

What is the potential impact of commercial Russian chrysotile on human health?

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Chrysotile or “white asbestos” is a silicate mineral of the serpentine group that according to several scientific studies has negative impact on human health with the risk to cause asbestosis, lung cancer, mesothelioma, and classified as “carcinogenic substance” by the International Agency for Research on Cancer (IARC).

Nowadays only fifty-five countries in the world have banned the production and sale of chrysotile asbestos (banned in Italy since 1992) while in China (the largest consumer), followed by Russia, India, Kazakhstan, Brazil, Indonesia, Thailand, Vietnam and Ukraine, the extraction and the use of chrysotile to manufacture building materials are possible in a “safe mode”.

In this scenario the effective health hazard of chrysotile, such as the Russian commercial one, has to be better evaluated to assess its cytotoxic and genotoxic effects.

In our *in vitro* study we focused the attention on Russian commercial chrysotile fibers, divided in two groups based on their length: <5µm (R1) and >5µm (R2) and administered in cultures of mesothelial (MeT5A) and alveolar (A549) human cells lines. UICC Crocidolite and wollastonite fibers were considered as positive and negative control fibers respectively.

Data obtained showed in both cells lines a decreased cells viability (by MTT test) and cell vacuolization (by light microscopy investigations) with higher grade after R2 treatment, confirming the higher cytotoxic effects of longer fibers.

Oxidative stress induced by fibers resulted in imbalance between oxidative status (by ROS detection test) and anti-oxidative action to contrast the insult, due to cellular glutathione (by total GSH assay). DNA damage inside single cells (by Comet assay) showed high grade of DNA damage, confirmed by a block in G2/M phase of cell cycle (by flow cytometric assays) in both cell lines.

This work underlines the importance of *in vitro* studies to evaluate human health impact of chrysotile with higher direct cyto-genotoxic action exerted by the longer fibers. It results