The Washington Times

Print Close

Thursday, October 2, 2008

Iran, China make neuroscience advances

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Iran and China are developing the ability to use sophisticated neuroscience, while U.S. intelligence officials find themselves ill prepared to monitor scientific advances that could threaten U.S. interests, a new report commissioned by the Pentagon says. The report for the Defense Intelligence Agency (DIA) calls on U.S. intelligence officials to closely monitor global advances in neuroscience.

Although a handful of emerging nations are said by experts to be gaining capacity to conduct neuroscience research, the study by 16 scientists under the auspices of the National Research Council (NRC), a nonprofit institution that provides advice on science and technology, focuses on just two.

Jonathan D. Moreno, professor of medical ethics at the University of Pennsylvania and a committee member, explained: "Take the short list of nations that have the capacity to do sophisticated neuroscience and cross-check that with the list of nations that are either ideological enemies of the U.S. or capable of aiding those enemies. You end up with two, China and Iran."

The panel searched for evidence of research into cognitive neuroscience and biotechnology, specifically for military uses, for both countries.

Though the report paints China and Iran as rising science powers in fields such as biotechnology, it offers no evidence that either is currently steering neuroscience work to military ends.

Nonetheless, many experts see the report as a wake-up call for U.S. intelligence.

"Technological advancements in specific fields of neuroscience have implications for U.S. national security and should therefore be monitored consistently by the intelligence community," the scientists write.

The report looks at trends during the next two decades, but experts say the global neuroscience race has heated up, with about 500 global companies trying to develop brain-targeting drugs and devices, according to NeuroInsights, an industry group.

Like biotechnology, neuroscience and neurotechnology - the engineering of

devices and drugs targeting the brain and nervous system - have therapeutic and military uses. Officials with the Pentagon's Defense Advanced Research Projects Agency openly talk of next-generation wish lists that include pills that decrease fear or enhance cognition in soldiers and devices that connect human thoughts with devices such as prosthetic limbs and unmanned aircraft.

Meanwhile, such nations as India, Brazil, China and Iran are increasing their capabilities in fields related to neuroscience - a fact that worries U.S. intelligence officials concerned with threats involving "neuroweapons" that act on the brain and nervous system.

The NRC panel, consisting of 16 scientists given classified and unclassified briefings from about two-dozen U.S. institutions doing neuroscience, looked abroad for emerging science threats.

The panel used open-source journals and Internet documents to show that China and Iran are growing their capacity to conduct sophisticated science. Yet despite receiving classified briefings from U.S. officials tasked with preventing "foreign technology surprises," the panel came up with no proof that Tehran or Beijing is engaging in classified military work dealing with neuroscience or technology.

The report says that China "is fast becoming an international superpower and a haven for biotechnology research," in part because of relatively inexpensive labor and biotechnological expertise in universities and companies. It also cites a 2007 Chinese strategy paper saying that the People's Liberation Army is trying to "make major breakthroughs in some basic, pioneering and technological fields of strategic importance."

The panel concludes that "although the [strategy document] does not directly mention specific details as to what technologies and science are to be used, it would not be too great a leap to suggest that the Chinese government is probably pursuing capability in cognitive neurosciences to enhance its national defense."

In the case of Iran, the panel states that it was easy to find information about the country's biotechnology programs and research groups on the Internet. "But it is not at all straightforward to find out how much of the research is connected to cognitive neuroscience and possible advances in science related to national defense."

Officials from the Chinese Embassy in Washington and the Iranian mission in New York did not respond to requests for comment by press time. The

Iranian mission was closed Wednesday in observation of the end of Ramadan.

DIA officials declined to talk about the report, and the Office of Naval Research, which sent officials to brief the panel, did not respond to interview requests.

Unlike some committee reports on sensitive subjects regarding intelligence or national security, this report does not contain a classified appendix. Christopher C. Green, the committee chairman and a clinical fellow in neuroimaging at the Detroit Medical Center, said that's because the committee received a number of classified briefings from U.S. government sources but got little useful information.

"We asked them to tell us their impressions of what is going on that might be of value in neuroscience and neurocognition, in particular over the next 20 years in China, Iran and Korea," said Mr. Green, who also is the assistant dean, Asia Pacific, of the Wayne State School of Medicine in Beijing. "We never got answers we thought were interesting."

Still, the panel of experts lobbed intelligence officials a warning about Tehran: "The development of other forms of military technologies, such as neurotechnological devices, to build Iran's national defense and perhaps even offense, remains largely unknown. It poses a threat to international stability, and we are compelled to learn more about ethical regulations for biomedical research in Iran."

More than moral considerations, ethical regulations over biomedical research on human testing have a strategic impact - giving nations with loose or no testing regulations an advantage over those with strict laws and monitoring.

There are international documents that nations pledge to follow in terms of human and animal testing, but each nation is responsible for establishing its compliance regime.

The study reports that Iran's ethics framework for human testing is largely influenced by the Islamic underpinnings of the society. Tehran says it adheres to international documents and guidelines on human testing and has confirmed its compliance with the United Nations and UNESCO documents that deal with human rights.

"However, the Iranian record of questionable treatment of [assumed] homosexuals, women, and secular scholars does not bolster confidence that both international and Iranian bioethics guidelines will always be complied

with by Iranian government biomedical researchers," the report states.

As for China, the NRC report cites a paucity of regulations on human testing but indicates an effort by officials to improve protections.

"My experience suggests that China is trying to firm up its human testing rules," said Mr. Moreno, author of "Mind Wars," a book exploring the intersection of neuroscience and national security. He added that he did not have information about Iran's ethical guidelines.

"In any case, the fact is there's no international regime for monitoring human experiments," Mr. Moreno said.

The disparities in human testing regulations and the lack of international monitoring, according to Dennis K. McBride, academic president at the Potomac Institute for Policy Studies and an affiliated professor at Georgetown University, is a serious problem that threatens, among other things, to shift the weight of research power in biotechnology from the United States to other nations, especially China.

"For a number of reasons, from differences in human testing controls to intellectual property laws, the U.S. stands to lose its leadership in biotechnology in a matter of years, not decades," Mr. McBride said.