China's Military Pursuit of Bio-Technology

Ms. Kanchana Ramanujam

The author works as a Research Assistant at the Centre for Land Warfare Studies (CLAWS), New Delhi. She holds a Master's degree in Defence and Strategic Studies from University of Madras and a Bachelor's degree in Biotechnology from Goa University. She is a university topper in the former. Her area of research is China. Her other areas of interest are terrorism, warfare, and matters military.

Summary

War has largely remained confined to the inanimate realms of land, air, space, etc. It is envisioned that it would cross over to the animate realm consisting of the human neuro-psychiatric system. This process would be aided by the cutting-edge developments in Science and Technology. The future battlefield is likely to consist of man-machine interfaces and bio-crossing technologies, especially Biotechnology, are expected to play a major role in it. This paper looks at China's military pursuit of Biotechnology, especially employing the CRISPR-Cas 9 technology, and why the Biotech industry has become a strategic industry for China.

Developments in science and technology (S&T) impact both the character and nature of warfare profoundly. New innovations are turning out to be disruptive and any military which takes the lead in absorbing the same would have a significant, perhaps decisive, edge over others.

The Chinese Defence White Papers reiterate the importance of powerful and modern armed forces in achieving the 'Chinese Dream'. True to this, China has taken giant steps towards modernising and transforming its armed forces. It has moved from Civil-Military Integration to Military-Civil Fusion so as to exploit the latest developments in S&T for advancing its military capabilities. In fact, President Xi Jinping heads the Central Commission for Military-Civil Fusion Development established in 2017. In Shenzhen, the Central Military Commission Science and Technology Commission has established the National Defense Science and Technology Innovation Rapid Response Group to 'promote the integration of military and civilian development in the field of science and technology and to use advanced commercial technology to serve the military.'[1] The second round of military reforms China implemented, helped in syncing the doctrine-writing done by the Academy of Military Science (AMS) with the new, S&T-driven capabilities. Such is the emphasis on S&T that Chinese Communist Party committees have been planted into more than 35 Chinese technological companies to ensure oversight![2]

He Fuchu of the Academy of Military Medical Sciences (AMMS), Beijing, sees bio-crossing technologies as tools which will make 'biological weaponization' possible and indeed, as the battlefield has continued to expand in the inanimate realm from the land

to the sky, sea, space, networks, etc., the animate realm consisting of human cells and cognitive abilities (the neuropsychiatric system) would become the next frontier for the battlefield to cross.[3] This is exactly the thought that is guiding the Chinese pursuit of 'zhishenquan' or 'command and superiority in the bio-domain' as they expect "a series of biological revolutions with 'smart' as the core."[4] In fact, way back in 2010, Guo Jiwei of the then Third Military Medical University (Army Medical University post the military reforms in 2017) co-authored a book titled 'War for Biological Dominance' examining the military impact of Biotechnology.[5] Bio-crossing technologies, especially Biotechnology, are being pursued so that China can 'seize the initiative' in this field.[6]

Is the People's Liberation Army (PLA) involved in research pertaining to the enhancement of human cognitive abilities through gene-editing, use of drugs, etc.? In 2011, the AMMS unveiled Night Eagle, a drug it claimed would help its troops remain awake for up to 72 hours with minimum cognitive degradation.[7] A company by the name Cogrowth is using artificial intelligence (AI) to interpret brain signals, which may, in future, be the basis for weapons being controlled by the power of thought![8] Furthermore, in 2015, He Fuchu of the AMMS, postulated that advances in biotechnology could lead to the creation of 'cerebrum control' weapons.

Clustered Regularly Interspaced Short Palindromic Repeats-CRISPR associated protein 9 (CRISPR-Cas 9) technology is one area where China has made massive strides. China has carried out CRISPR-Cas 9 experiments on a number of animals such as dogs, mice, rats, pigs, and rabbits. In fact, the world's first gene-edited dogs - Beagles named Hercules and Tiangou - were created in China.[9] Liangxue Lai, the researcher behind this project, mentioned that these dogs had potential police and military applications owing to their highly muscular body and better running ability.[10]

With so many CRISPR trials on animals, there is speculation that this technique is being used to study the enhancement of cognitive abilities. In fact, even as bioethicists and other stake-holders debated the issue of CRISPR trials on humans, China became the first country to carry out the same in 2016.[11] Dr Lu You of Sichuan University introduced gene-edited T-cells into the body of a lung cancer patient. Moreover, gene editing to confer resistance to Human immunodeficiency virus (HIV) was carried out on human embryos disregarding bioethics, and the first gene edited humans, named Lulu and Nana, were born in China in 2018.[12] It is pertinent to mention here that experiments in animals have shown that removing the gene linked to HIV pathogenesis - CCR5 - also enhances cognitive abilities.[13] Was this a deliberate move by China to study the enhancement of cognitive abilities in humans? It apposite to mention here that in 2016, an AMS researcher presented a doctoral dissertation titled 'Evaluation and Research on Human Performance Enhancement Technology'. It viewed CRISPR one of the three 'human performance enhancement technologies' and as the next 'disruptive technology' where China must take the lead.[14] Of the 14 cancer-related, CRISPR trials currently underway in China, the medical establishments of the PLA, especially the PLA General Hospital and the AMMS are involved in five![15]

It is noteworthy that by way of academic engagements and partnerships with foreign companies and academic institutions, the Chinese biotech companies have not just benefitted in terms of technical expertise, but also collected clinical and genetic data of foreign citizens.[16] This big data would not

only help incorporation of AI into medical biotechnology, but could also be used offensively as the data would reveal the genetic vulnerabilities of specific populations. China, in fact, places immense importance on data localisation and legally protects data by means of the Cyber Security Law (2017), Personal Information Security Specification (2018), etc.[17, 18]

Biotechnology is a critical dual-use technology offering a possible strategic depth and ensuring economic and health security in China. Over 10 crore people in China are diabetic and a quarter of the new global cancer cases are from China.[19] This is an area where China's domestic Biotechnology industry could play a critical role, reducing China's dependence on costly, imported medicines and patents and CRISPR-Cas 9 technology could provide a possible cure for such diseases. Hence, China has encouraged the growth of the Biotech industry by means of programmes and policies for attracting/ retaining human talent, providing infrastructure such as biotechnology parks and demonstration zones, concessions, legal support, etc.

Chinese advancement in the field of healthcare is likely to benefit the entire mankind. But it is the possible, offensive, military use which is a cause of concern.

Endnotes:

1. Sz.people.com.cn. (2018). The country's first national defense science and technology innovation rapid response team started in deep. [online] Available at: http://sz.people.com.cn/n2/2018/0315/c202846-31343562.html [Accessed 4 Nov. 2019].

2. Nouwens, M. and Legarda, H. (2018). China's pursuit of advanced dual-use technologies. [online] IISS. Available at: https://www.iiss.org/blogs/research-paper/2018/12/emerging-technology-dominance [Accessed 4 Nov. 2019].

3. xinhuanet.com. (2017). The future direction of the new military revolution in the world. [online] Available at: https://web.archive.org/web/20190823210313/http://www.xinhuanet.com/politics/2017-08/24/c_129687890.htm [Accessed 5 Nov. 2019].

4. Ibid.

5. Kania, E. and VornDick, W. (2019). China's Military Biotech Frontier: CRISPR, Military-Civil Fusion, and the New Revolution in Military Affairs - Jamestown. [online] Jamestown. Available at: https://jamestown.org/program/chinas-military-biotech-frontier-crispr-military-civil-fusion-and-the-new-revolution-in-military-affairs/ [Accessed 4 Nov. 2019].

6. Ibid.

7. South China Morning Post. (n.d.). PLA eyes 'Night Eagle' to make army of night owls. [online] Available at: https://www.scmp.com/article/982075/pla-eyes-night-eagle-make-army-night-owls [Accessed 5 Nov. 2019].

8. Kania, E. and VornDick, W. (2019). China's Military Biotech Frontier: CRISPR, Military-Civil Fusion, and the New Revolution in Military Affairs - Jamestown. [online] Jamestown. Available at: https://jamestown.org/program/chinas-military-biotech-frontier-crispr-military-civil-fusion-and-the-new-revolution-in-military-affairs/ [Accessed 4 Nov. 2019].

9. Cohen, J. (2019). China's CRISPR push in animals promises better meat, novel therapies, and pig organs for people. [online] sciencemag. Available at: https://www.sciencemag.org/news/2019/07/china-s-crispr-push-animals-promises-better-meat-novel-therapies-and-pig-organs-people [Accessed 4 Nov. 2019].

10. Akst, J. (2015). Genetically Engineered Dogs. [online] The Scientist Magazine®. Available at: https://www.the-scientist.com/the-nutshell/genetically-engineered-dogs-34636 [Accessed 4 Nov. 2019].

11. Cyranoski, D. (2016). CRISPR gene-editing tested in a person for the first time. [online] nature.com. Available at: https://www.nature.com/news/crispr-gene-editing-tested-in-a-person-for-the-first-time-1.20988 [Accessed 4 Nov. 2019].

12. Cohen, J. (2019). Did CRISPR help-or harm-the first-ever gene-edited babies?. [online] sciencemag.org. Available at: https://www.sciencemag.org/news/2019/08/did-crispr-help-or-harm-first-ever-gene-edited-babies [Accessed 4 Nov. 2019].

13. Ibid.

14. Kania, E. and VornDick, W. (2019). China's Military Biotech Frontier: CRISPR, Military-Civil Fusion, and the New Revolution in Military Affairs - Jamestown. [online] Jamestown. Available at: https://jamestown.org/program/chinas-military-biotech-frontier-crispr-military-civil-fusion-and-the-new-revolution-in-military-affairs/ [Accessed 4 Nov. 2019].

15. Ibid.

16. Kazmierczak, M., Ritterson, R., Gardner, D., Casagrande, R., Hanemann, T. and Rosen, D. (2019). China's Biotechnology Development: The Role of US and Other Foreign Engagement. [online] p.122. Available at: https://www.uscc.gov/sites/default/files/Research/US-China%20Biotech%20Report.pdf [Accessed 6 Nov. 2019].

17. Bird, R. (2018). Where are we now with data protection law in China?. [online] lexology.com. Available at: https://www.lexology.com/library/detail.aspx?g=dbe04c03-7990-4e0d-8368-e0170637de08 [Accessed 6 Nov. 2019].

18. Qing, R. (2017). An Introduction to the PRC Cyber Security Law. [online] glo.com.cn. Available at: http://www.glo.com.cn/en/upload/contents/2017/06/593769caecc92.pdf [Accessed 7 Nov. 2019].

19. Hu, C. and Jia, W. (2018). Diabetes in China: Epidemiology and Genetic Risk Factors and Their Clinical Utility in Personalized Medication. Diabetes, [online] 67, p.1. Available at: https://diabetes.diabetesjournals.org/content/67/1/3 [Accessed 5 Nov. 2019].