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### **Biological Markers Of Exposure And Effect In Risk Assessment**

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#### ***Abstract***

The paper gives coverage of the national experience in relation to use of biomarkers and its practical significance. Adverse chemical exposures and their effects on the body are used as an example to illustrate basic stages in the implementation of biomarkers in medical and ecological research.

Biomarkers are characterized as a significant component in substantiating cause-effect relations within the “environment – adverse effect” system and basic requirements to their use within medical-ecological research are formulated considering up-to-date international approaches and national competences. Implementation and use of new highly sensitive analytical techniques allow analyzing pathways of body responses to environmental exposures at earliest stages in their development.

The “Nitrate levels in drinking water – N-nitrosodimethylamine levels in blood, nitrite levels in urine” system was used as an example for substantiating markers of oral exposure to nitrates and N-nitrosodimethylamine in drinking water. The paper reports the results of experimental research aimed at establishing cause-effect relations within the system.

These established cause-effect relations between changes in biochemical indicators of adverse effects and markers of exposure to N-nitrosodimethylamine made it possible to predict unfavorable health outcomes associated with it. Upon exposure to N-nitrosodimethylamine, likely adverse effects include cytolysis activation, weaker antioxidant protection and activated oxidation processes. As a result, dysfunctions may occur in the liver and motor-evacuation functions of the bile-excreting tracts may be impaired.

Available experience and our own research results allowed us to develop a biomonitoring system that includes biomarkers of exposure and effect. They are employed to create an evidence base to prove that adverse chemical environmental exposures cause actual health harm.

***Keywords:*** biomarkers of exposure, biomarkers of effect, biomonitoring, cause-effect relations, chemical environmental factors.