

What will future humans look like?

Thumbnail source:

Thumbnail is a combination of three images:

Berlin Naturkundemuseum DNA (Blue glass vial) : [LoKiLeCh](#) - https://commons.wikimedia.org/wiki/File:Berlin_Naturkundemuseum_DNA.jpg

Brain autopsy lateral view: [Jensflorian](#) - https://commons.wikimedia.org/wiki/File:Brain_autopsy_lateral_view.jpg

Stars Gather in 'Downtown' Milky Way: NASA/JPL-Caltech - <http://www.spitzer.caltech.edu/images/3560-sig11-003-Stars-Gather-in-Downtown-Milky-Way>

Song source(s):

1st song: [Whitesand](#): 'One Man Stands In Her Way' - Epic Emotional Synth Soundtrack (BR 2049 Inspired) - <https://www.youtube.com/watch?v=DdxmCYNTBKE>

2nd song: [Whitesand](#): 'Tears of Luv' (Blade Runner 2049 Inspired) - Emotional Beautiful Synth Music - <https://www.youtube.com/watch?v=3kHprTI0SgA>

Image source(s):

CAS 4qyz (CRISPR): [Thomas Splettstoesser](#) (www.scistyle.com) - https://commons.wikimedia.org/wiki/File:CAS_4qyz.png

Paralysis agitans (1907, after St. Leger): [William Richard Gowers](#) (1845–1915) after St. Leger (unknown dates) - [Herter, Christian Archibald](#) (1907) [1892] "[Fig 66 — Paralysis agitans. \(After St. Leger.\) \(Gowers\)](#)" in [Diagnosis of Organic Nervous Diseases](#) (2nd ed.), New York and London: G. P. Putnam's Sons, pp. p. 589 Retrieved on 24 March 2011.

Eye iris: *Petr Novák, Wikipedia* (che) - https://commons.wikimedia.org/wiki/File:Eye_iris.jpg

Berlin Naturkundemuseum DNA (Blue glass vial) : [LoKiLeCh](#) - https://commons.wikimedia.org/wiki/File:Berlin_Naturkundemuseum_DNA.jpg

Video source(s):

Discord introduction made in After Effects

Digital Human: <https://pixabay.com/en/videos/human-digital-network-communication-747/>

DNA Helix: <https://pixabay.com/en/videos/dna-helix-deoxyribonucleic-acid-6973/>

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TI and JG introduction made in After Effects

Blue-purple abstract DNA pattern:

<https://pixabay.com/en/videos/abstract-blue-background-waves-5265/>

DNA ladder patterns:

<https://pixabay.com/en/videos/dna-medical-research-medicine-5555/>

Green-yellow abstract pattern:

<https://pixabay.com/en/videos/particle-abstract-lights-animation-5188/>

DNA circular pattern: <https://pixabay.com/en/videos/dna-science-blue-lines-circles-5367/>

Yellow DNA: <https://pixabay.com/en/videos/dna-genetics-clone-gene-science-6368/>

Elephant walking: <https://pixabay.com/en/videos/elephant-pachyderm-tanzania-6447/>

Electrocardiogram: <https://pixabay.com/en/videos/medicine-stripes-equipment-16752/>

Purple-yellow abstract: <https://pixabay.com/en/videos/abstract-background-colors-4969/>

Blue virus: <https://pixabay.com/en/videos/virus-infection-blue-medicine-5572/>

Blood cells: <https://pixabay.com/en/videos/blood-cells-medical-blood-cell-5452/>

Blue rotating brain: <https://pixabay.com/en/videos/brain-human-medical-anatomy-5461/>

Neuron: <https://pixabay.com/en/videos/eye-neuron-zoom-science-15522/>

Matrix tunnel: <https://pixabay.com/en/videos/data-matrix-tunnel-technology-4001/>

Skull CAT scan: <https://pixabay.com/en/videos/skull-cat-scan-medical-anatomy-4122/>

TV in rubble: <https://pixabay.com/en/videos/tv-screen-media-monitor-retro-16880/>

Marine beach coastline:

<https://pixabay.com/en/videos/marine-beach-coastline-alanya-9421/>

Hemispheres of the brain:

<https://pixabay.com/en/videos/face-brain-human-head-schema-16530/>

Skull scan: <https://pixabay.com/en/videos/skull-radiology-healthcare-x-ray-6282/>

Chess: <https://pixabay.com/en/videos/chess-queen-shah-mat-board-game-4852/>

Crosswalk: <https://pixabay.com/en/videos/crosswalk-crowd-people-many-3630/>

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Human skeleton scan:

<https://pixabay.com/en/videos/human-anatomy-x-rays-medical-x-ray-5463/>

News headlines:

<https://pixabay.com/en/videos/news-newspaper-article-press-media-5398/>

Scientist: <https://pixabay.com/en/videos/laboratory-architecture-modern-4372/>

Rat eating: <https://pixabay.com/en/videos/rat-nager-eat-chucks-food-grains-6281/>

Computer overhead display:

<https://pixabay.com/en/videos/science-fiction-overhead-display-6421/>

Code system failure:

<https://pixabay.com/en/videos/code-programming-system-fails-14214/>

Yellow DNA brown background:

<https://pixabay.com/en/videos/dna-genetics-molecular-biology-6213/>

Running along beach:

<https://pixabay.com/en/videos/runner-shore-coast-coastline-10809/>

Monkey eating apple:

<https://pixabay.com/en/videos/ape-monkey-primate-barbary-macaque-8216/>

Atom gas electrons:

<https://pixabay.com/en/videos/atoms-gas-electrons-bacteria-virus-5205/>

Outro made in After Effects

Information source(s):

<https://qz.com/1185488/chinese-scientists-used-crispr-gene-editing-on-86-human-patients/>

<http://theconversation.com/the-future-of-genetic-enhancement-is-not-in-the-west-63246>

<https://www.nature.com/articles/ng.3860>

https://en.wikipedia.org/wiki/Ancient_DNA

<https://www.seeker.com/worlds-oldest-known-dna-discovered-1764980841.html>

<https://jamanetwork.com/journals/jama/fullarticle/2456041>

<https://www.yourgenome.org/facts/what-is-genetic-engineering>

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<https://www.dna-worldwide.com/resource/160/history-dna-timeline>

Script 1 - What Will Future Humans Look Like? (TI):

The average human of the future could be cancer free, stronger than a professional weightlifter, smarter than the smartest 1 percent of humans today and could be capable of designing exactly how their children look down to the position of cosmetic birthmarks. What kind of fantastic technology would usher in this change in humanity? Welcome to the world of genetic engineering.

(Cue combined title of TI and JG)

- **The future of genetic engineering (Outline basics/talking points)**

Genetic engineering is the artificial alteration of DNA and considering that we only discovered what DNA was in the 1950's and we are still trying to find safe ways to alter it, you could say that genetic engineering is *still* a very new field. After we discovered the structure of DNA, it was decided in 1990 to map all 3.2 billion base pairs of DNA within our own body, and this process took 13 years to complete. The total cost of the human genome project was 2.7 billion dollars. Today, the sequencing the human genome would cost just 100 dollars and would take 1 day, with the ability to read the human blueprint more effectively, it opens the possibility of altering it. New genetic engineering tools are making this manipulation possible, with one popular new editing mechanism known as CRISPR-CAS9 making headlines worldwide. Since our genome is the blueprint to everything that makes us *us*, what could we edit, are there any downsides and why would we edit ourselves?

- **Why do we want to genetically engineer humans?**

Genetically editing humans has many potential upsides, for one we could make humans resistant to cancer. A recent study looked at elephant and human cancer rates and the association with genetics. Elephants are larger creature with significantly more cells than a human, this means that there should be more chance for elephants to develop cancer, however the study found that the mortality rate of elephants due to cancer is less than 5%, while humans have up to a 25% cancer rate. The reason is due to their genetics, elephants and humans both contain a cancer suppressor gene called TP53, which stops the growth of cancerous cells. In humans, there is one copy of this gene, in elephants there are twenty. This means that if a mutation gets rid of this gene in humans, there is less chance of stopping a cancerous growth while in elephants, they still have 19 more chances.

What all this means is that genetic engineering in the future could create copies of genes like TP53 and create cancer resistant humans. The possibilities are endless, we could not just insert genes but also remove them, such as hereditary inherited diseases, like Huntington's disease and Hemophilia. Further into the future, we could use genetic engineering to control specific traits in our babies, pre-designing them before they are born with increased muscle mass, intelligence and even cosmetic changes like eye color and ear shape.

Another reason to genetically engineer humans is to begin the process of artificially increasing the intelligence of our species. We could design our babies with more efficient brains dedicated to higher cognitive thought, such as a larger hippocampus, the area of the brain tasked with memory storage. Some humans with larger hippocampuses report photographic memory and instant recall of events from years back.

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Through this process of making our offspring artificially more intelligent, these offspring could in turn design more intelligent offspring faster, leading to a biological intelligence explosion, a similar concept to the artificial intelligence explosion, just on a slower timescale.

- **Why it could be dangerous**

However, with the promises of more intelligence also comes the potential downsides, the idea of giving enhanced memory also means making tragic events fresh in a person's mind. As our memory is not perfect, we can forget and recover from tragic events over time, those who have perfect recall would have a harder time doing so. In this way, the idea of perfect recall becomes a curse. Of course, a world where intelligence manipulation exists may also be a world where mechanical implants for memory alteration is possible, but this is not a guarantee, and even this technology is very problematic in its own way.

Genetically designing babies could be exploited, giving a baby seemingly debilitating traits is just as possible and those who are genetically enhanced, with IQs far beyond even the most intelligent human could form a new type of caste system, where they outcompete regular humans in jobs, athletics and the arts. More intelligent humans would quickly assume the roles of scientists, politicians and artists. This would make unenhanced humans behind and at a disadvantage. We need to take care going into these technologies and address these issues carefully.

- **Why it could take decades to become an industry**

These ethical considerations will inevitably lead to strong debate on the topic and will cause many polarized opinions. As the first genetically modified humans begin to appear, they will be published in the same way Dolly the Sheep was, on front news headlines and with news headlines about human experimentation.

When we talk about human experimentation, we must remember that animal trials precede the human trials. These are usually unsuccessful, take for example the many headlines you may hear about cures for cancer, only to never hear of them again. This is because these breakthroughs are made in animal models that usually do not work either in mice or in humans when further experimentation is done. What this means is that an industry of genetically modified humans won't arise in a matter of years, but it will take decades to become a prominent industry and ethical concern.

If we take decades to genetically modify humans, we may find more promising avenues for human enhancement. The industry of cybernetics is advancing just as fast and AI will far outperform humans before the century is out, if humans wish to remain at the top of the food chain, we may find ourselves not just genetically enhancing ourselves, but instead opting for a combination of genetic, cybernetic and artificial neural enhancements instead.

- **Bridging section into JG's video**

The alteration of our very own DNA means that we will be controlling our evolution at an even more intricate level than what we already are. We won't just utilize artificial selection to slightly alter traits over generations, we will opt for custom designing our offspring and completing redefining what it means to be human. But evolution is a process that has been going on for billions of years, it is a fundamental force that will not end even with our meddling. If we trace our lineage back, we have been on a several billion year long path to humans, nature has modified DNA in a random process that eventually led to us, and even we are not the end product of nature. So, tracing back our lineage, who was our very first ancestor that possessed

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the strands of DNA that would eventually lead to us? Head on over to JG Science's channel to find out!

(Leave spare black space for link to JG video)

(Outro)