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Use of exfoliated buccal and nasal cells for the detection of acute and genotoxic effects caused by occupational and life-style exposures

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Exfoliated cells can be collected with non-invasive methods from different organs. It is possible to analyze nuclear aberrations which provide information about genotoxic and acute cytotoxic effects caused by exposures. Genotoxic effects lead to formation of micronuclei (MNi), nuclear buds and binucleates while acute cytotoxic effects lead to formation of pyknosis, condensed chromatin, karyorrhexis and karyolysis. Recently, a standardized protocol was developed for experiments with buccal cells and the scoring criteria can be also used for nasal cells. Several studies were conducted in which the impact of life-style exposures was investigated in these cells. Clear-cut positive effects were detected in mouth cells of heavy smokers. Furthermore, the finding indicates that MNi formation increases with exposure to tar while unexpectedly an inverse association with nicotine uptake was observed. Also khat and betel chewing led to increased MNi rates in buccal cells while coca chewing caused a protective effect. In total ca. 80 occupational studies were conducted so far with exfoliated nasal and buccal cells. Results of investigation in Austria show that significant MNi induction is detectable in nasal but not in buccal cells of welders, while in wood workers only a baseline effect was detected in both cell types. Consistently negative results were obtained in electroplaters and in workers which were exposed to chicken manure. However, evidence of acute cytotoxic effects was observed in all aforementioned studies. Overall, the findings indicate that cytome assays with exfoliated cells are a valuable tool to detect health risks caused by exposure to genotoxins.

Biography

G Wultsch studied Medicine at Medical University of Graz. He has completed his PhD at the age of 25 years from Graz Medical University and conducted Postdoctoral studies as well in the Medical University of Graz Medical University of Graz. He is the Chief Medical Officer of the Occupational Medical Center in Graz and the Head of the occupational medicine branch of the Austrian medical chamber. His work combines the control of the health status of the employees in various industries as well as the function as a consultant to various chambers. The results were published in 7 articles in reputed journals (one is accepted for publication in Mutat Res – Reviews, and the results of 2 investigations are in preparation).

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