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"OMICS" analysis of cadmium-induced lung cell transformation

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Chronic exposures to carcinogens like cadmium (Cd) are common in the living environment. However, little is known about its effect exerted at the proteome level. In the present study, using lung epithelial cells (LECs), we found that cell transformation of LECs occurred after culturing in Cd (12 and 20 microM) for 8 to 12 weeks. These transformed cells are resistant to higher dosages of Cd (40 microM) as well as other common apoptotic-inducing agents that without causing significant cell death or alteration in growth rate. This demonstrated that chronic exposure to Cd is able to induce irreversible changes in these transformed cells and that acquisition of apoptotic-resistance is developed.

By 2-DE proteomic analysis, we reported that alterations to the proteome were found to be varying in the transformed cells that were exposed to 20 microM Cd than 12 microM Cd when compared to passage-matched control cells. In general, proteins belonging to intermediate filaments, antioxidative stress-, chaperone-, and glycolytic proteins were altered in these transformed cells. Moreover, p53 expression is significantly abrogated in these transformed cells. Taken together, our findings suggest that although Cd alone (12 and 20 microM) is sufficient to induce cell transformation and alter the proteome to a similar extent, the proteome responses to different Cd-dosages are varied. This further substantiates the notion that the concentration of carcinogen being exposed is one of the critical determinants during the process of carcinogenesis.