

DOES THE ASBESTOS CLASSIFICATION NEED TO BE IMPLEMENTED? CYTOTOXIC INSIGHTS IN PROGRESS

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Although the WHO definition still applies to regulate asbestos, to date, the scientific community is evaluating to modify this estimate. Asbestos is considered as such when varieties of amphiboles (tremolite, actinolite, crocidolite, amosite and anthophyllite) and serpentine (chrysotile) have a fibrous (length > 5 μm , width < 3 μm and aspect ratio > 3:1) and asbestiform (fibrillar structure and flexibility) aspect. More common are the fibrous but not asbestiform varieties of the same groups of minerals (but also lizardite and antigorite). However, these are not considered and regulated in the same way in the different countries worldwide. So effects on the health of these minerals are unclear and debated.

This study evaluated the cytotoxic effects non-asbestiform powders and carcinogenic potential in BALB/c 3T3 cells. Moreover, the micronuclei test was performed in the human alveolar basal epithelial cells (A549) to evaluate the genotoxic damage.

Preliminary results show similar toxicity in the BALB/c 3T3 cells exposed to asbestos (F3) and samples A3 and A5, lower toxicity for A4 and A1 and absence of toxicity for A2, P1 and P2. Both the asbestos and the non-asbestiform samples belong to the amphiboles of the tremolite-actinolite serie. Sample A3 is composed of fibrous lizardite.

Moreover, a statistically significant micronuclei increase was observed in A549 cell when exposed for different time (24, 48 and 72h). These results indicate that non-asbestiform amphiboles can trigger a genetic disorder, a necessary step in cancer development.

Chronic diseases by inhalation fibers are linked to factors such as morphology, size, physical-chemical properties and bio-persistence correlated to the habits, can produce relevant consequences to the human respiratory system.

Having more certainties on this issue plays an essential role in assessing health risk because, acicular fibers could influence the final calculation of the asbestos concentration. Therefore, it is necessary to debatable which size parameters have to be considered as lower and upper limits of a range.