

Biological effects on asbestiform and non-asbestiform amphiboles. Which aspect ratio range consider on quantitative determination of Elongated Mineral Particles (EMP) in bulk samples?

MILITELLO G.M.¹, LA MAESTRA S.² & GAGGERO L.¹

¹Departement of Heart, Environmental and Life Sciences (DISTAV), University of Genoa, Italy

²Department of Health Sciences (DISSAL), University of Genoa, Italy

The term asbestos is a generic term refers to both, fibrous (length $> 5 \mu\text{m}$, width $< 3 \mu\text{m}$ and aspect ratio $> 3:1$) and asbestiform (fibrillar structure and flexibility) varieties of serpentine and amphibole.

Acicular fibrous varieties despite having the same chemical composition are not classified as asbestos because not asbestiform. However, effects on the health of these minerals are still debated.

The goal of this work was to observe the induced DNA damage caused by exposure of both asbestiform and non-asbestiform powders. The presence of micronuclei was performed in epithelial A549 cells line in order to simulate intra-alveolar environmental.

Preliminary results show a statistically significant increase ($P < 0.01$) of micronuclei in asbestos-exposed cells compared to unexposed ones. Similar results were reported when A549 cells were examined after 24, 48 and 72h from contact with non-asbestiform amphiboles.

These results indicate that non-asbestiform amphiboles can determine a genetic disorder, a necessary step in cancer development, albeit the kinematic of processes has to be further clarified.

For this purpose, the samples are being tested to analyze the different pathways involved in pathogenetic mechanisms of diseases triggered by inhalation of fibers.

Having more certainties on this issue play an essential role in the assessment of health risk because, as part of the analysis for environmental monitoring, acicular fibers could influence the final calculation of the asbestos concentration.