

Occupational exposure risks of hazardous biological agents in an animal testing facility

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Animal testing facilities play a crucial role in biomedical research, but the presence of hazardous biological agents (HBAs) poses potential health hazards to the personnel involved. The HBAs can be found in bioaerosols, for example, organic dust, bacteria, viruses, animal faeces, animal hair or urine. Exposure to HBAs may, depending on the classification of the organism, result in, inflammatory responses, respiratory diseases, digestive tract infections and general discomfort. Exposure to HBAs is for the most part, accidental or non-intentional and the main exposure routes are inadvertent ingestion and inhalation (Davidson al., 2020). This study aimed to determine the presence of potential HBAs within an animal testing facility using active and passive sampling techniques in various types of rooms hosting different activities. Bioaerosol samples were collected using an active air sampler and a non-selective agar medium plate. Surface swabbing samples were collected (swabbed) according to the prescribed NIOSH method [2] (NIOSH, 2017), After which the samples were incubated on tryptone glucose extract agar (TGE), a non-specific medium for the growth of common biological agents, as well as a select group of other agar plates to target specific types of organisms e.g., m-Green agar for yeasts and moulds and Chromogenic coliform agar (CCA) for growth of *Escherichia coli* and coliforms growth. The HBAs were categorised based on morphological differences and quantified by counting the growth of colony-forming units on the plates. The areas that contained the highest number of colony-forming units (CFU/cm²) were both washing areas and the entrance of the facility where personal protective equipment is stored. HBAs were also quantified in the hallways that lead to clean and dirty areas within the facility. The lowest number of microbial growth (CFU/cm²) was observed in the experimental rooms where the animals are handled, and tests are conducted. Since the identity of the HBAs was not confirmed during this study, pathogens might be among the detected HBAs. This study proved the presence of potential HBAs and warrants the need for regular monitoring and more in-depth analysis of the types of potential HBAs. Based on the findings, it is recommended that the animal testing facility enhances safety measures to minimize occupational risks. This may include improvements in facility design, updates to safety protocols, and recommendations for ongoing training and education for personnel. The goal is to develop a comprehensive risk management plan that ensures the well-being of the workers in the animal testing facility while maintaining the integrity of scientific research involving hazardous biological agents.

- [1] Davidson, M., Kift, R. & Reed, S. Biological Hazards. In Reed, S., Pisaniello, D. & Benke, G., ed. Principles of Occupational Health and Hygiene an Introduction. 3rd ed. New York: Routledge, **2020**. pp. 486–532.
- [2] NIOSH (National Institute of Occupational Safety and Health), Lindsley, W.G., Green, B.J., Blachere, F.M., Martin, S.B., Law, B.F., Jensen, P.A. & Schafer, M.P. NIOSH Manual for Analytical Methods, 5th ed, **2017**. pp. 25–27.