

检测研究

三氯乙烯对职业人群的细胞遗传学效应

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摘要 目的: 探讨三氯乙烯(TCE)对职业人群有无细胞遗传损伤作用以及与接触浓度和时间的关系。方法: 采用气相色谱和吡啶化学比色法对工作场所中TCE浓度和工人尿中三氯乙酸(TCA)含量进行了测定, 采用外周血淋巴细胞微核试验、胞质分裂阻滞微核试验以及姐妹染色单体交换(SCE)试验、单细胞凝胶电泳(SCGE)试验对141名直接接触TCE的工人和39名对照者检测了有无染色体损伤和DNA损伤。结果: TCE接触组人群(车间空气中TCE平均浓度为90.4 mg / m³, 尿中TCA平均浓度为61.79 mg / L)微核、双核微核、SCE和彗星样淋巴细胞出现率分别为1.66 %、2.73 %、4.33、7.48 %, 均明显高于对照组(分别为1.13 %、1.66 %、2.95、3.74 %, P<0.05或P<0.01); 除SCE外, 微核、双核微核、彗星样淋巴细胞出现率与接触工龄间存在相关关系(r=0.222, 0.246, 0.320; P<0.05或P<0.01); 微核、双核微核发生率、SCE和彗星样淋巴细胞出现率与尿中TCA浓度间也存在相关关系(r=0.294, 0.260, 0.229, 0.268; P<0.05或P<0.01)。结论: TCE具有遗传毒作用, 长期接触高浓度TCE可导致染色体断裂和DNA损伤。

关键词 [三氯乙烯](#); [遗传毒性损伤](#); [淋巴细胞](#)

CYTOGENETIC EFFECT OF TRICHLOROETHYLENE ON OCCUPATIONALLY EXPOSED WORKERS

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Abstract Purpose: To evaluate the cytogenetic effects of trichloroethylene(TCE) on the workers, and to determine the dose-response and time-response correlations among the exposure level and duration. Methods:TCE concentration in the work place and TCA in urine of the workers exposed to TCE were determined using gas chromatography and pyridine spectrophotometry, respectively. Conventional micronucleus(MN), cytokinesis-block micronucleus(CB-MN), sister-chromatid exchanges(SCE), and single cell gel electrophoresis (SCGE) from 141 workers exposed to TCE and 39 controls were carried out to determine chromosomal and DNA damage. Results: In the TCE-exposed group(the average concentration of TCE in work place was 90.4 mg / m³, the average level of urine TCA of the workers exposed to TCE was 61.79 mg / L), the frequencies of MN, CB-MN, SCE and the percentage of lymphocytes with comet-like tail in peripheral blood lymphocytes(PBLs) were 1.66 %, 2.73 %, 4.33 and 7.48% respectively, and were higher than those in the control groups(1.13 %, 1.66 %, 2.95 and 3.74 % respectively, P<0.05 or P<0.01). Except for SCE, there were positive correlations between the percentage of MN, CB-MN, the percentage of lymphocytes with comet-like tail in PBLs and the exposing time(r=0.222, 0.246, 0.320; P<0.05 or P<0.01). The positive correlations were also evident between the percentage of MN, CB-MN, SCE and the percentage of lymphocytes with comet-like tail in PBLs and the the average level of urine TCA of the workers exposed to TCE (r=0.294, 0.260, 0.229, 0.268; P<0.05 or P<0.01). Conclusions: TCE is genotoxic, and long term exposure to the high dose of TCE may induce chromosome breakage and DNA damage.

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