

Biosafety

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Biosafety is the prevention of large-scale loss of biological integrity, focusing both on ecology and human health.^[1]

Biosafety is related to several fields:

- In ecology (referring to imported life forms from beyond ecoregion borders),
- In agriculture (reducing the risk of alien viral or transgenic genes, genetic engineering or prions such as BSE/"MadCow", reducing the risk of food bacterial contamination)
- In medicine (referring to organs or tissues from biological origin, or genetic therapy products, virus; levels of lab containment protocols measured as 1, 2, 3, 4 in rising order of danger),
- In chemistry (i.e., nitrates in water, PCB levels affecting fertility) and
- In exobiology (i.e., NASA's policy for containing alien microbes that may exist on space samples - sometimes called "biosafety level 5"^[citation needed]).

The international Cartagena Protocol on Biosafety deals primarily with the agricultural definition but many advocacy groups seek to expand it to include post-genetic threats: new molecules, artificial life forms, and even robots which may compete directly in the natural food chain.

Biosafety in agriculture, chemistry, medicine, exobiology and beyond will likely require application of the precautionary principle, and a new definition focused on the biological nature of the threatened organism rather than the nature of the threat.

When biological warfare or new, currently hypothetical, threats (i.e., robots, new artificial bacteria) are considered, biosafety precautions are generally not sufficient. The new field of biosecurity addresses these complex threats.

Biosafety level refers to the stringency of biocontainment precautions deemed necessary by the Centers for Disease Control and Prevention (CDC) for laboratory work with infectious materials.

Typically, institutions that experiment with or create potentially harmful biological material will have a committee or board of supervisors that is in charge of the institutions biosafety. They create and monitor the biosafety standards that must be met by labs in order to prevent the accidental release of potentially destructive biological material.

Contents

- 1 Biosafety in synthetic biology
- 2 See also
- 3 References
- 4 External links

Biosafety in synthetic biology

With the potential future creation of man-made unicellular organisms, some are beginning to consider the effect that these organisms will have on biomass already present. Scientists estimate that within the next few decades, organism design will be sophisticated enough to accomplish tasks such as creating biofuels and lowering the levels of harmful substances in the atmosphere.^[2] Scientist that favor the development of synthetic biology claim that the use of biosafety mechanisms such as suicide genes and nutrient dependencies will ensure the organisms cannot survive outside of the lab setting in which they were originally created.^[3] Organizations like the ETC Group argue that regulations should control the creation of organisms that could potentially harm existing life. They also argue that the development of these organisms will simply shift the consumption of petroleum to the utilization of biomass in order to create energy.^[4]

See also

- Quarantine
- European BioSafety Association

References

- [^] *Biosafety and the environment: An introduction to the Cartagena Protocol on Biosafety* (<http://www.cbd.int/doc/press/presskits/bs/cpbs-unep-cbd-en.pdf>). GE.03-01836/E. United Nations Environment Programme. (undated). p. 8.
- [^] Collins, James. "Synthetic Biology: Bits and pieces come to life" (http://www.nature.com/nature/journal/v483/n7387_supp/full/483S8a.html). *Nature* **483** (7387): S8–S10. doi:10.1038/483S8a (<http://dx.doi.org/10.1038%2F483S8a>). Retrieved 12 April 2012.
- [^] "First Self-Replicating Synthetic Bacterial Cell" (<http://www.jcvi.org/cms/research/projects/first-self-replicating-synthetic-bacterial-cell/faq/#q8>). J. Craig Venter Institute. Retrieved 12 April 2012.
- [^] Silvia Ribeiro, Ribeiro (December 3, 2010). "News Release: Biofuels, Bioenergy and Biochar: False Solutions Lead to Land-Grabbing" (<http://www.etcgroup.org/en/node/5243>). Retrieved 12 April 2012.

External links

- WHO Biosafety Programme (<http://www.who.int/csr/labepidemiology/projects/biosafety/en/>)
- CDC Biosafety pages (<http://www.cdc.gov/od/ohs/biosfty/biosfty.htm>)
- The Sunshine Project: Nonprofit Laboratory Biosafety Watchdog (<http://www.sunshine-project.org>)
- International Centre for Genetic Engineering and Biotechnology (ICGEB): Biosafety pages (<http://www.icgeb.org/biosafety/>)
- Greenpeace (<http://greenpeace.org>) safe trade campaign
- American Biological Safety Association (<http://www.absa.org>)
- Biosafety in Microbiological and Biomedical Laboratories (<http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4toc.htm>)
- Program for Biosafety Systems (<http://www.ifpri.org/themes/pbs/pbs.htm>) US-funded program
- Food Security and Ag-Biotech News (<http://www.merid.org/fs-agbiotech/>) — balanced global news on biosafety issues in agriculture
- GMO Safety (<http://www.gmo-safety.eu/en/>) - Information about research projects on the biological safety of genetically modified plants.
- Karlsruhe Institute of Technology (KIT) - Forschungsstelle für Brandschutztechnik: Research on fire protection and extinguishing systems in microbiological and genetic engineering laboratories. (http://www.ffb.uni-karlsruhe.de/download/IMK_Ber_Nr_149_Kunkelmann_Brandschutz_in_Genlaboren_Teil_1-240.pdf)
- COST Action FP0905 Biosafety of forest transgenic trees (<http://www.cost-action-fp0905.eu>)
- Biosafety Scanner (<http://en.biosafetyscanner.org>)
- The 2013 International Conference on Biocontainment Facilities (<http://www.TradelineInc.com/BIO2013>)
- eBook Reference: Management Principles for Building and Operating Biocontainment Facilities (Kindle Edition) (<http://www.TradelineInc.com/AmazonBSL3>)

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