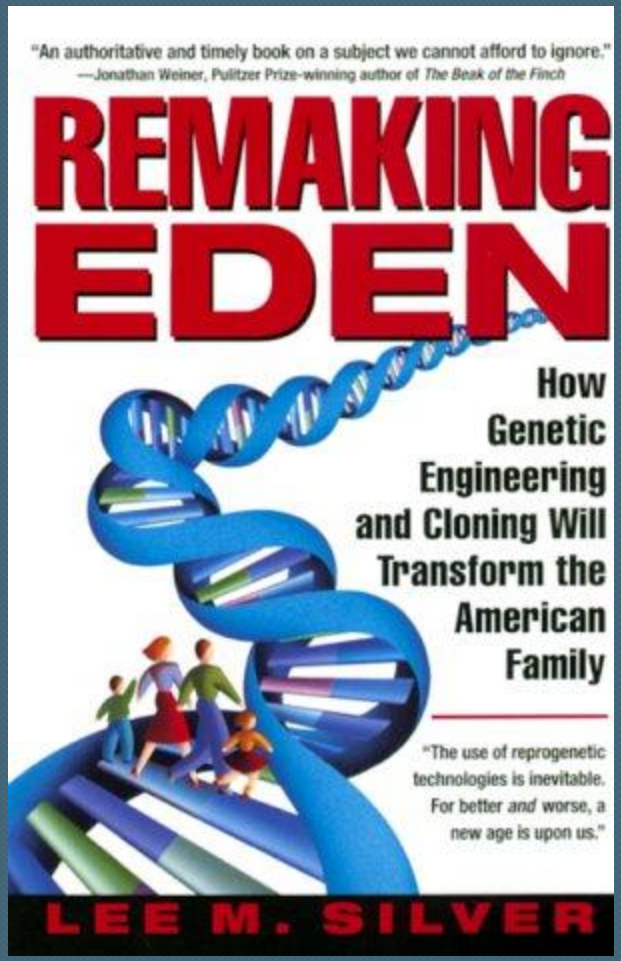
	Yes
Rule out a fatal disease	60%
Ensure greater intelligence	33%
Influence height or weight	12%
Determine sex	11%

Should parents with genetically linked diseases be required to test their children for them?

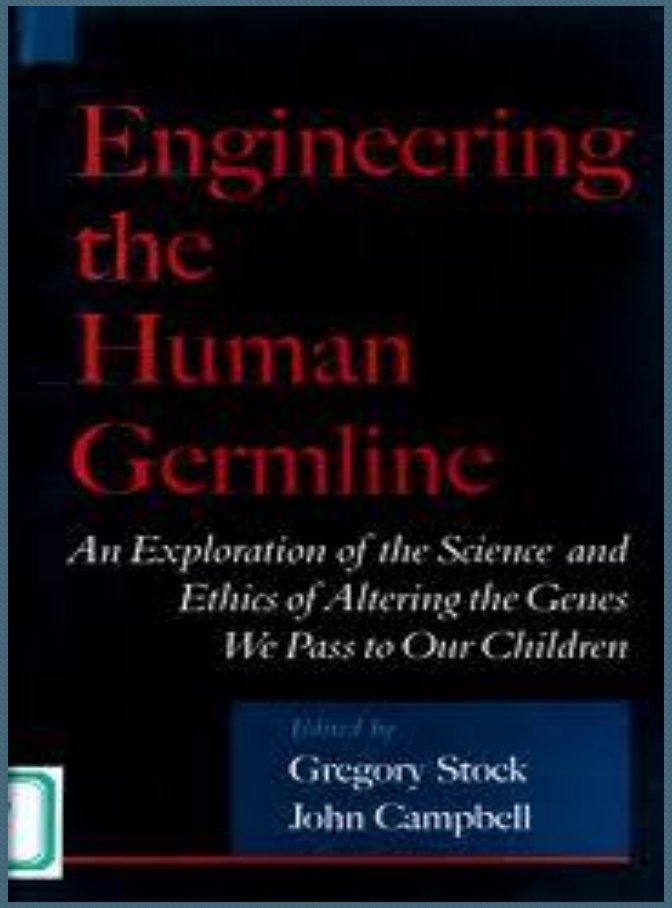
Yes 39% No 35%

TIME, JANUARY 11, 1999

Illustrations for TIME by John Craig



Engineering the Human Germline



Goal: To make inheritable genetic modification "acceptable" to the public.

Conclusion: "The question is not if, but when and how."

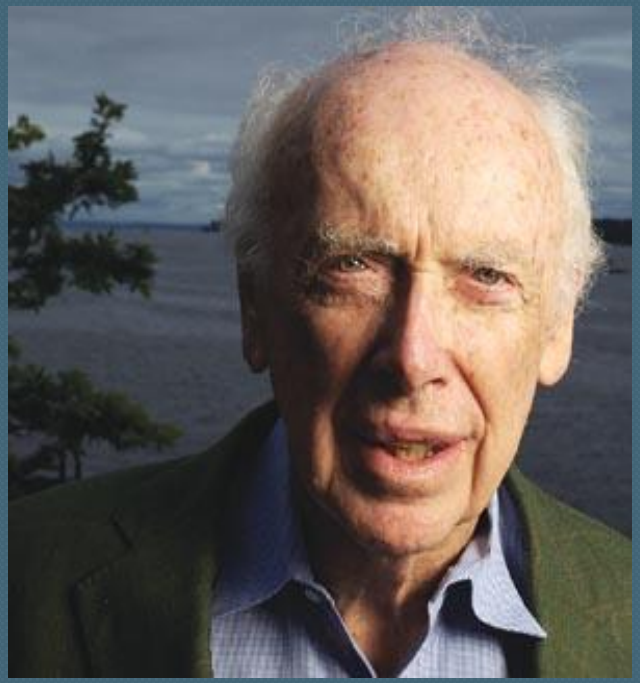
Science facts

A prominent techno-enthusiast

"We have created a society that is so technologically complex that we must now create people who are smart enough to manage it."

Daniel Koshland

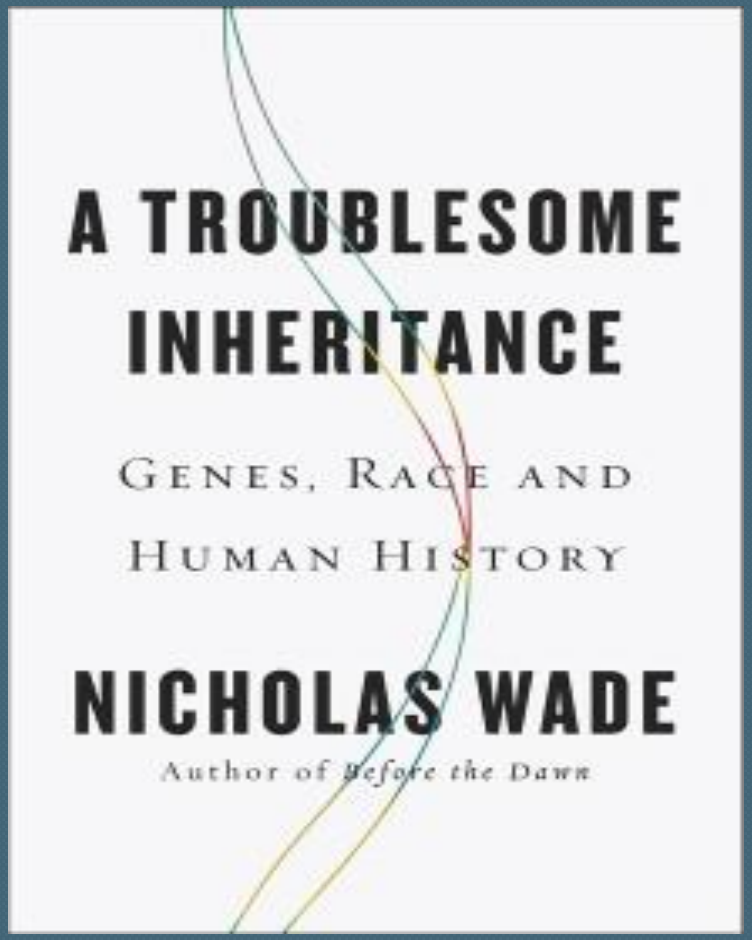
And another

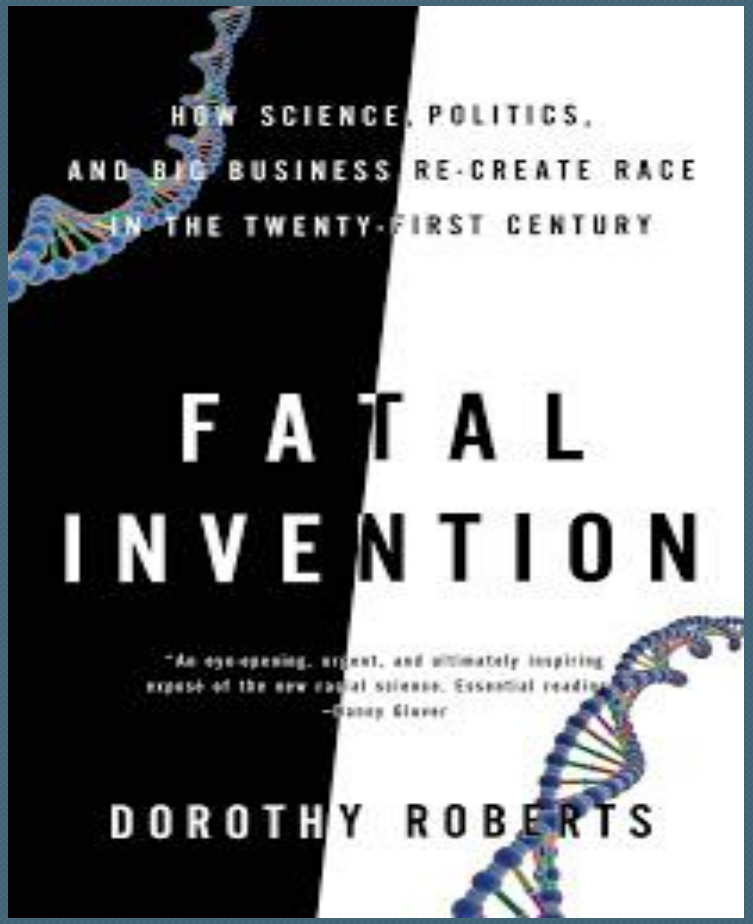


"People say it would be terrible if we made all girls pretty. I think it would be great."

"All our social policies are based on the fact that [Africans'] intelligence is the same as ours - whereas all the testing says not really."

Race: biological or social?





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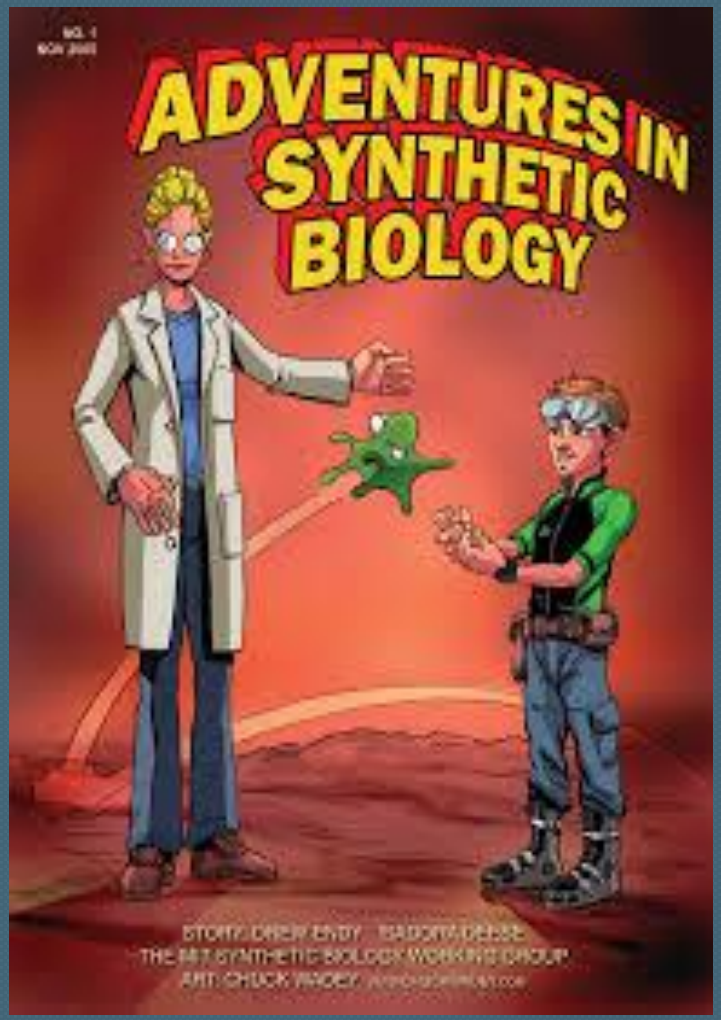
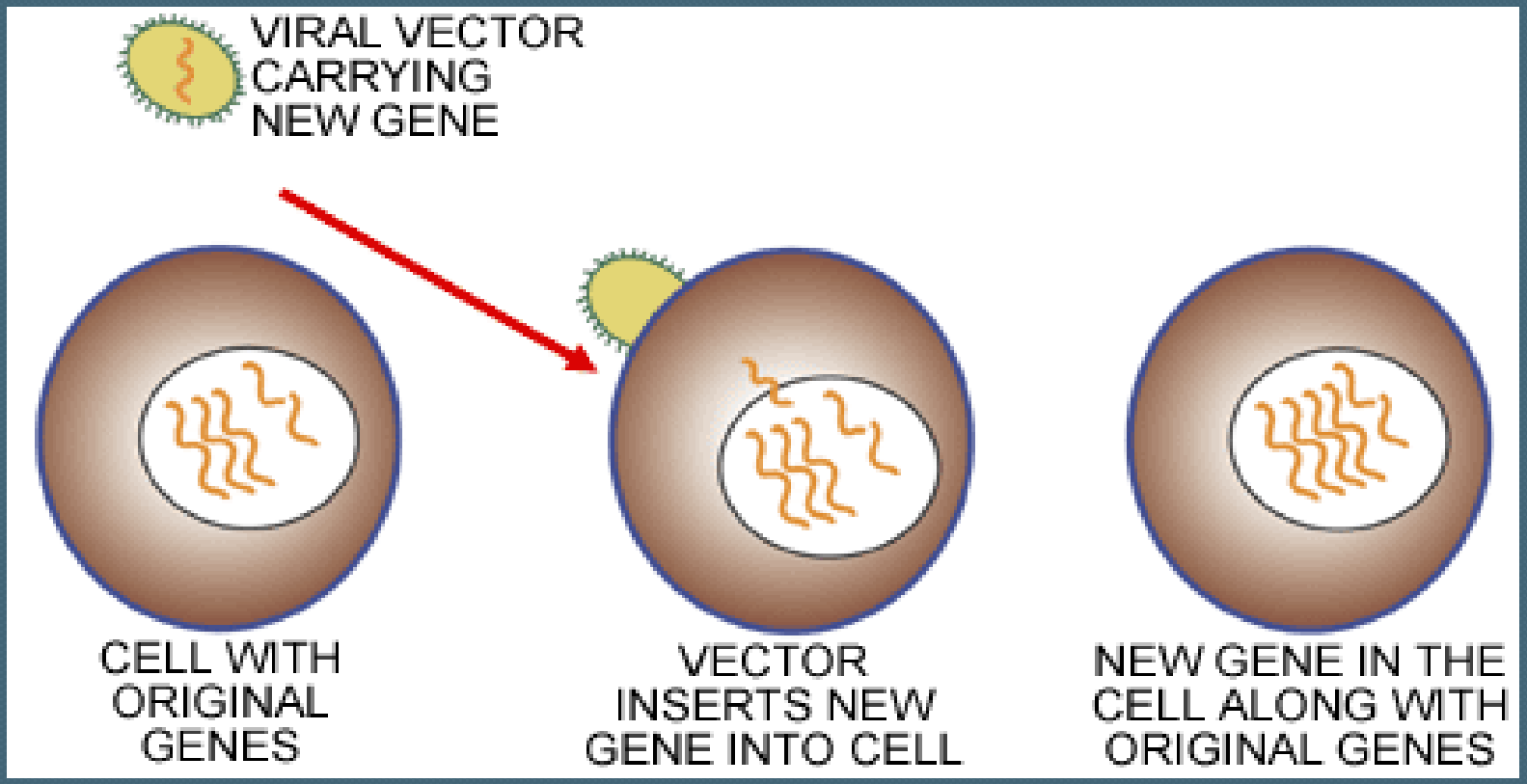


"What if we could liberate ourselves from the tyranny of evolution by being able to design our own offspring?"

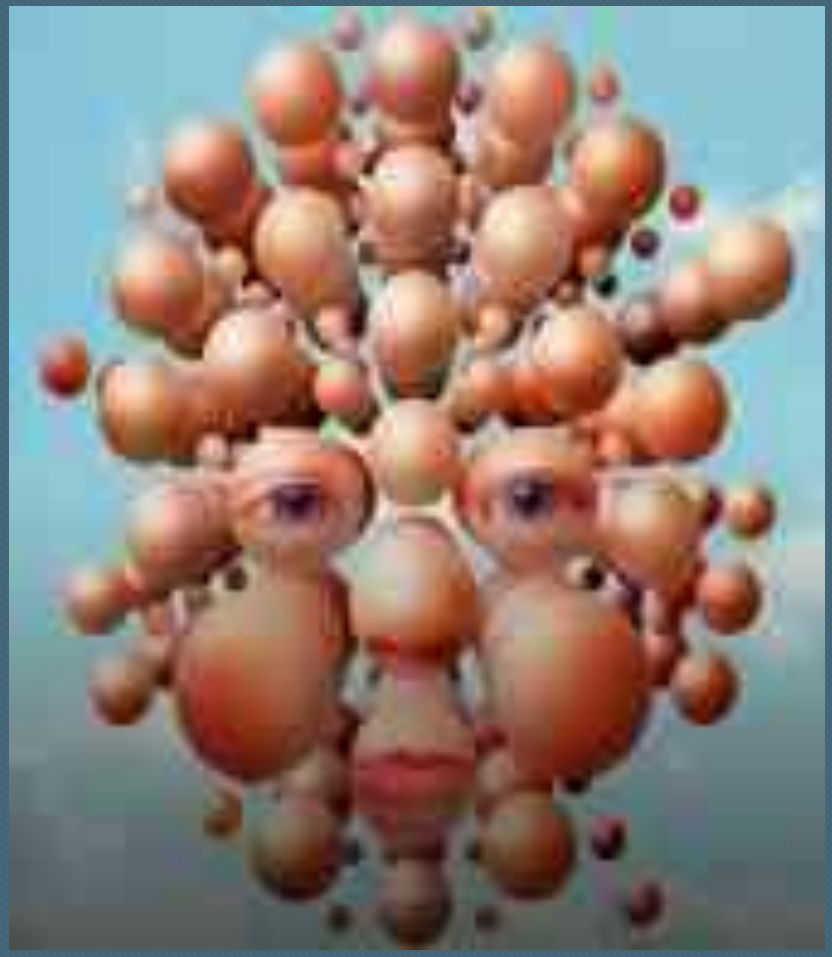
Drew Endy, Stanford University

Old-style genetic engineering



Precision gene editing

"Engineering the Perfect Baby"



MIT Technology Review

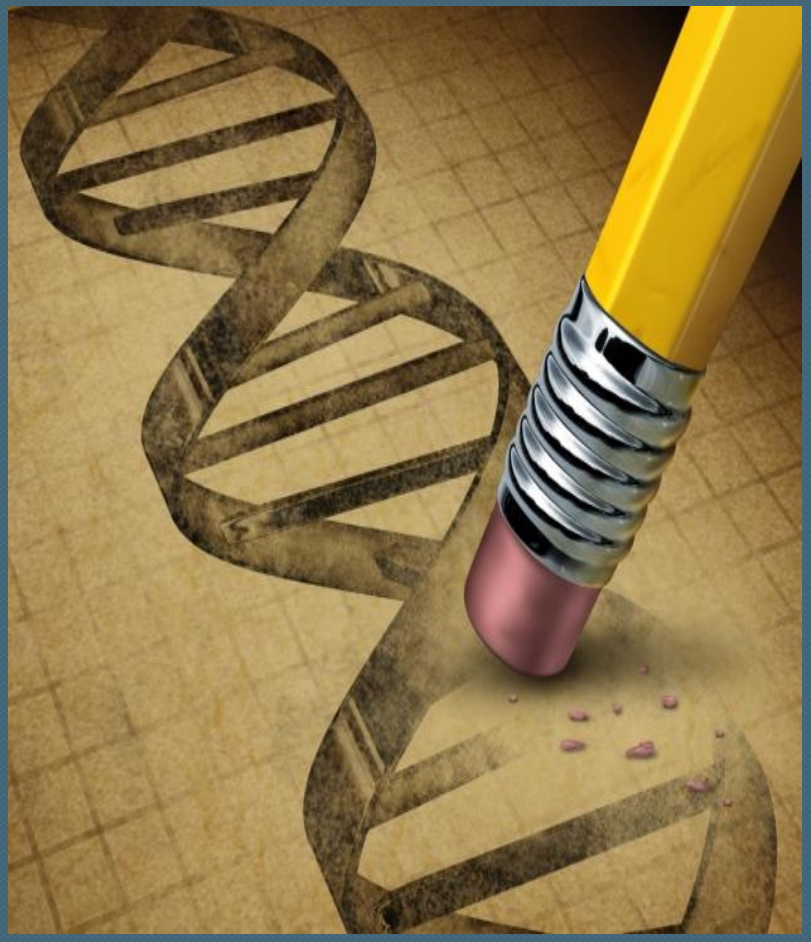
Scientists are developing ways to edit the DNA of tomorrow's children.
Should they stop before it's too late?

"Don't edit the human germ line"

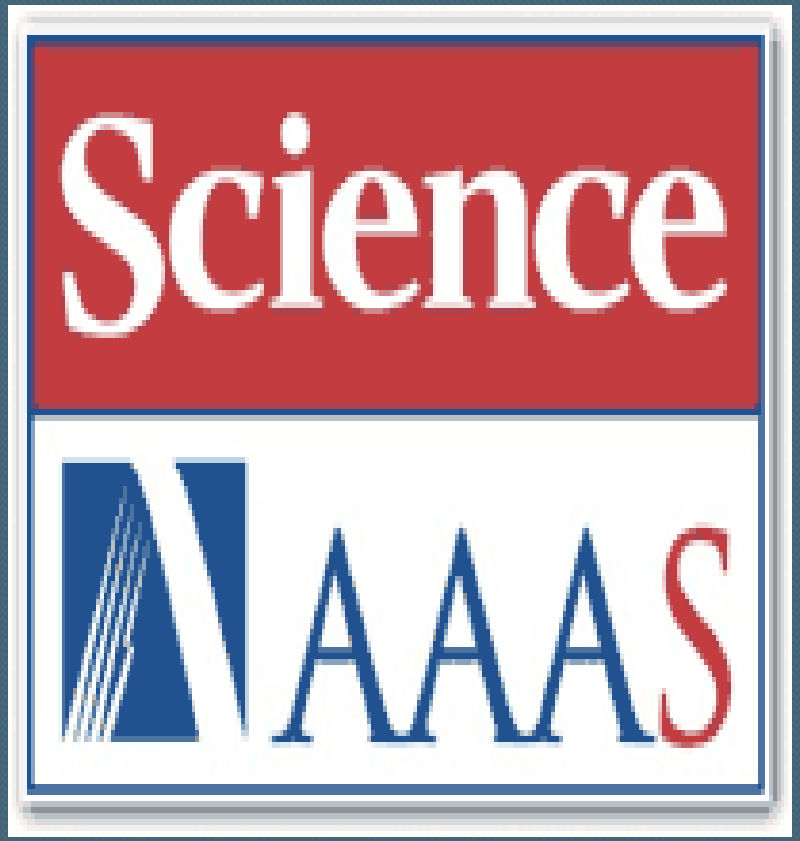
Nature

"serious risks…the therapeutic benefits are tenuous."

"a path towards… genetic enhancement."



“A prudent path forward…”



A prudent path forward for genomic engineering and germline gene modification

Genetically Modified humans?

Seven reasons to say "No"

Underlying world views

- Vast inequality is normal (or in any case inevitable)
- Extreme uses of technology are wonderful (or inevitable)
- Enhancing individuals is more exciting than improving society
- Let the market decide – we don't need public policy

Values for a new biopolitics

Social justice
Human rights
The common good
A precautionary approach
Democratic governance

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Biologists call for halt

The New York Times

Biologists Call for Halt to
Gene Editing Technique in Human

"The technique could be used to cure genetic diseases, but also to enhance qualities like beauty or intelligence. The latter is a path that many ethicists believe should never be taken."