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Lactate dehydrogenase (LDH) as a marker enzyme to detect silica-exposure induced cyto-toxicity in agate workers

Bhagwan D Aggarwal
National Institute of Occupational Health, India

Abstract

Agate-workers in Khambhat region of Gujarat (India) are chronically exposed to the silica-dust due to agate grinding, and made them susceptible for silicosis. Due to lack of proper diagnosis at early stage, the workers continue to be exposed with silica-dust until the prognosis of silicosis. The present study was undertaken to investigate total lactate de-hydrogenase (LDH) activity in blood samples of silica-exposed agate workers as a less invasive way to measure for silica-induced toxicity. Total LDH activity was measured in the plasma (serum) and blood cells of agate workers and the ratio of plasma/cell LDH activity in blood was calculated as a measure to detect cyto-toxicity in exposed workers. The LDH activity in plasma (serum) samples of exposed workers was found to be about 25 fold more, while the activity was 10 fold less (10% of control) in blood cells of silica-exposed agate workers than the control (exposed) subjects. The ratio of LDH (plasma/cells) was found to be 0.02 in control (unexposed) subjects, while it was 6.6 in silica-exposed agate workers. The data suggest that LDH activity is significantly increased in the blood plasma and significantly decreased in blood cells of the exposed workers. Study indicates that the silica-exposure causes significant cell and tissue damages, and differentially modulating LDH activity in blood plasma and blood cells of silica-exposed agate workers. Study proposes total LDH activity and LDH ratio (plasma/cells) along with the occupational exposure history as a marker enzyme for silica-exposure induced toxicity in exposed workers.