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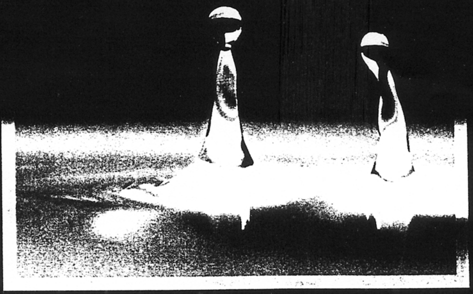

Talk *by* **Mojo**

The aim of this running study is to evaluate the genotoxic risk of the show cave workers employed by the Slovak Cave Administration in Liptovský Mikuláš, who are exposed to radon. Radon (Rn) is a radioactive natural gas, which ensues from decay of radium (^{226}Ra). The isotope ^{226}Ra is a member of uranium decay chain, which occurs naturally as a component of many minerals (uraninite, torbernite, autunite), natural waters and rocks (dark sales, granites, light – colored volcanic rocks, some sedimentary rocks containing phosphate, carbonate and other). Radon is permanently seeping from these materials and inside bounded spaces like are mines or caves where the concentration can be higher. Radon is also the most important source of environmental radiation and he has a potential to generate genotoxic effects, like are chromosomal aberrations. The main adverse health effect of the radon is the possible development of lung cancer after a long-term exposure.

There are several known isotopes of Rn. The half life of most of them is short (^{217}Rn 5.4x10^{-4}s, ^{218}Rn 0.019 s, ^{219}Rn 3.96 s, ^{220}Rn 55.6 s). The most stable is the isotope ^{222}Rn. Its half life is 3.823 days and the energy of its alpha (α) decay is 5.49 MeV. This isotope can be dangerous for the humans and other organisms which are breathing the contaminated air. The energy of alpha particles permits them to travel only for few centimetres through air. The travel is inversely related to the density of tissue. Inside human lungs it is several millimetres. When the alpha particle passes through the cell nucleus it can cause the DNA damage.

The concentrations of ^{222}Rn inside underground spaces (caves) depend on air circulation and have large seasonal variability. Highest concentrations ware measured during the summer. Winter values are only 1/3 to 1/10 of the summertime high values. During the winter is the direction of airflow from underground spaces to free airspace so the underground concentrations of radon decrease.

At the Clinic of Occupational Medicine and Toxicology we examined 15 workers (11 men, 4 women) exposed to radon, with average age 36.87±7.14 years (S.D.). The average exposure time was 10.73±5.99 (EX) years. The control group consisted of healthy employees Of the Martin Faculty Hospital, without exposure to genotoxic agents. We evaluated 1 500 mitoses (100 mitoses per subject). In exposed group we detected statistically higher frequency of total chromosomal aberrations (CAs) in comparison to control (2.27%±0.46 (S.D.) vs. 1.13%±0.53, $p<0.05$). The chromatid (CTA-type) presented 1.67%±0.72 and chromosome (CSA-type) 0.60%±0.83 of aberrations. At four workers (26.67%) we detected higher genotoxic risk. The total number of chromosomal aberrations shows, that in the exposed group was higher exposure to genotoxic agents

MICROCYSTIN CONTENT IN FISH TISSUES IN SELECTED LOCALITIES OF THE CZECH REPUBLIC

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Toxic cyanobacteria represent serious problem for water supply systems, recreation and agriculture also due to production of biologically active compounds including microcystins. Microcystins can accumulate in various aquatic organisms including fish. Majority of microcystins in fish are taken up via the gastrointestinal tract, while the toxin uptake through the gills and skin is less pronounced. Many authors have recently carried out studies concerning the accumulation of toxic cyanobacterial metabolites and microcystins, in particular, in fish tissues. There are substantial differences in toxin concentrations in these studies and some of them addressed the problem of health risks associated with consumption of microcystin-contaminated fish.

The aims of the present study were to analyse microcystin content in the tissues of fish from selected localities in the Czech Republic and to evaluate potential risk of fish consumption.

Studied localities included water dams Vír, Plumlov and Mostiště as well as fishpond Novoveský, a typical hypertrophic pond for intensive breeding of common carp. The toxin content was determined by high-performance liquid chromatography coupled to mass spectrometry.

The highest concentrations were detected in the liver of canivorous fish, mainly in Percidae: in the Mostiště dam in *Perca fluviatilis* 8.6 ng.g^{-1} fresh weight (FW), in the Plumlov dam in *Sander lucioperca* 7.3 ng.g^{-1} FW and in Vír dam in *Perca fluviatilis* 22.7 ng.g^{-1} FW. In the fishpond Novoveský, microcystin was detected in the liver of carnivorous *Sander lucioperca* (15.8 ng.g^{-1} FW) and *Aspius aspius* (4.14 ng.g^{-1} FW) as well as in omnivorous *Cyprinus carpio* (0.6 ng.g^{-1} FW) and herbivorous *Ctenopharingodon idella* (2.0 ng.g^{-1} FW). Concentrations of microcystins in the edible portion of fish tissues (muscles) were generally bellow the limit of detection (2 ng.g^{-1} FW).

In summary, it can be concluded that although the accumulation of microcystins in the fish tissues exist, concentrations of microcystins from monitored localities are low and they do not represent serious health risk to humans.

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