17 | O r a l

INTENSITY OF INDOOR RADON (^{222}Rn) IN FAMILY HOMES IN ALDAMA, CHIHUAHUA, MEXICO AND THE RELATIONSHIP TO LUNG CANCER

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Abstract: Radon gas (^{222}Rn) forms from decaying radioactive uranium and is considered a causal agent of lung cancer. It is well known that the State of Chihuahua has about 60% of uranium reserves in Mexico and, in consequence, we have hypothesized that high levels of ^{222}Rn can be detected in outdoor and indoor environments. The objective of this study was to measure the intensity of human exposure to ^{222}Rn in homes in the city of Aldama, Chihuahua, which is located near one of the main natural deposits of radioactive uranium. A second objective was to associate radon levels with lung cancer among Aldama´s inhabitants. This study is important when it is considered that any person can incorporate radon into his/her lungs by breathing air rich with this gas, and this effect can be maximized in an atmosphere rich in ^{222}Rn. Fifteen family households in Aldama agreed to participate in the study. The gas was quantified with a portable AlphaGuard device; (Professional Radon Monitor, Genicron Instruments GmbH), which was placed in a bedroom of each home at a high of 0.74 m for three days. This device has the advantage of being highly efficient and able to quantify gas in Becquerels (Bq m^{-3}), with readings every 10 min. Ambient temperature (AT), air pressure (AP) and relative humidity (RH) were also measured every 10 min. A questionnaire was designed and applied to obtain information on the incidence of cancer among the families. Plans of the houses and the type of building materials were also obtained. The results showed that Aldama´s residents are breathing in an environment that exceeds the maximum permissible limits of radon gas (USA-148 Bq m^{-3}) and that this effect is higher at night being above maximum permissible levels suggested by the International Atomic Energy Agency of the United Nations (< 200 Bq m^{-3}). Most residents in the area have a history of lung cancer in their families. It can be concluded that ^{222}Rn is responsible for the lung cancer of some of Aldama´s residents

Key Words: Uranium, noble gas, harmful isotope, Chihuahua, Mexico

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