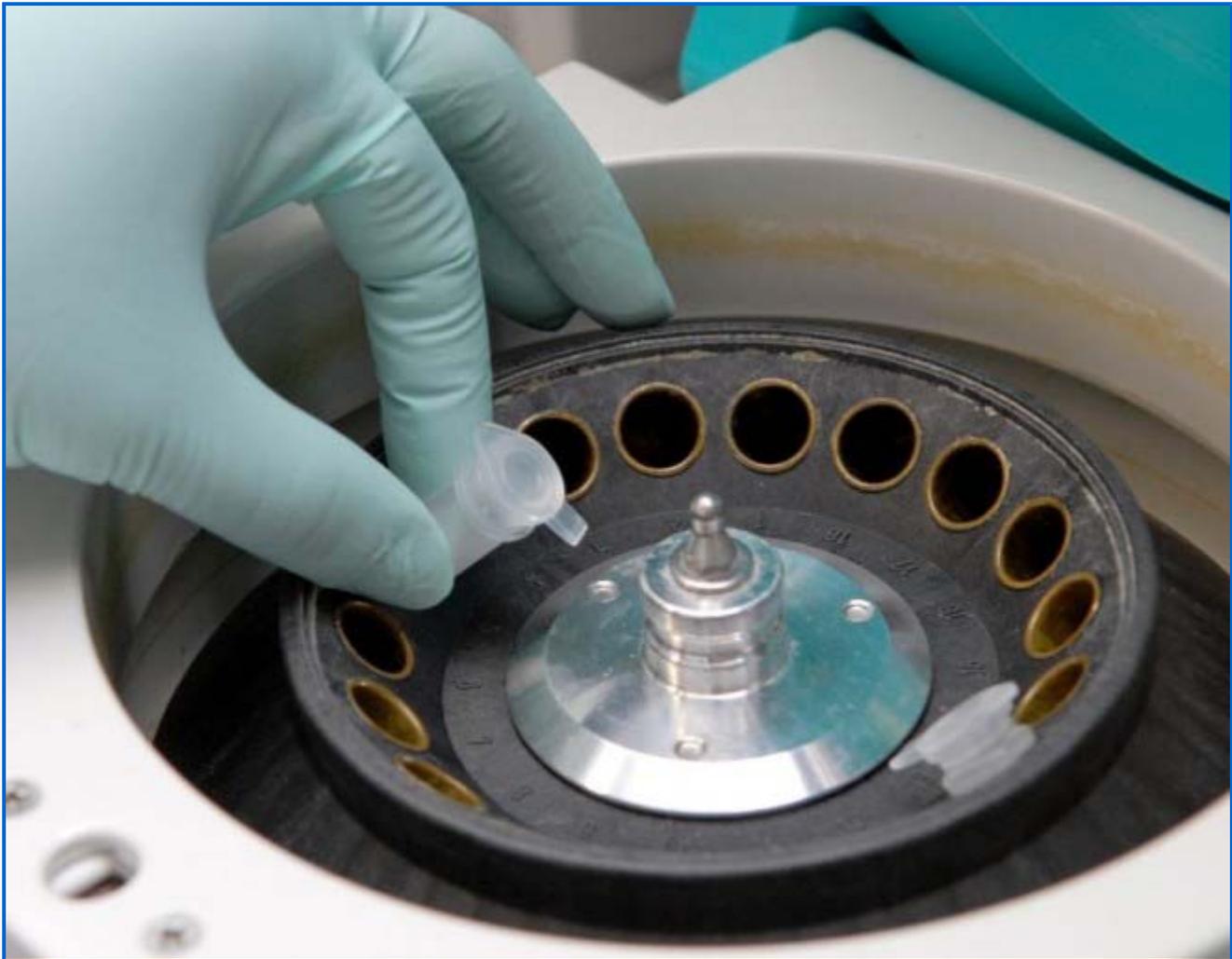


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# Pentagon Looks to Breed Immortal ‘Synthetic Organisms,’ Molecular Kill-Switch Included

By [Katie Drummond](#)  February 5, 2010 | 9:42 am | Categories: [DarpaWatch](#)



The Pentagon’s mad science arm may have come up with its most radical project yet. Darpa is looking to re-write the laws of evolution to the military’s advantage, creating “synthetic organisms” that can live forever — or can be killed with the flick of a molecular switch.

As part of its [budget for the next year](#), Darpa is investing \$6 million into a project called BioDesign, with the goal of eliminating “the randomness of natural evolutionary advancement.” The plan would assemble the latest bio-tech knowledge to come up with living, breathing creatures that are genetically engineered to “produce the intended biological effect.” Darpa wants the organisms to be fortified with molecules that bolster cell resistance to death, so that the lab-monsters can “ultimately be programmed to live indefinitely.”

Of course, Darpa's got to prevent the super-species from being swayed to do enemy work — so they'll encode loyalty right into DNA, by developing genetically programmed locks to create “tamper proof” cells. Plus, the synthetic organism will be traceable, using some kind of DNA manipulation, “similar to a serial number on a handgun.” And if that doesn't work, don't worry. In case Darpa's plan somehow goes horribly awry, they're also tossing in a last-resort, genetically-coded kill switch:

*Develop strategies to create a synthetic organism “self-destruct” option to be implemented upon nefarious removal of organism.*

The project comes as Darpa also plans to throw \$20 million into a new synthetic biology program, and \$7.5 million into “increasing by several decades the speed with which we sequence, analyze and functionally edit cellular genomes.”

Of course, Darpa's up against some vexing, fundamental laws of nature — not to mention bioethics — as they embark on the lab beast program. First, they might want to rethink the idea of evolution as a random series of events, says NYU biology professor David Fitch. “Evolution by selection is *nota* random process at all, and is actually a hugely efficient design algorithm used extensively in computation and engineering,” he e-mails Danger Room.

Even if Darpa manages to overcome the inherent intelligence of evolutionary processes, overcoming inevitable death can be tricky. Just ask all the other research teams who've made stabs at it, trying everything from cell starvation to hormone treatments. Gene therapy, where artificial genes are inserted into an organism to boost cell life, are the latest and greatest in life-extension science, but they've only been proven to [extend lifespan](#) by 20 percent in rats.

But suppose gene therapy makes major strides, and Darpa does manage to get the evolutionary science right. They'll also have a major ethical hurdle to jump. Synthetic biology researchers are already facing the same questions, as a [2009 summary](#) from the Synthetic Biology Project reports:

The concern that humans might be overreaching when we create organisms that never before existed can be a safety concern, but it also returns us to disagreements about what is our proper role in the natural world (a debate largely about non-physical harms or harms to well-being).

Even expert molecular geneticists don't know what to make of the project. Either that, or they're scared Darpa might sic a bio-bot on them. “I would love to comment, but unfortunately Darpa has installed a kill switch in me,” one unnamed expert tells Danger Room.

*Photo: VA.gov*

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## Comments (81)

Posted by: sickboy | 02/5/10 | 9:57 am

Yeah you think something like this would be classified instead of being broadcasted out to the public. Maybe they already done it and their just easing us in to seeing what the public reaction would be. I hope the outcome is good and not bad like more life-extension technologies. If not oh well the world could use a zombie apocalypse and remember the rules limber up (cardio) and double tap.

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Posted by: travelling | 02/5/10 | 10:13 am

impossible bullshit!

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Posted by: DoktorEdwin | 02/5/10 | 10:25 am

Seems highly logical, practical, and over all, plausible. I mean, how hard could it be to genetically engineer unkillable super organisms?

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Posted by: stoffer | 02/5/10 | 10:32 am

@DoktorEdwin - It is very, very, very hard. Everything in this universe must die. Even this universe itself. Cycle of life and death is a fundamental law of this universe, just like laws of thermodynamics.

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Posted by: daveinva | 02/5/10 | 10:36 am

“Develop strategies to create a synthetic organism “self-destruct” option to be implemented upon nefarious removal of organism.”

.  
You mean, like a facehugger?

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Posted by: oral | 02/5/10 | 10:44 am

@stoffer

Wait till we learn to reignite a a star, spawn universes and edit "laws"

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Posted by: DoktorEdwin | 02/5/10 | 10:58 am

@Stoffer -

\*cough\* Sarcasm \*cough\* 😊

—

However cool it would be to see this developed, I think there are a few problems.

1.)

What Stoffer said.

2.) I don't know how much good I see in an unkillable being, or say, an army of unkillable beings (unless by 'immortal', they mean death by natural causes and not say, a gun shot wound to the head.) that could be used at the disgression of a power hungry government.

3.)

Unless we now how aliens secretly helping us engineer stuff like this, (as legend has it, the ancients did) I don't know where they plan on pulling this immensely advanced technology and understanding from. I suppose that is what the \$6 mil is for, but it seems a couple hundred years ahead of its time if you ask me.

ALTHOUGH, it would be pretty damn cool to have an immortal pet. No more shoebox funerals or vet visits.

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Posted by: DoktorEdwin | 02/5/10 | 11:00 am

Have\* in place of how.

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Posted by: garyisabusyguy | 02/5/10 | 11:02 am

I've seen things you people wouldn't believe. Attack ships on fire off the shoulder of Orion. I watched C-beams glitter in the dark near the Tannhauser gate. All those moments will be lost in time... like tears in rain... Time to die.

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Posted by: benf66 | 02/5/10 | 11:26 am

Famous last words "tamper proof" cells.

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Posted by: gerrrg | 02/5/10 | 11:29 am

Mutations will ensure that this will never be 100% safe.

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Posted by: Lundok | 02/5/10 | 11:35 am

I have to ask, why the hell do we need this? Does ANYTHING need to be 'unkillable'? Really? I am all for the advancement of any and all technology, but it's like these guys are watching a bunch of horror and sci-fi movies and saying "hey wouldn't that be cool if that really happened?"

To paraphrase benf66, things always, always, always go wrong.

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Posted by: Glenn | 02/5/10 | 11:41 am

I can't help but wonder if there's more to this genetic re-engineering. Instead of creating "monsters", could they instead be trying to genetically re-engineer soldiers to have more desirable traits? Could tolerance to fear or panic be genetically improved? Could they install a "shut-down" system, should a soldier be captured? It's frightening to think what they could be injecting into our boys in the name of national security...

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Posted by: caffeineguy | 02/5/10 | 11:50 am

What exactly is the practical application of this technology? Are they suggesting using this for making "intelicrops" to feed the hungry? My understanding is that Bio-Weapons are illegal and there is no way this research should be legal under the department of defense.

DOD should focus on defending us against real threats, you know terrorism, global warming, or the looming threat of Canadian aggression.

They are talking about creating a whole new technology that has no established protocols or controls in place. Simple miscalculations (of course the military never makes mistakes) can have life altering consequences on a global scale.

They should go back to staring at goats.

They call it Mad Science for a reason. This shit is crazy.

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Posted by: JohnnyC66 | 02/5/10 | 11:58 am

Sarah Conner is going to be pi\$\$ed

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Posted by: vinylist | 02/5/10 | 12:08 pm

Live forever? If only there weren't those darned trash compactors! Haven't we seen this movie already?

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Posted by: xznofile | 02/5/10 | 12:19 pm

Lieutenant Broger: Sir we've surrounded the biobots and we're fragging the hell out of them but they keep regenerating and just don't die!

Me: Remove an organ from each one!

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Posted by: Phenomejan | 02/5/10 | 12:24 pm

Didn't anybody see iRobot???? I hope we aren't depending on Will Smith when this shit goes sideways...

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Posted by: iProtestant | 02/5/10 | 12:30 pm

like jeff goldblum said, just because we can doesn't mean we should. what's wrong with these people?

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Posted by: jackfnburton | 02/5/10 | 12:38 pm

I want more life, fuc\*\*r!!!

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Posted by: jackfnburton | 02/5/10 | 12:38 pm

Oh, and sign me up for the Basic Pleasure Model.

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Posted by: RyanM | 02/5/10 | 12:51 pm

Jem'Hadar anyone?

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Posted by: wendylou | 02/5/10 | 1:08 pm

Can you say "Blade Runner"?

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Posted by: killtacular | 02/5/10 | 1:17 pm

All this unheard of bioengineering with a budget of 6 mil? Do they WANT us to laugh at them?

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Posted by: WiredUp99 | 02/5/10 | 1:23 pm

Live forever.... the original cell on this planet appears to have been rather successful at it.

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Posted by: AndrewFoose | 02/5/10 | 1:31 pm

Like Stickboy said, I think this is bogus. However, this might just be like those completely ridiculous joke that Tex Avery said he put into his cartoons as a shield to the ones he wanted: This is so over the top that, for example, the hyperintelligent robotic tanks they are actually making seems rational by comparison. (Note: I am not part of the military and so my example was completely made up.

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Posted by: greengestalt | 02/5/10 | 1:34 pm

Great.

Sounds like a "BioWeapons" program. And let's see, America's major enemies this last decade use: Box cutters and brute force, roadside bombs, suicide bombs...

Dubya did his best to restart "Star Wars" and as a recent WIRED article pointed out, all Star Wars did was ensure man's extinction in case of a nuclear war. I'm referring to the "Dead hand".

So they now work on things that are illegal under international law (bioweapons) or at best some kind of mutant creatures... It'd just add to the "They are Great Satan" attitude, and lend some truth to it. Really, imagine either case: A plague wiping out the middle east. The whole world, led by China, would turn arms on us. Or- some kind of hideous mutant ogre running around ripping people apart and so tough it could take bullets and IED blasts, but then with a 'genetic kill' in case the locals managed to convert it to Islam.

These guys are not worth our tax money. Especially when the rich elite are starting wars to sell both sides weapons. I say limit the military down to 1/3. Keep a small nuclear deterrent, a small force and a few elite units. Then use the 'saved' 2/3 to pay off the debt and work on American infrastructure. No more stealth toilet seats and \$10K plastic widgets to keep chairs from scuffing the floor, let 'em go to the hardware store.

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Posted by: Cyberneurotik | 02/5/10 | 1:35 pm

@garyisabusyguy: I signed up for an account on Wired specifically to commend you for your Blade Runner quote. It's really quite beautiful, given the context.

@everyone else: From my basic understanding of biology, an immortal organism simply wouldn't degrade over time and die of age. Take note the difference between "immortal" and "invulnerable". These so-called "lab beasts" would die with a bullet to the brain just as we all do.

But lab creatures aside, what about the other implementations of immortal cells? What about our food? Or, dare I say, ourselves? If anything, DARPA could provide us with real live vampires.

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Posted by: shez | 02/5/10 | 1:59 pm

Call me crazy, while zombie DARPA rats sound awesome, I'm guessing their sights are a bit lower. Maybe a bacteria that they can control evolutionarily? The implications of them achieving that would be astounding.

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Posted by: IgnorantDesign | 02/5/10 | 2:37 pm

This is clearly going to be microbes at least for a VERY long time. And they may not die naturally in time but that wont save them from some clorox bleach. ..

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Posted by: garyisabusyguy | 02/5/10 | 3:12 pm

@Cyberneurotik thanks, the first thing that came to mind

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As far as exactly how immortal we want cells to be... Well, right now we have some issues with telomeres (like par/rar encoding for genes) and hydrogen sulfide mediated cell death.

.  
If we could 'redesign' dna, then it would be pretty nifty to package the par/rar package in a more durable way. All sorts of messy things happen with the current method, where after fifty or so years of replication the redundant info has been lost and cancer, etc... comes from the resulting mutations.

.  
Then there is that whole, messy, death thing. If a creature is deprived of oxygen for a while (hours, days, weeks), why shouldn't it be able to just take a few hits off an O2 canister and get up and walk away??? Something to do with the interaction of hydrogen sulfide and cell proteins to cause apoptosis (cell death). Just imagine if we could go into dormant states like water bears and reanimate 'later'...

.  
I think that it will take changes to organ location to take that 'bullet to the brain', I would suggest some decentralization, maybe placing redundant 'brain stems' throughout the nervous system and maybe even some fail-over for one-off parts like the heart or liver. It would sure be nice to be able to re-claim information from lifeless brain matter also...

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Posted by: Gunbunny | 02/5/10 | 3:17 pm

What I'd imagine would be a more short lived bioweapon. You need to occupy an area? Send in a biological entity to wipe out the humans in the location. Then engage the kill switch when everyone is dead, and defend from there.

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Posted by: earthlingbob | 02/5/10 | 3:48 pm

This is indeed old news! Phyllis Diller was born in 1817 and still going strong! Of course it might have something to do with her husband 'Fang'!

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Posted by: frankleedg | 02/5/10 | 3:50 pm

people have been creating organisms in the plant and animal kingdom for as far back as agriculture dates back to.

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Posted by: janpol | 02/5/10 | 3:58 pm

Only 6 mil to develop inmortal creatures? Sounds cheap 😊

Maybe they know it's not possible and it's just a way to get more money....

P.D: I'm from Argentina....we see that a lot 😊

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Posted by: TheNumber | 02/5/10 | 4:27 pm

I say go for it. Either it fails and nothing comes of it, it's successful and now we have the ultimate weapon, or it succeeds but something goes horribly wrong and now an undying killing machine roams around. Either way, scientific progress!

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Posted by: flavor13 | 02/5/10 | 4:45 pm

I can see them basing the premise for this project on some very sound biological science (viz, what we know as of today about how cells work), but their claim for an immortal and evolution free organism is just plain silly as there are thousands of ways a cell can die, and most of them stem from a lack of adaptability to its environment. Then again, I guess they could lock such a cell away in a bunker so that even after we blow ourselves to heck, there will be something left still alive.

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Posted by: a00r | 02/5/10 | 5:22 pm

interesting...

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Posted by: hotwu | 02/5/10 | 5:40 pm

If I had to choose between altering the certainty of both death and taxes, I would prefer to focus on taxes first.

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Posted by: NoahB416 | 02/5/10 | 5:42 pm

At best, this has the potential to go terribly, terribly wrong.

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Posted by: BigChil | 02/5/10 | 5:47 pm

Is it just me or does this just sound like a bad idea. How many sci-fi movies have we all seen when something just like this goes haywire because some nincompoop in a white jacket spills his Diet-Coke on the master control console and boom we are assholes to armpits in some nightmare creature that is bent on destroying mankind.

Why do we find it necessary to go out and figure out new and more efficient ways of killing one another anyway? If you really want to get the point across to each other; put the two people who are pissed off at one another in a room lock the door and say who ever survives wins! You put large clubs in the room behind some type of locked devise that each combatant must solve before they can get the weapon. This way both combatants are forced to either kill or be killed once they have solves the problem of how to get the weapon. Maybe in this case we would figure out how to solve our problems without killing one another.

Rather we, pay very smart people to figure out very clever and scary ways to kill one another, give that

technology to people whose job it is to figure out whom to kill and have them tell people who really want to kill people go do it. I would think in all of the years that mankind has been around this whole thing might get just a little boring.

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Posted by: Irishedp | 02/5/10 | 6:11 pm

“The Cylons were created by man.”

its all a matter of time.

Irishedp  
@Irishedp (twitter)

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Posted by: BigChil | 02/5/10 | 6:16 pm

Actually, Cylons were crafted by a teenage girl. That is really saying something.

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Posted by: Cheer10 | 02/5/10 | 7:38 pm

Firstly, a concern - this article has already referred to these beings as ‘lab monsters’. For how little we understand about what consciousness (self-awareness) IS, using terms like that is dangerous to both sides of the social equation. We must assume that there is a distinct possibility that DARPA could reach success, given theories concerning our potentially not-so-distant future, in relation to technological advancement. Assuming that they will achieve their goal, and these life-forms are created, it would be a foolish mistake to then ostracize them from society. If you disagree, perhaps you should re-read Frankenstein.

Secondly, however, I do agree that this is a very bad idea. There is nothing good that can come of creating sentient, artificial life. If there indeed is some kind of extra-dimensional being watching over this planet, then it would probably tell us the same thing, could we so ask.

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Posted by: tidvinko | 02/5/10 | 8:39 pm

Mmm, thats kinda scary dude when you think about it.

jerr  
internet-anonymity.se.tc

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Posted by: devanate | 02/5/10 | 9:10 pm

It’s not “un-killable”. It’s cells just don’t age. It could still be shot or poisoned or stabbed or crushed to death.

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Posted by: CascadianPDX | 02/5/10 | 9:14 pm

Hey DARPA, if you make one that looks like Darryl Hannah in "Blade Runner", can you make an extra one for me?

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Posted by: RealityBites | 02/5/10 | 9:45 pm

Wouldn't it be nice if they actually bred something useful like a General with a brain, or maybe a politician with an IQ over 30.

Or a government employee that isn't a megalomaniac cretin.

Guess these dimwits never watched Jurassic park.

They aren't mad scientist's they are bipedal cockroaches trying to bred more of their friends.

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Posted by: Clarpet | 02/5/10 | 9:49 pm

" fortified with molecules that bolster cell resistance to death, so that the lab-monsters can "ultimately be programmed to live indefinitely." "

Only one problem: Growth occurs because of cell reproduction and cell reproduction rate is directly related to cell death. I.E. the cells "know" when new cells are needed based on basically "supply and demand".

What they are attempting to do would theoretically result in an organism that never stops producing cells which also never die, and therefore the organism never stop growing. That, or they would need to manually grow the cells AND somehow force them to assemble, but prevent them from dividing to create new cells.

The whole problem with all of this is that in order to achieve an organism that did this on it's own, the DNA would have to be pre-encoded to produce a finite number of cells for each organ, etc. so each cell would have to "keep count" to know when the last one had been produced. Even if they DID achieve that, there would be the problem of injury: if the organism got a cut, it would bleed to death, assuming it HAD blood, because it wouldn't be able to produce additional skin cells...unless it the "cell count" programed in the DNA also identified (very quickly, mind you) when cell count had dropped, though that's not really a solution either because the body actually produces \*additional\* cells to fill in the wounded area in our bodies.

Finally, there's also the issue of "corrupt data" in DNA: make too many copies and eventually you one comes out bad, hence cancer, for example. The only way to over come the "death" of a cell is to somehow bypass the division limit imposed by the DNA, however, we already know this leads to serious issues such as.... yeah, cancer.

Go ahead and try DARPA, I doubt you'll succeed.

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Posted by: msmandy91 | 02/5/10 | 9:51 pm

I'm sorry.. I don't agree with this one bit. This isn't something we should be tampering with. And what use would these be to us? Weapons? How ethical. Poor choice. Darpa. Poor choice.

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