

# International Humanitarian Law Review on Genetically Modified Super Soldier

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## Abstract:

This research aims to find out and understand genetically modified super soldier as well to find out and understand whether genetically modified super soldier is legitimate under international humanitarian law. This paper used normative legal approach by utilizing literature study. Data collected are secondary data derived from conventions, books, research, scientific journal and other written sources relevant. Data collected was analyzed descriptively. The result inflicted of this research as follows: 1) Genetically modified super soldier is genome manipulation on soldier aimed to modify sequencing or gen characteristic to create stronger soldiers by utilizing biotechnology, pharmacology, neuroscience, nanotechnology, and biochemical. 2) Genetically modified super soldier collides ethical and human rights as it did not consider informed consent of soldier. Genetically modified super soldier requires law review in its justification as means and method of warfare because some of genetically modified super soldier technologies constitute possibilities in disobeying international humanitarian law principles, and its justification of means and method of warfare that did not comply ethical requirement.

**Keywords:** Ethical; Human Rights; International Humanitarian Law; Super Soldier

## INTRODUCTION

Jean Pictet describes "*International humanitarian law in the wide sense, is constituted by all the international legal provisions, whether written and customary, ensuring respect for individual and his well-being*"<sup>1</sup> has brought us today upon the effort of fulfillment to international humanitarian law. In modern era nowadays, the interaction between technological development and armed forces is a constant feature of the history of warfare. Technological development can be stimulated by, and dedicated directly to addressing, military requirements. On other occasions, technological development outside the military sphere affects or informs the conduct of warfare and military expectations, as has been illustrated by the application of computing and software innovations that have led to major changes in the military tactics of developed nations.<sup>2</sup>

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<sup>1</sup> Jean Pictet. (1977). *Humanitarian Law and Protection of War Victims*. Leiden/Geneva: Henry Dunant Institute. p.13

<sup>2</sup> Hitoshi Nasu. (2012). *Nano Technology and Challenges to International Humanitarian Law: A Preliminary Legal Assessment*, International Review: ICRC. p.654

History had shown technology evolution and its contribution in war, either in defensive or offensive form, starting from body armor, gun, tank and many more. Yet, soldier as a main part of war is no longer typical to historical era. Modern military research and weapons development are marked by the ongoing pursuit of a dehumanized battle space replete with robots, drones and other unmanned systems. While there are a number of reasons for this, one is certainly the desire to remove the 'human element' from combat: emotion, error and the physical limitations of human combatants (including mortality) and the risk of overwhelming decision-making capacities. However, a rival school of thought is beginning to emerge that notes the continuing importance of the human element in combat and aims to improve human combatants rather than replace them. This is the field of military human enhancement.<sup>3</sup> Soldiers efficiency in decision-making have not yet being replaced by technology upon today, however soldiers themselves are inseparable with flaws, such as the need for sleep, fear, hunger, even post-war they may develop post traumatic stress syndrome, that may trigger 'human failing'<sup>4</sup> and majorly contribute to mission accomplishment.

Related to current military research development, terminator style of warfare has been predicted to happen in few decades, as such realistic efforts are developed by US, Russia, China, and some countries with sophisticated technology by using advanced pharmacology, biotechnology, neuroscience, genetics, nanotechnology and robotics.<sup>5</sup>

The importance of soldier and its complexity in war has created massive military research as in the future; this type of soldier will be capable to actively engage in combat efficiently. Yet this type of soldier may raise concern, as they are different form typical soldier today and could be inferred as "modified" soldier. Practically, the term 'super soldier' is adhered to them, and new rules are necessary to regulate them, as they are no longer "subject" that international humanitarian law refers to. Regarding to this concern, this paper will discuss 1). what is genetically modified super soldier; and 2). whether genetically modified super soldier is legitimate in international humanitarian law.

## METHOD

This paper used normative legal approach by utilizing literature study. Data collected are secondary data derived from conventions, books, research, scientific journal and other written sources relevant. Data collected was analyzed descriptively.

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<sup>3</sup> Matthew Beard, Jai Galliot and Sandra Lynch. (2016). "Soldier Enhancement: Ethical Risks and Opportunities". *Australian Army Journal Autumn*. 13 (1): 6.

<sup>4</sup> Heather A. Harrison Dinniss and Jann K. Kleffer. (2016). "Soldier 2.0: Military Human Enhancement and International Law". *International Law Studies*. 92 (432): 435

<sup>5</sup> See: *How Pentagon ss Building the 'Enhanced' Super Soldiers of Tomorrow*, <https://www.inverse.com/article/9988-how-the-pentagon-is-building-the-enhanced-super-soldiers-of-tomorrow>; *8 Technologies Pentagon is doing to make Super Soldier* <http://www.businessinsider.com/8-technologies-the-pentagon-is-pursuing-to-make-super-soldiers-2016-3?IR=T&r=US&IR=T>; *Iron Man Robot Putin* <http://www.dailymail.co.uk/news/article-3612649/Iron-Man-robot-one-step-closer-reality-Putin-s-scientists-reveal-Ivan-Terminator.html>; *5 Ways Scientists Are Building Real World Super Soldier* <http://www.pcmag.com/slideshow/story/322349/5-ways-scientists-are-building-real-world-super-soldiers>; accessed on Saturday, 22<sup>nd</sup> April 2017

## RESULT AND DISCUSSION

### Genetically Modified Super Soldier Definition

#### 1. Genetic Modification

Genetic modification or genetic engineering is a process that alters the genetic make-up of an organism by either removing or introducing DNA. DNA can be introduced directly into the host organism or into a cell that is then fused or hybridized with the host.<sup>6</sup> DNA sequencing was firstly identified through Human Genome Project (HGP). The sequencing of the human genome represented the largest single undertaking in the history of biological science and stands as a signature scientific achievement. All of history in the making, human DNA took just 13 years to sequence under the Human Genome Project (HGP), an international public project led by the United States, and a complementary private program. Sequencing the human genome - determining the complete sequence of the 3 billion DNA base pairs and identifying each human gene - required advanced technology development and the assembly of an interdisciplinary team of biologists, physicists, chemists, computer scientists, mathematicians and engineers.<sup>7</sup>

The completion of the human genome sequence has had a significant impact on biomedical science. The genetic basis for thousands of common hereditary diseases is now known, and widely-available genetic tests exist for many common diseases and other physical traits. Related fields such as proteomics (the study of protein expression throughout an organism) have also benefitted from the technological and scientific advances made possible by the HGP. Additional international efforts are under way to sequence the genomes of one thousand individual humans to create the most complete and detailed reference map of the human genome.<sup>8</sup> Today, genetic modification is used in creating medicine, animal for experiment purposes, laboratory material research, gene therapy and human enhancement.

#### 2. Super Soldier

According to Joseph Pugliese, Researcher Director of the Department of Media, Music, Communication and Cultural Studies from Macquarie University at Australia defines super soldier as *what is constructed through a series of technological interventions and manipulations that transmute the soldier into an enhanced human-machine of war.*<sup>9</sup> Anthony Gucciardi defines super soldiers refer to genetically modified humans that are capable of producing super human abilities that typical humans cannot generate.<sup>10</sup>

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<sup>6</sup> *Genetic Engineering*, [https://en.wikipedia.org/wiki/Genetic\\_engineering](https://en.wikipedia.org/wiki/Genetic_engineering) as cited from The European Parliament and the Council of the European Union, 12 March 2001 on the deliberate release into the environment of genetically modified organisms and recalling council Directive 90/220/EEC Document, <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32001L0018> accessed on Wednesday, 1<sup>st</sup> March 2017.

<sup>7</sup> Simon Trip and Martin Grueber. (2011). *Economic Impact of the Human Genome Project*. Columbus, Ohio: Batelle Memorial Institute. p.1

<sup>8</sup> Jorge L. Contreras. (2011). "Bermuda Legacy: Policy, Patents, and the Design of the Genome Commons". *Minnesota Journal of Law Science and Technology*. 12 (1): 72.

<sup>9</sup> Jai Galliot and Mianna Lotz. (2013). *Super Soldier: The Ethical, Legal and Social Implications*, US: Ashgate Publishing Ltd. p.25

<sup>10</sup> Christopher E. Sawin. (2016). "Creating Super Soldier For Warfare: A Look Into The Laws of War". *Journal of High Technology*. 17 (1): 109.

It must be noted that genetically modified to human today is not yet inheritable. Any genetic effect or modification will be restricted to the individual treated and is not inherited by the progeny.<sup>11</sup> Even though cloning technology is existed, yet the author does not find any indication to create super soldier by cloning, moreover United Nation Declaration prohibits it on human cloning to apply cloning technology on human.<sup>12</sup>

The idea of using technology to enhance soldiers was first used by George Washington during the American Revolutionary War from 1775-1783, where vaccinations were used to enhance the human immune system. However, the next time human enhancement was used in creating super soldiers for warfare began as early as the turn of the nineteenth century where the Soviet Union sought to use DNA manipulation to cross breed humans with apes to create an army that would not easily die or complain by becoming resistant to pain and unconcerned about the quality of food they ate.<sup>13</sup>

In modern war, Vietnam War could be noted as extreme examples of soldier enhancement. The conflict was distinct in another way it came to be known as the first “pharmacological war”, because the level of consumption of psychoactive substances by military personnel was unprecedented in American history. The British philosopher Nick Land aptly described the Vietnam War as “a decisive point of intersection between pharmacology and the technology of violence”.<sup>14</sup> Soldier enhancement has become focus on United States military through *Future Soldier 2030 Initiative*. *Future Soldier 2030 Initiative* with seven major areas such as human performance and training, soldier protection, lethality, mobility and logistics, soldier network, soldier sensors, soldier power and energy. This program investigates many futuristic technologies, including medicine, nerve trigger, exoskeleton and artificial intelligence assistance.<sup>15</sup>

Defense Advanced Research Project of Pentagon (DARPA) through its fiscal year report had released list of research such as: 1). widening physical capabilities by improving strength and mobility with nano-reinforced exoskeletons and other external devices; 2). improving cognitive abilities such as memory, attention and awareness through the use of networked body suits and pharmacological means; 3) enhancing senses such as smell, sight, taste and hearing; and 4). altering the human metabolism to allow for increased endurance, rapid healing and the digestion of otherwise indigestible materials.<sup>16</sup> The usage of modafinil for brain enhancer in France and US is

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<sup>11</sup> See: John Steward, “Human Enhancement”, Dartmouth Undergraduate Journal of Science, 2013, <http://dujs.dartmouth.edu/2013/11/human-enhancement/> accessed on Thursday, 27<sup>th</sup> April 2017.

<sup>12</sup> United Nations Declaration on Human Cloning, 2005, A/Res/59/280.

<sup>13</sup> Christopher E. Sawin. *Op. Cit.*, p. 107.

<sup>14</sup> Lukas Kamienski, The Drugs That Built a Super Soldier, <https://www.theatlantic.com/health/archive/2016/04/the-drugs-that-built-a-super-soldier/477183/> accessed on Friday, 5<sup>th</sup> May 2017.

<sup>15</sup> See: Future Soldier 2030 Initiative, [https://en.wikipedia.org/wiki/Future\\_Soldier\\_2030\\_Initiative](https://en.wikipedia.org/wiki/Future_Soldier_2030_Initiative) accessed on Tuesday, 27<sup>th</sup> April 2017; Future Soldier 2030 Initiative Document, 2009, Soldier Roger Center, US Army Natick. p.2.

<sup>16</sup> See: Department of Defense Fiscal Year. (2015). *Budget Estimates, March 2014 by Defense Advanced Research Projects Agency ( Research, Development, Test & Evaluation, Defense-Wide)*; Patrick Lin, Maxwell J. Mehlham and Keith Abney. (2013). *Enhanced Warfighters: Risk, Ethics, and Policy*, Greenwall Report.

also investigated for military purposes by Britain and Canada.<sup>17</sup> In China, People of Liberation Army (PLA) officially introduced Night Eagle.<sup>18</sup> The drug was developed specifically for the military to help soldiers cope with sleep deprivation during missions for 72 hours with unknown side effects and unrevealed composition. These indication have published that nowadays super soldier is no longer a novel-based story or fiction movie.

## Genetically Modified Super Soldier Legitimacy in International Humanitarian Law

### 1. Ethical and Informed Consent

Clearly "medical ethics" refers exclusively to matters arising in the treatment of patients and would not extend to the ethical opinions entertained by doctors upon the nature of a particular conflict,<sup>19</sup> as scientific research in military development such as biotechnology can substantially modify human life, alter the nature of society, and destroy human lives one at a time or in mass numbers.<sup>20</sup>

In military research development, human as object of the research is allowed to undergo research under informed consent procedure as granted in Article 7 of ICCPR regulates "no one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. In particular, no one shall be subjected without his free consent to medical or scientific experimentation".<sup>21</sup> But apparently, military research is placed superior than informed consent due to soldiers may deal with experimental drugs, undergo surgery testing, even any unapproved procedure to their body without able to resist under informed consent right. This is contradict upon Ethics in Research, particularly on human subject protection noted that when conducting research on human subjects, minimize harms and risks and maximize benefits; respect human dignity, privacy, and autonomy; take special precautions with vulnerable populations; and strive to distribute the benefits and burdens of research fairly.<sup>22</sup> This is particularly concerning hence the arising power of countries with mandatory military may perform massive military research to their soldiers to trigger dominance in military power, such as China.

Edmund D. Pellegrino noted that if humans wish to avoid universalizing one aspect of their nature, and at the same time truly control the products of their own ingenuity, they must ground their notions of right and wrong in something more than a "willful" gene.<sup>23</sup> The problem of ethic that may arise is the good or wrong of particularly

<sup>17</sup> Heather A Harrison Dinnis and Jann K. Kleffner. *Op. Cit.*, p. 434.

<sup>18</sup> PLA eyes "Night Eagle" to make army of night owls <http://www.scmp.com/article/982075/pla-eyes-night-eagle-make-army-night-owls>, accessed on Monday, 20<sup>th</sup> March 2017.

<sup>19</sup> MJ. Gunn H. McCoubrey. (1998). "Medical Ethics and The Laws of Armed Conflict". *Journal of Armed Conflict Law*. 3 (2): 140.

<sup>20</sup> Marion Hilligan et al. (2007). *Superhuman-Biotechnology's Emerging Impact on The Law*. Western Michigan: University Thomas M. Cooley Law Review. p. 5.

<sup>21</sup> Article 7 of International Covenant on Civil and Political Rights 1976.

<sup>22</sup> David B. Resnik. (2015). *What is Ethics in Research and Why is it Important*. US: National Institute of Environmental Health Sciences. p.4. as cited from Shamoo A and Resnik D. (2009). *Responsible Conduct of Research*. New York: Oxford University Press. p. 15.

<sup>23</sup> Edmund D. Pellegrino. (2001). "The Human Genome Project: The Central Ethical Challenge". *St. Thomas Law Review*. 13 (4). p. 818.

concerning issues might be utmost at the doctors and scientist realm and not publicly published. Soldier will be a subject of merely trial and error upon military research.

## 2. International Humanitarian Law Review

The main issue arises in relation to the usage of advanced technology of human military is that how far the extension of such technology could trigger a review in International Humanitarian Law particularly in Additional Protocol I of Geneva Convention (AP I) and customary law. In accordance to that, such technology shall rely on classification whether these “super soldier” falls into weapon or means and method of warfare. If genetically modified super soldier is set as weapon, it is necessary to fulfill international humanitarian law principle as follows:<sup>24</sup> 1). Distinction principle; 2). Proportionality principle; and 3). The prohibition of unnecessary suffering.

Firstly, As AP I regulates that weapon must be discriminating enough to target only combatants and never noncombatants and civilian objects.<sup>25</sup> Biological weapons and most anti-personnel landmines, then, are indiscriminate and therefore illegal in that they cannot distinguish whether they are about to infect or blow up a small child versus an enemy combatant. Unintended killings of noncombatants or “collateral damage” may be permissible, but not their deliberate targeting; but to the extent that biological weapons today target anyone, they also target everyone.<sup>26</sup> Employing weapons, projectiles and material and methods of warfare which are of a nature to cause superfluous injury or unnecessary suffering or which are inherently indiscriminate in violation of the international law of armed conflict, provided that such weapons, projectiles and material and methods of warfare are the subject of a comprehensive prohibition and are included in an annex to this Statute, by an amendment in accordance with the relevant provisions set forth in articles 121 and 123.<sup>27</sup>

Secondly, as regulated in Article 52 of AP I that civilian objects shall not be the object of attack or of reprisals. Civilian objects are all objects which are not military objectives,<sup>28</sup> clearly requires combatant to reflect proportionality principle to maintain casualties as minimum as possible. In the words of Judge Higgins, in her Dissenting Opinion in the *Nuclear Weapons Advisory Opinion* stated that:<sup>29</sup>

“The principle of proportionality, even if finding no specific mention, is reflected in many provisions of Additional Protocol I to the Geneva Conventions of 1949. Thus even a legitimate target may not be attacked if the collateral civilian casualties would be disproportionate to the specific military gain from the attack. Example like firing excessive shots and bombs to immobilize an adversary”.

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<sup>24</sup> Patrick Lin, Maxwell J. Mehlham and Keith Abney. (2013). *Enhanced War Fighters: Risk, Ethics, and Policy*. New York: Greenwall Foundation. p. 30.

<sup>25</sup> Article 48 Additional I Protocol of Geneva Convention (AP I) 1977.

<sup>26</sup> Patrick Lin, Maxwell J. Mehlham and Keith Abney. *Loc.Cit.*, p. 30.

<sup>27</sup> Rome Statute of the International Criminal Court 1998 as cited in Yoram Dinstein. (2004). *The Conduct of Hostilities under the Law of International Armed Conflict*. Cambridge: Cambridge University Press. p. 61.

<sup>28</sup> Article 52 of AP I 1977.

<sup>29</sup> Yoram Dinstein. *Ibid.*, p. 120 as cited from Advisory Opinion on Nuclear Weapons. (1996). *Advisory Opinion on Legality of the Threat or Use of Nuclear Weapons*. Den Haag: ICJ Report. p. 587.

Third, the prohibition on unnecessary suffering principle is related to proportionality in that it requires methods of attack to be minimally harmful in rendering a war fighter *hors de combat* or unable to fight. This prohibition has led to the ban of such weapons as poison, exploding bullets, and blinding lasers, which cause more injury or suffering than needed to neutralize a combatant.<sup>30</sup>

Even though super soldiers still have not yet classified as weapon, because they are still unable to produce their own weapon directly from their own body (such as produce laser to kill adversary) but in the future super soldiers may fall into weapon if they are able to do so and it is necessary to review their legitimacy. This is particularly concerning due to Article 1 of Biological and Toxin Weapons Convention 1975 (BTWC) implicitly stated that (1) microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes; (2) weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict. The term 'biological agent', however not implicitly stated, it can be broadly indicated as "living creature", which is included human as well.<sup>31</sup>

Lastly, super soldiers may fall into method of warfare classification. As cited from Program on Humanitarian Policy and Conflict Research, Manual on International Law Applicable to Air and Missile Warfare (hereinafter AMW Manual) that methods of warfare refers to activities designed to adversely affect the enemy's military operations or military capacity and extends to the various general categories of operations (bombing, ground, close-air support, etc.), as well as the specific tactics used for attack.<sup>32</sup> Observing the military research indication such as brain-machine interfaces, also known as neural interface systems, attempt to connect the brain directly to a machine without the need for manual input, such as a keyboard, joystick or other device. The interfaces use electrodes (whether surgically implanted in the brain or merely resting on the scalp) to record and translate the user's brain signals into commands that operate computer-controlled devices. The technology has been used both to actively control an external device (e.g., the ability to operate drones with the mind) and to passively shift information by using the brain's power to unconsciously detect anomalies in large amounts of data.<sup>33</sup>

During the last decade, the Pentagon's DARPA launched the "Advanced Speech Encoding Program" to develop non acoustic sensors for speech encoding in acoustically hostile environments, such as inside of a military vehicle or an urban environment. The DARPA division is currently involved in a program called "Silent Talk" that aims to develop user-to-user communication on the battlefield through EEG signals of "intended speech," thereby eliminating the need for any vocalization or body gestures. Such capabilities will be of particular benefit in reconnaissance and special

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<sup>30</sup> Patrick Lin, Maxwell J. Mehlham and Keith Abney. *Op. Cit.*, p. 31.

<sup>31</sup> See: Patrick Lin, Maxwell J. Mehlham and Keith Abney. *Ibid.*, p. 31.

<sup>32</sup> Heather A. Harrison Dinnis and Jann K. Kleffner. *Op. Cit.*, p. 436-437 as cited from Program on Humanitarian Policy and Conflict Research. (2009). *Manual on International Law Applicable to Air and Missile Warfare*, Cambridge: Cambridge University Press.

<sup>33</sup> Heather A. Harrison Dinnis and Jann K. Kleffner. *Ibid.*, p. 435.

operations settings, and successful applications of silent speech interfaces have already been reported.<sup>34</sup>

It shall be noted that indication of using soldier as method of warfare is also concerning, because in Vietnam War, Research has found that 3.2 percent of soldiers arriving in Vietnam were heavy amphetamine users; however, after one year of deployment, this rate rose to 5.2 percent. In short, the administration of stimulants by the military contributed to the spread of drug habits that sometimes had tragic consequences because amphetamine, as many veterans claimed, increased aggression as well as alertness. Some remembered that when the effect of speed faded away, they were so irritated that they felt like shooting “children in the streets”. Inferred that military enhancement violates IHL provisions it is also found that special unit of US army was given steroid injection. If Parties concerned are elaborating the legitimacy over super soldiers as method of warfare even by more “humane” way, it shall require a review under Article 36 of AP I concerning new weapons or method of warfare.

## CONCLUSION

In conclusion, international humanitarian review on genetically modified super soldier may address two points: 1). Genetic modification or genetic engineering is a process that alters the genetic make-up of an organism by either removing or introducing DNA. The development of genetic modification of the super army originated from the development of the human genome project, then used as a basis for human enhancement and then used in military human enhancement by utilizing biotechnology, pharmacology, neuroscience, nano-technology, and biochemistry; and 2). Genetically modified super soldier in the development of military research through experiments that violate ethical and human rights by not considering informed consent on soldiers who became the object of experimentation made the practice of genetic modification of super soldiers cannot be justified. In international humanitarian law, genetic modification of the super soldier requires legal review in its justification as a tool and method of war because some genetic modification technologies may violate the principles of international humanitarian law, in addition to the need for an international humanitarian law review of the legitimacy of means and methods of warfare that does not in compliance with ethical requirements.

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<sup>34</sup> Ivan S. Kotchetkov et al. (2010). *Brain-Computer Interfaces; Military, Neurosurgical and Ethical Perspective*. New York: Department of Neurological Surgery. p. 4.



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