

## Elements in the human organism of Norilsk residents

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It is known that billions of tons of heavy metals are emitted by industry and transport in the world annually; however the mechanism of influence of the chemicals on the human organism is still unknown.

Our research is studying how ecosystems of large Russian cities affect the composition of its residents. The material of the research is human body ash residue – crematory material remaining after the human body has been burnt. Such kind of material had been already used earlier by European scientists for more specific objectives [1]. However the emergence of modern and accurate methods of analysis (ICP-MS, INAA, electron microscopy etc) allows using ash residue to obtain the complex data on the elemental composition of human body.

### Results

As an example it will be consider one of the Russian and world's most polluted cities – Norilsk. Large-scale production of copper, nickel, cobalt and platinum releases about 1.5 thousand tons of Ni, Cu, Co, Pb, Mn and Fe etc into the atmosphere of Norisk.

The studying of human body ash residue of Norilsk residents shows that such elements as Er, Tm, Cs, Sm, Be, Zr, Y, Tb, Ho, Lu, Al, Pr, Dy, Gd, Ni, U, Ce, Cd, Sr, V, Mg, Ge, Se, Nd, P, Si, Rb, Ca, Ga and Sn concentrate in Norilsk residents in greater quantities in comparison with other Russian cities. The results indicate comparatively small amount of Cu, Ni and Co in the human body in the significant emissions of these elements. Probably it is connected with the size and reactivity of emitted particles [2] as well as the fact that the elements in question are essential for human. On the other hand it is obviously the great concentration of rare, rare-earth and radioactive elements in the absence of data on their accumulation in the ecosystem of Norilsk, although these elements are widely used in the metallurgical industry. Thus it is observed the redistribution and selective concentration of elements in the system «atmosphere-human», the reasons and mechanisms of which require further studying.

[1] Krebs (1954) *Science* **119**, 429-431. [2] Fubini & Fenoglio (2007) *Elements* **3**, 407-414.