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**The Basic Elements of Dual Use Research In
Life Sciences – *Challenges for defining its
contours and Management in The Modern
Biotech Era***

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Biosafety and Biosecurity...

- “Biosecurity” is a broad term used to define protection against all forms of biological threats.
- “Biosafety” is a narrower term used to denote the safety or the biological stability or integrity of the organism in question.



Dual Use of Biological Research...

- Globalization has many manifestations.
- Biological research is one of them!
- “Biosecurity” is a huge concern.
- Biosecurity includes biosafety, environmental safety, human and animal safety.
- Modern biology is one of the frontier sciences that is considered highly “transformative”.



Dual Use Life Sciences...

- Modern biologists can carry out manipulations or modifications of living organisms at the molecular and nano-levels. E. g.: genetic engineering
- Modern biologists can now synthesize a new organism *de novo* – “Synthetic Biology”.



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Dual Use Life Sciences Research...

- The Promise: Fantastic!!!! change the way we live.
- The risks: Not fully comprehensible in the long term, but none that cannot be handled for now.
- The Issue: These same technologies can be used to can harm or damage. Can present threat to public health and national security!?!



The Dual Use Research...

- Things that have legitimate scientific purpose.
- Things that can be misused to cause intentional or unintentional harm to public health and national security.



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The Dual Research Dilemma...

- A National Research Council of the National Academies Report –
“**Biotechnology Research in An Age of Terrorism**”

Captures the essence of all concerns!!!



The Dual Use Research...

Some examples....

1. Deactivating vaccines.
2. Conferring resistance to deadly pathogens.
3. Enhanced spread of pathogens – host range and virulence.
4. Cheating diagnosis and detection.
5. Weaponization of biological agents or toxins.



Bio-tensions...

How to safeguard against Bad-Motivation?

- Eternal vigilance.
- Identify potential misuse opportunities.
- Due diligence.
- Maintain free flow of information for normal scientific progress.
- Evaluate local legislation to deal with the threats.
- Promote research in counter measures.



National Biosecurity Initiatives...

- Do not ignore or underestimate threat to live stocks and agriculture.
- Develop National guidelines via IBC and state and national oversight.
- Consider “Code of Conduct” for scientists and laboratory workers in life sciences.



The Dual Use Research...

- Education and awareness.
- Appropriate communication about potential misuse and possible threats.
- International cooperation for Biosecurity.
- International harmonization of biosecurity policies.
- A national Biosecurity oversight agency.



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Management of Dual Use Research...

Handling Changing “Risk” Landscape:

- Demography
- The environment
- Technological changes
- Socio-economic impacts



Management Challenges...

- New risk management paradigm for changing risk patterns.
- Synergy between public-private sectors.
- Stakeholder dialogues.
- Strengthen international cooperation.



Management Challenges...

- How to maintain scientific openness in a democratic society or cyber-connected world?
- How can we exercise control over dual-use equipments, and materials?
- How to gain public confidence in modern life sciences enterprise?
- How to balance between scientific freedom and security concerns?



Management Challenges...

Behavioral patterns:

1. Psychopathic, sociopathic and criminal
2. Negligent and thoughtlessness
3. Right-minded professionals with a narrow view of the consequences of their work.
4. Lackadaisical attitude



Management Tools...

- Formal treaties
- Consensus pacts
- National legislation
- Informal agreements or mutual consents
- Advance Informed Agreements (AIA)
- Professional codes of conduct



Conclusions...

- Evaluate existing systems of security.
- Stakeholder discussions to consolidate existing laws
- Enhanced open communication.
- Bolster regulations.