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 (226Ra). The isotope 226Ra 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 (217Rn 5.4x10⁻⁴s, 218Rn 0.019 s, 219Rn 3.96 s, 220Rn 55.6 s). The most stable is the isotope 222Rn. 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 222Rn inside underground spaces (caves) depend on air circulation and have large seasonal variability. Highest concentrations were 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 1500 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.