

HUMAN-BIOMONITORING (HBM) – LEARNING BY PLAYING

BIOMONITORING U LUDZI (HBM) – UCZENIE SIĘ PRZEZ ZABAWĘ

Karl Ernst von Muehlendahl, Judith Linnemann

Kinderumwelt gGmbH, German Academy of Pediatrics (Deutsche Akademie für Kinder- und Jugendmedizin, DAKJ), Osnabrück, Germany

Summary

Kinderumwelt – an agency of the German pediatricians concerned with environmental medicine – has developed an e-learning module about human-biomonitoring. It allows active learning because the user can study interactively with the help of a model. The HBM module is part of www.allum.de (the internet portal „Allergy, Environment, Health”) and is available in German and English. Since the module works mainly with images, it is also accessible to users with incomplete command of the English or German languages.

Streszczenie

„Kinderumwelt” – agencja założona przez pediatrów niemieckich zajmująca się medycyną środowiskową – jest autorem modułu internetowego HBM „e-learning” nauczającego biomonitoringu u ludzi. Pozwala to na interaktywne uczenie się przez użytkownika za pomocą symulującego modelu. Moduł HBM jest częścią adresu www.allum.de (portal Allergy, Environment, Health) i jest dostępny w j. angielskim i niemieckim. Moduł działa głównie za pomocą obrazków, co pozwala na jego użycie osobom mniej biegłym w j. angielskim lub niemieckim.

Human-Biomonitoring

Human-Biomonitoring is the measurement of the body burden of toxic chemical compounds, elements, or their metabolites, in biological substances. (Wikipedia, 2011) [1]. In laboratory analysis, the suspected pollutants are being quantified within human material (blood, serum, urine, breast milk, hair, teeth, tidal air). A detailed definition can be found in (von Mühlendahl, Otto, & Linnemann, 2011, pp. 11–14) [2].

Scientific Simulation – learning by playing

E-learning means learning and teaching with the aid of electronic and digital media (Kerres, 2001) [3]. The main aspects of e-learning are multicodality and interactivity. Multicodality means that pictures, texts, cross-references, animations and simulations are being used (Rey, 2009) [4]. Animation takes place

without being influenced by the user. Interactivity indicates that the user has different possibilities to control the object and to intervene in animated processes. Simulations are models, which display important aspects of reality. By free or directed experiments or observation, the learners can acquire knowledge about structural or functional properties of the original (Niegemann & Hessel, 2003) [5].

Human-biomonitoring in simulation

The setting of a young family serves as a model situation.

In their environment, a new pollutant was found. In the first of nine chapters, the family learns everything about its incorporation and the importance and influence of the individual situation (gender, profession, age) and behavior in environmental health.

Nadesłano: 1.03.2012

Zatwierdzono do druku: 7.03.2012

The second chapter shows that uptake, metabolism, accumulation and excretion depend on the chemical properties of pollutants. To illustrate this, solvents, gases and heavy metals are used as examples.

In the third chapter, the concept of the half-life period is explained. In addition to this, the user learns about basic cellular processes and their self-regulating forces.

Most important, in chapter nine, the similarities and differences between reference values and HBM values are outlined.

At this point, the father from chapter 1 reappears. His individual measurement result is compared to the valid reference- and HBM-values. With the aid of an animation, the derivation of both values is vividly described in chapter 9 (see figure 1).

In each chapter, the user is asked to start the simulations and to conduct experiments. An „action window” explains what to do. Depending on the situation, a mouse click or a „mouse over” opens the required objects.

The project is aimed at an interested public, health personnel and medical journalists who are seeking information on human-biomonitoring. Its didactical approach to the complex issue enables the use in vocational training schools and secondary schools.

Opening chapters provide relevant information about environmental medicine and thus, if thoroughly read and understood, contribute significantly to successful risk communication.

www.allum.de and the HBM module are free of charge. Have a look!

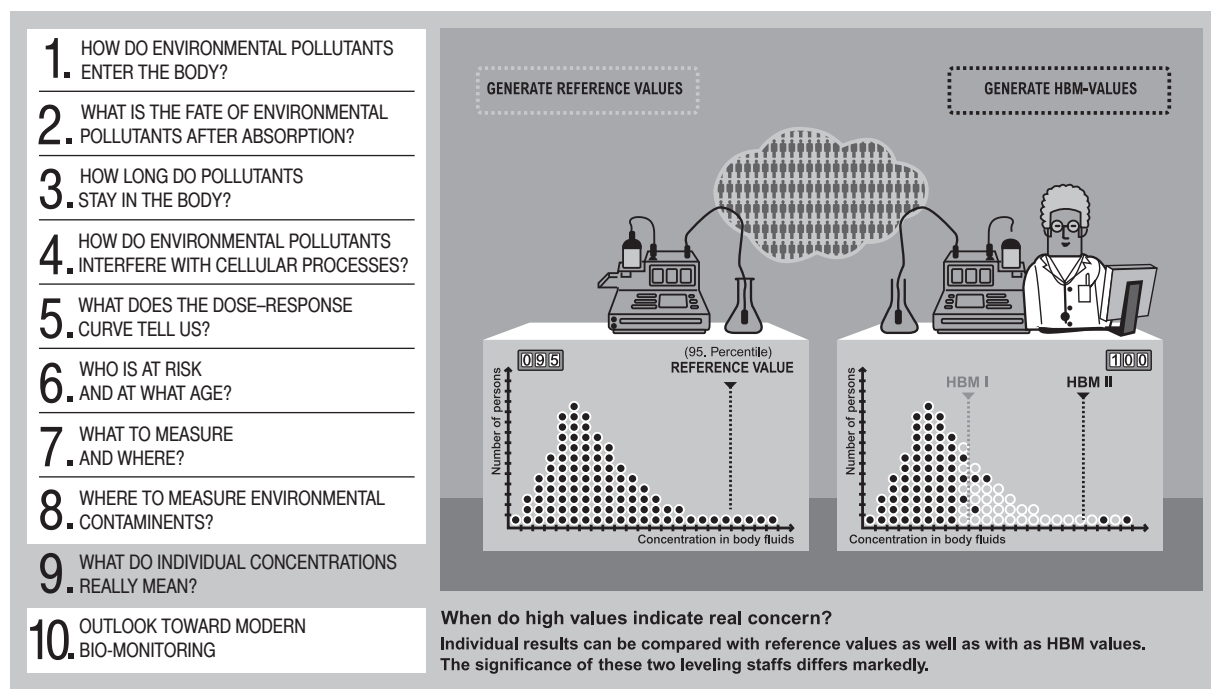


Figure 1. Human-biomonitoring in simulation
Rycina 1. Symulacja biomonitoringu u ludzi (HBM)

References

1. Wikipedia. Biomonitoring. Retrieved August 17, 2011 from <http://en.wikipedia.org/wiki/Biomonitoring>. May 31, 2011
2. Mühlendahl K.E. Otto M. & Linnemann J.: How to explain the importance of Human Biomonitoring. Medycyna Środowiskowa/Environmental Medicine 2011, 2 (14), 11–14.
3. Kerres M.: Multimediale und telemediale Lernumgebungen. Konzeption und Entwicklung. München: Oldenbourg Wissenschaftsverlag. 2001.
4. Rey G.D.: E-Learning. Theorien, Gestaltungsempfehlung und Forschung. Bern: HansHuber-Verlag. 2009.
5. Niegemann H.M. & Hessel S.: Kompendium E-Learning. Berlin: Springer-Verlag. 2003.

Address for correspondence:
Prof. Karl Ernst v. Muehlendahl MD, PhD
Kinderumwelt gGmbH
der Deutschen Akademie für Kinder- und Jugendmedizin
Westerbreite 7, 49084 Osnabrück
Tel. +49 541 97789 -00
Fax +49 541 97789 -05
Kinderhospital Osnabrück
Iburger Str. 187, 49082 Osnabrück
muehlend@uminf.de