

Focus on IFA's work

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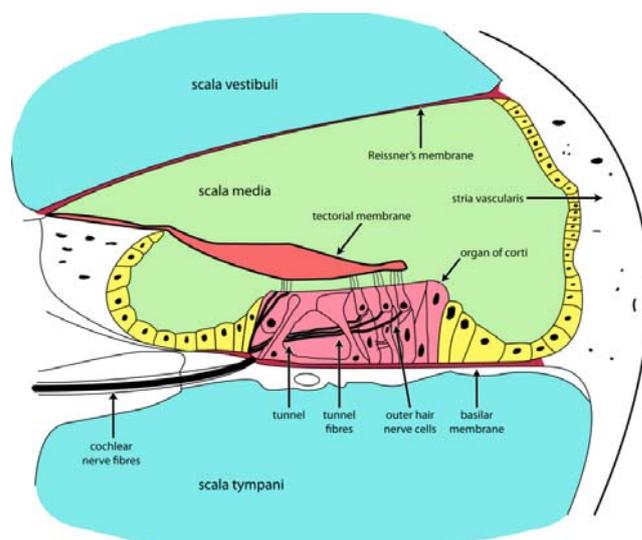
Ototoxic substances

Problem

Ototoxic substances are chemicals which may damage the inner ear and/or the nerves leading to it, thereby causing disorders such as hearing loss and disturbance of the sense of balance. In accordance with the EU Physical Agents (Noise) Directive 2003/10/EC, employers must consider the combined effects of noise and ototoxic agents in risk assessments, where technically feasible. This directive was implemented in Germany on 6 March 2007 in the form of the Occupational Health and Safety Regulation on Noise and Vibration (LärmVibrationsArbSchV). The scientific knowledge required for evaluation of the risk of ototoxic effects posed by agents is often incomplete. For this reason, current knowledge on the ototoxic properties of agents should be surveyed, and the sectors and specific areas identified in which high exposure to ototoxic substances and also noise exposure occur.

Activities

In the course of a comprehensive literature survey, agents associated with hearing loss were identified; and the scientific findings from animal tests and epidemiological studies on the ototoxicity of these substances, together with the observations on the combined effects of noise and ototoxic substances, were compiled and evaluated. In order for working areas associated with a possible elevated risk of hearing loss to be identified, data relating to workplace exposure to particular ototoxic substances were selected and evaluated from the IFA's MEGA exposure database.



Cross-section through the cochlea of the inner ear, Copyright: [Creative Commons License](#)

The working areas thus identified were then compared against the IFA's MELA database of measured data on workplace exposure to noise. The results have been used, among other things, in a project entitled "Combined Exposure to Noise and Ototoxic Substances" funded by the European Agency for Safety and Health at Work. Together with other European OSH institutes, the IFA was involved during this project in drafting a report by the Agency in order to provide an up-to-date picture of the state of knowledge in this area. At the heart of the report was the development of an agreed list of ototoxic substances. Following weighting of the evidence of relevant studies, the substances concerned were classified in a system.

Results and Application

The results of the survey were published in the form of several journal articles and conference papers. The report commissioned by the European Agency is freely available for download from the Internet. It contains a description of the underlying physiological mechanisms which may lead to hearing loss, information on the diagnostic instruments currently available, and an overview of knowledge on chemical substances which may contribute to hearing loss. Tasks and working areas are stated in which exposure to ototoxic substances may occur. Examples of MEGA/MELA database analyses are presented which identified working areas in which noise exposure and exceedings of workplace limit values for ototoxic substances have been investigated in the recent past. Finally, gaps in the current state of knowledge are stated which should be addressed during new measures and future key areas of research.

Altogether, there is a lack of validated findings at this stage on the dose-effect relationship of ototoxic substances in human beings. Risk management should therefore be conducted on the precautionary principle, with particular consideration being given to the substances which have been shown to be ototoxic in humans. This particularly applies to working areas with comparatively high exposure to noise and ototoxic substances.

Area of Application

Persons concerned with issues of risk assessment and the evaluation of atmospheric concentrations of chemical agents and exposure to noise.

Additional Information

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Expert Assistance

IFA, Division 1: Information technology – Risk management

Literature Requests

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