CENTRE FOR JOINT WARFARE STUDIES

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CENJOWS

CHINA WEAPONISING BIOTECH

1. **Weaponizing Biotech: How China's Military is Preparing for a 'New Domain of Warfare'.** China's national strategy of military-civil fusion has highlighted biology as a priority, and the People's Liberation Army could be at the forefront of expanding and exploiting this knowledge.

2. The PLA's keen interest is reflected in strategic writings and research that argue that *advances in biology are contributing to changing the form or character of conflict*. For example:-

(a) ***Biology is among seven "new domains of warfare"*** discussed in a 2017 book by Zhang Shibo, a retired general and former president of the National Defense University, who concludes: ***"Modern biotechnology development is gradually showing strong signs characteristic of an offensive capability,"*** including the possibility that ***"specific ethnic genetic attacks" could be employed.***

(b) The 2017 edition of *Science of Military Strategy*, a textbook published by the PLA's National Defense University that is considered to be relatively authoritative, debuted a section about ***biology as a domain of military struggle***, similarly mentioning the potential for ***new kinds of biological warfare to include "specific ethnic genetic attacks."***

(c) Chinese military scientists and strategists have consistently emphasized that biotechnology could become a "new strategic commanding heights of the future Revolution in Military Affairs".

3. **<u>The Biological Revolution in Military Affairs</u>.** Senior officers and academics in the Chinese People's Liberation Army (PLA) have not only highlighted concerns about *"national biological security (and) defense"* in response to the threats of infectious diseases, but also emphasized the importance of ***exploring the military potential and even offensive applications of biotechnology*.** Senior Colonel Guo Jiwei (郭继卫) of the PLA's Third Military Medical University co-authored ***War for Biological Dominance*** (*Zhishengquan Zhanzheng*), which examined the ***impact of biotechnology on the Revolution in Military Affairs.*** The concept *zhishengquan*, which might be translated variously as **"biological dominance**" **or "command/superiority in biology,"** is starting to become more prevalent in PLA writings on future warfare of varying degrees of authoritativeness.

4. Notably, Major General He Fuchu (贺福初), former president of the Academy of Military Medical Sciences (AMMS) and now vice president of the Academy of Military Sciences, has long been a prominent proponent of the **militarization of biotechnology**. He has anticipated that ***"Modern biotechnology and its integration with information, nano-technology, and the cognitive, etc. domains will have revolutionary influences upon weapons and equipment, the combat spaces, the forms of warfare, and military theories".***

5. Consequently, pursuant to this new "Revolution in Military Affairs," success on the future battlefield will require achieving ***"biological dominance and this "biological frontier" (shengwu jiangyu) of warfare will emerge as a new domain for new methods of confrontation.***

6. Although writings about **"genetic weapons"** should not be interpreted as official doctrine or formal concepts of operations, it is noteworthy to see striking parallels in themes repeated by a number of PLA scholars andscientists from influential institutions.

7. Certain discussions about the future of "military struggle in the domain of biology" are troubling. Examples are:-

(a) Seemingly authoritative textbooks have included references to the possibility of **"specific ethnic genetic attacks"** (*teding zhongzu jiyin gongji*), while other military experts characterize the notion of a **"ethnic bionation"** as erroneous.

(b) According to Gen. Zhang Shibo, former president of the PLA's National Defense University, today's biotech advances unlock **the possibility to create new synthetic pathogens that are "more toxic, more contagious, and more resistant."**

(c) "Obviously, genetic weapons possess many advantages over traditional biological weapons."

(d) In particular, **the weaponization of CRISPR** is expected to prove more lethal and more precise in ways that could cause major changes in the dynamics of future warfare, despite the risks that would be inherent in its employment and the *current limitations of this nascent technology.*

(e) ***In the long term, genetic weapons are anticipated to have more of a "strategic deterrent function."***

8. ***Such theories and speculation about future capabilities could become actual possibilities for the PLA pursuant to academic and commercial research that is currently underway.***

9. **CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) at the Frontier in China.** At the most basic level, "**CRISPR**" **is a tool for gene editing** that possessesimmense potential for precise and efficient modifications:-

(a) **Chinese scientists** across academic institutions and commercial enterprises have been **at the forefront of experimentation with this technique from the start**, including the company **BGI** (formerly known as **"Beijing Genomics Inc."**), which also **manages China's National Genebank.**

(b) PRC research in CRISPR has rapidly progressed into clinical trials that involve the application of these gene-editing techniques to animals and to humans, including because some of the regulatory requirements for medical research in China have been less strict and demanding. For instance, there are ***currently at least fourteen trials of CRISPR underway across Chinese hospitals****,* which are primarily exploring its potential to treat cancer.

(c) To date, the **use of CRISPR in animals has been a very prominent element of Chinese research**. For example, the **use of gene-edited animals to grow human-like organs for use in transplants** may prove not only lucrative but also medically promising, given continued shortages of organs**.**

(d) The **creation of highly muscular dogs for use in policing** illustrates the potential for gene-edited animals to contribute to state coercion.

(e) Meanwhile, **BGI has attempted to market cloned or gene-edited animals, including 'micro-pigs' as pets**, and another company, Beijing Xinuo Valley Biotechnology Co. Ltd.) has **cloned a number of dogs as pets and for policing**.

(f) Chinese researchers have leveraged gene editing of animals to optimize their use as models for human diseases or characteristics, such as the study of intelligence. For instance, **Mu-Ming Pu (蒲慕明), who has been a leader in designing the "China Brain Plan," has pursued cloning and genetic alteration of macaque monkeys** at the Institute of Neuroscience (ION) in Shanghai to"customize" them for specific research requirements.

10. While the potential leveraging of CRISPR to increase human capabilities on the future battlefield remains only a hypothetical possibility at the present, there are indications that Chinese military researchers are starting to explore its potential. A doctoral dissertation titled "Evaluation and Research on Human Performance Enhancement Technology," published in 2016, ***envisions CRISPR as one of three primary "human performance enhancement technologies"*** that can be utilized to boost personnel combat effectiveness. The researcher argues that because ***CRISPR holds such "great potential" as a "disruptive" technology, China must "seize the initiative."***

Conclusion

11. Ultimately, today's advances in biotechnology may prove revolutionary, and the strategic implications, whether for medicine or the military or aggregate national competitiveness, are only just starting to be appreciated. Today, the PRC is actively exploring new frontiers of such biological cross-disciplinary technologies: from these prominent developments in CRISPR to bionic robotics, intelligentized exoskeletons, and techniques for human-machinecollaboration.

12. Although biomedical research involves numerous promising applications in medicine and therapeutics, there are also reasons for concern about some of the ethical and security externalities of these research engagements.

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