



Zdravlje u Mađarskoj - Health in Hungary

Hungarian Biosafety Laboratory

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The Hungarian Biosafety Laboratory (BL) at the National Center for Epidemiology (NCE) was established in 2002 by reorganization of the previous poxvirus laboratory led by Elek Farkas. The BL was supported by both the EU project PHARE and the Hungarian government with the aim to strengthen Schengen borders. The official permission to set up our institution was granted by Hungarian authorities in June, 2006. This laboratory is the only high containment laboratory operating in Middle Europe.

According to the Hungarian law (61/1999 Health Ministry regulation), NCE's duty including that of BL is to give rapid and appropriate response to the emergence and reemergence of risk group 3/4 pathogens in Hungary. The BL fits in the structure of NCE; lots of reference laboratories are in connection with BL such as the National Reference Laboratory (NRL) for Influenza, NRL for Poliovirus, NRL for Viral Zoonosis, NRL for Highly Pathogenic Bacteria, NRL for Leptospirae, NRL for Bacterial Zoonosis, NRL for Aerobic Enteric Bacteria and NRL for Legionella. Several risk group (RG) 3 pathogens are handled continuously in BL: Enteroviruses including polioviruses, West-Nile virus, Tick-born encephalitis virus, Dengue virus 1-4, Hantavirus (all type), Yellow-fever virus, Chikungunya virus, Rift-Valley fever virus, highly pathogenic avian influenza viruses, Bacillus anthracis, Burkholderia sp, Brucella sp, Francisella tularensis, Yersinia pestis, Coxiella burnetti, Legionella pneumophila, Leptospira sp, Bordetella pertussis and B. parapertussis. Broad spectra of microbiological operations are used such as detection (PCR, real time PCR, serological tests, electron microscopy, biochemical identification), isolations (cell cultures, animal inoculations), characterization (hemagglutinin inhibition, microneutralization, molecular subtyping), production of diagnostical sera and antigens. The BL participated in the development of the Hungarian H5 mock up vaccine and it is the place for the maintenance of RG3 pathogens strain culture collection.

The BL consists of two parts: a Biosafety Level 4 (BSL4) suit laboratory and Biosafety Level 3 (BSL3) laboratory. Normally the BSL4 part is operated under BSL3 conditions but in case of emergencies it can be easily converted to BSL4. We have the ability to detect RG4 pathogens (for example Crimean-Congo hemorrhagic fever virus, orthopoxviruses) using several methods (such as molecular diagnostic tools and cell and animal inoculation). The BSL4 laboratory has three rooms. In the first room mostly the uninfected cell cultures are passaged and nucleic acids are aliquoted. The second room is the venue of nucleic acid isolation using MagNA Pure and that of immunofluorescence experiments (e.g. antigen preparation). In the third room there is a lyophilizer, a 9-place individually ventilated animal cage and a biosafety cabinet level 3 (bsc3) where the unknown, possibly RG4 agent-containing samples are processed. In this last room the animal experiments are performed. The BSL3 laboratory possesses rooms; in the first room, where two bsc2 are placed, vegetative bacteria are handled while in the second room the bsc3 samples containing bacterial spores are processed.

Both BSL4 and BSL3 can be operated independently from each other. The double-door autoclaves and the decontamination showers are elemental part of BL along with the double door and the depressive air pressure system. Refrigerators, air pressure, filtration systems, decontamination systems are monitored continuously, and the BL engineers are alarmed in case of system disorders to take appropriate measures. Apart from biosafety, the biosecurity is also a very important issue in the scope of BL. There is a security service at the entrance and a fence around the BL building. Unauthorized visitors are detected by a motion alarm system installed at both the entrances and in the corridor, and the close TV camera system surveilled by two independent observers. Access to the laboratory is allowed only to authorized persons using personal magnetic cards.

The BL is currently participating and has participated in several international cooperations in order to contribute to and participate in harmonization processes, standardization of biosafety practices and diagnostic procedures and to strengthen biosafety/biosecurity awareness. The most important cooperations are the following: ENIVD (European Network for Diagnostics of "Imported" Viral Diseases), EQADeBa (External Quality Assurances for the Detection of Highly Pathogenic Bacteria of Potential Bioterrorism Risk), QUANDHP (Quality Assurance Exercises and Networking on the Detection of Highly Infectious Pathogens), ERINHA (European Research Infrastructure on Highly Pathogenic Agents) and RiViGene (Risk Virus Genes). Due to these collaborations, the staff of BL has / had the opportunity to be trained in the most significant Biosafety laboratories of the EU. The acquired experience is continuously applied to improve the processes, procedures etc. and as a result, the BL and its staff have become prepared to cope with emergencies elicited by dangerous pathogens.