

Jan Alexander MD PhD
Professor in Medicine (Environmental Medicine/ Toxicology)
EUROTOX Registered Toxicologist
Oslo, Norway

27 February 2007

To whom it may concern

Re Hair analysis 07-00106 performed 31/01/2007 at Chem Tox by Dr Pascal Kintz

This hair analysis shows elevated levels of strontium.

Strontium (Sr) occurs both in non-reactive isotopes and radioactive isotopes. The analysis does not differentiate between the non-radioactive and radioactive Sr isotopes present in the sample. Given that the elevated hair level of strontium is due to systemic exposure, it is not possible on the basis of this measurement to estimate the dose.

Strontium accumulates in the skeleton. Stable non-radioactive strontium has low toxicity. It can disturb bone mineralization especially in combination with vitamin D deficiency, but this is very seldom in adults.

Radioactive strontium, which also is deposited in the skeleton upon systemic exposure, occurs in three isotopes, ^{90}Sr with a half life of 29 years, ^{89}Sr and ^{85}Sr with half lives of 51 and 65 days, respectively. Mainly ^{89}Sr has previously been used in medicine to relieve bone pain due to cancer. ^{85}Sr has been used in radiological imaging of bone.

Bone marrow effects are the most serious immediate consequences of exposure to high levels of radioactive strontium. Depending of the dose incorporation into bone may result in hypoplasia of the haematopoietic tissue and pancytopenia, i.e. anemia, immune system depression and depression of blood platelets, the latter resulting in bleeding tendency. The severity will depend on the dose. At lower doses white blood cells will occur with weakened immune functions as a result.

Internally deposited radionuclides, such as radioactive strontium, is classified as carcinogenic to humans by the International Agency for Research on Cancer. Long term exposure and effects relate to radiation induced cancer in tissues adjacent to bone and haematopoietic cells in bone marrow are especially vulnerable with increased risk of leukaemia. The risk is dependent on the actual radiation dose.

