

Star Wars Science: How To Make A Stormtrooper

By *Nicholas Staropoli* — December 16, 2015



[1] shutterstock.com

This week(1) will bring the long awaited latest installment in the Star Wars saga (*The Force Awakens*, Episode VII), and with it comes the latest iteration of the stormtrooper. The stormtroopers that served Darth Vader in the original trilogy (Episodes IV-VI) were very different than the ones that helped eradicate the Jedi in episode III (*Revenge of the Sith*). However, in watching the trailers for *The Force Awakens*, there appears to be a completely new interpretation on the stormtrooper.

Regardless of how they look, it was decided in the prequels that stormtroopers are all clones of a single character. Although that may still sound like science-fiction, making a stormtrooper is more realistic for our galaxy than many may realize.

In *Attack of the Clones* (Episode II), Star Wars fans are introduced to the 'cloners' of the planet Kamino who were charged with making millions of stormtroopers. They described their process as meeting three qualifications: 1) clones of one man, 2) human growth enhancers, and 3) genetic engineering to make the optimal soldier.



[2] *In Attack of the Clones, the clones are all descended from the ancestor of the bounty hunter in Episode 4. In the George Lucas movies, the galaxy is a very small place. Credit: Disney*

Clones of one man: Many mammals to date have been cloned sheep, monkeys, rabbits, pigs just to name a few and humans are a real possibility. One way to do this would be to use a technique called somatic cell nuclear transfer. First the whole genome is extracted from almost any cell (basically anything but a red blood cell which has no DNA and sperm or eggs which only have

half). Then the genome is injected into an egg that has had its genome removed. The egg, now with a new, full genome in it, behaves like a fertilized embryo that can be implanted in a uterus, and normal pregnancy ensues.

The Obama administration bans SCNT. Jango Fett needs better lobbyists.

Human growth enhancers: The growth enhancers are a big deal, according to the cloners, without these it will take an actual lifetime to grow a single soldier. The enhancers make it possible to do it in half the time. Any baseball fan is familiar with steroids and human growth hormones (hgh) that have plagued the game since the 1980s, but many may not be aware that in the United States growth hormones are an approved medical therapy to accelerate growth in kids [who aren't growing fast enough](#) [3]. So these are available and well studied in our galaxy.

Genetic engineering: Similar to cloning, genetic engineering of an embryo has not progressed far in humans, but it has in other animals. Successful genetically engineered [salmon](#) [4], [chickens](#) [5], [pigs](#) [6], and [cows](#) [7] have all made headlines in recent months. The genetic engineering of human embryos has already been done too. Earlier this year researchers in [China reported successfully using](#) [8] the gene editing technique known as CRISPR-Cas9 on a human embryo.

Although we may know the 'how' to do the engineering, the 'what' may pose some problems. Human personality characteristics are complex and are impacted by many genes as well as other factors, like the environment. [You could clone Tom Brady](#) [9], for example, but he is actually a terrible athlete. It took more than genes to make him a great quarterback.

The cloners mention inserting genes into stormtroopers that make the clone more docile and obedient, but it is hard to tell if they exist in our humans? This has actually been extensively studied in cows where researchers have found a connection [with forms of the gene DRD4](#) [10] which codes for a receptor for the neurotransmitter dopamine and docility. Humans carry many versions of this gene too and it appears it may have a similar role in humans as it does with cows. However, this is very controversial in both animals and it may not be as simple as adding it to an embryo and producing a more docile soldier.

That anyone would want a "docile" stormtrooper is not the biggest mystery of Star Wars plots, though it would explain how a whiny kid from a backwater planet was able to roust the whole lot of them.

Outside of the obvious ethical issues and finding the right genes for obedience, making a stormtrooper is something that *is* conceivable for both our universe and the galaxy far, far away. Actually, the technology where we lack the furthest from the Star Wars Universe is they have a way to mass incubate fetuses using artificial embryos. That is a technology that has [been elusive for many years](#) [11] and is probably parsecs(2) from being a reality in our universe. We would have to find millions of volunteers to carry each of these clones to term and that's about as realistic as Han shooting second.

NOTE:

(1) Okay, me, tonight, because I bought the tickets months ago.

(2) Ha ha [again](#) ^[12]

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- [12] <http://acsh.org/2015/12/for-medicine-are-we-living-in-that-galaxy-far-far-away/>