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Bio-security, an emerging challenge

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Freedom to research in biotechnology shouldn't be hampered, but the risks must be dealt with.

Advancements in biotechnology can be used to alarmingly destructive effect.

Recently, in September 2011, researchers in Rotterdam succeeded in modifying the avian flu virus in ferrets (the best animal model for influenza in humans) to make it capable of airborne transmission, and therefore, making it far more contagious.

The implications are that the highly-dangerous A(H5N1) avian flu virus, which so far spreads only from birds to humans, could get modified fairly easily, to enable it to spread by airborne transmission from human to human, making it far more dangerous. The A(H5N1) avian flu has caused around 350 deaths from 600 reported cases so far, giving it a mortality rate of around 60 per cent.

ADVANCES IN BIOTECH

Recent research indicates that developments in biotechnology have now made it quite feasible to modify a wide range of pathogens to give them new features, including those that can make them far more dangerous to humans. A number of new diseases have emerged in recent years, adding to the list of existing pathogens and toxins that are dangerous to humans.

In the recent case, the research journals concerned were asked by US agencies to not publish key details of their work on the precise nature of changes to the A(H5N1) virus, due to the apprehension that such information may be misused by unscrupulous elements. While the request has been acceded to, it has kicked off a debate in the scientific community on the general question of disclosure of certain research details in biosciences, which could be used by terrorists and some others against human populations, and the possible role of WHO in this regard.

The Biological Weapons Convention, 1972, which has 165 countries party to it, embodies the determination of the international community to ban biological and toxin weapons. Such weapons have, for long, been regarded as being relatively less effective for military use.

However, the convention is wanting in the area of verification. The US, which is the global leader in biotechnology, has stalled progress in this area, due to concerns regarding leakage of scientific information. This may now change. However, while the convention applies to governments, it leaves open the possibility of non-state actors attempting to use bio-weapons.

Unlike nuclear weapons technology, biotechnology is relatively accessible and far less costly to use. For example, the cost of gene sequencing has dropped dramatically with technology advances. Biotech research can be done at a relatively low cost compared to nuclear technology. Harmful pathogens can be easily transported and released to cause

disease and panic.

So, this technology offers non-state actors a potential low-cost, high-impact instrument to cause damage to human populations, or to the agricultural sector of target countries. The accidental release of dangerous pathogens from research facilities is another possibility.

Indeed, reports have already surfaced of Al Qaeda in the Arabian Peninsula (AQAP) seeking to produce a deadly toxin, Ricin, from the waste left after extracting castor oil. What if pathogens like avian flu A(H5N1), plague, SARS, etc. are deliberately modified to enable airborne transmission from humans to humans? This possibility can no longer be dismissed as science fiction.

Action is needed at the national and international levels to deal with this threat. Biotech research is conducted in a wide range of institutions, in government laboratories, universities, and by the private sector. Freedom to do research in biotechnology shouldn't be hampered, and intellectual property rights must be protected. However, the risks to society and the general population must be dealt with, as in the case of nuclear research.

This presents a formidable challenge to national regulatory agencies and governments in devising suitable frameworks to enhance bio-security and bio-safety, while allowing research to go ahead. Developing countries shouldn't face additional hurdles in access to biotechnology and its useful applications.

India should be actively engaged in international efforts and adopt national measures to strengthen bio-safety and bio-security. Otherwise, institutions and researchers in India are likely to face problems in entering into technology collaborations and research activities in biotechnology.

REGULATORY AGENCY

India is still to set up a National Biotechnology Regulatory Agency, as a single professional entity to deal with all aspects of biotech research and applications.

A Bill on this subject, prepared in 2008, was finally tabled in Parliament in December 2011. This Bill needs to be revisited, to take into account the issue of bio-security and regulation of research activities, to prevent potentially dangerous information going into the wrong hands. This is a delicate issue, and needs to be dealt with in consultation with all stakeholders — research community, academics, and the private sector.

Research institutions should devote more attention to security aspects, such as personnel security, security of materials and equipment, and security of information and data. Suppliers of biotech equipment and consumables may need to take more care and verify end-user details while responding to requests for equipment and materials that could be used for harmful ends.

In the area of response to bio-threats, the actions needed are similar to those for combating disease outbreaks. Rapid response should include national and international coordination to instantly identify and determine the genetic makeup of the responsible pathogen, and evolve counter measures. The WHO's Global Outbreak and Response Network (GOARN) has functioned well and could be further strengthened.

On the international level, more teeth have to be given to the BWC. Verification provisions should be strengthened, and the role of national entities more precisely defined. A model code of conduct and rules for biotech institutions and national agencies could be useful. The Chemical Weapons Convention could provide a useful model in this regard. The threat from bioterrorism just got more likely than nuclear terrorism, and needs an effective response.

(The author is a former Ambassador to Cuba and Greece.)

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