



等长度的 DNA 片断迁移距离 (25~45 μ m); (++++) 级, 有在较长的 DNA 片断迁移距离 (45 μ m 以上)。见上图。每份样品计数 25 个细胞, 每组统计出损伤率和各组损伤程度的平均值。

2 结果

2.1 受热前后飞行员的基本情况

飞行员在受热前, 主观感觉均良好, 受热后, 均感觉热, 出汗增多, 除此之外, 其中有 3 人感觉头晕、烦渴。飞行员在受热过程中口

温变化见表 1, 可见随着受热时间的延长, 口温逐渐升高, 前后差值约 0.9 $^{\circ}$ C。

2.2 热应激对飞行员淋巴细胞 DNA 的影响

热应激对飞行员淋巴细胞 DNA 的影响, 见表 2, 与受热前相比, 可见淋巴细胞损伤数明显增多, 损伤程度明显加重。我们分析了受热前后 DNA 损伤情况与现患疾患的关系, 结果见表 3。表 3 可见, 有现患疾患的飞行员在淋巴细胞损伤数和损伤程度均明显高于无疾患的飞行员。

表 1 受热过程中飞行员口温变化情况

	受热前	受热时间				受热后
		30min	60min	90min	120min	
口温 ($^{\circ}$ C)	36.74 \pm 0.24	36.99 \pm 0.22	37.20 \pm 0.24	37.35 \pm 0.20	37.64 \pm 0.22	37.00 \pm 0.24

表 2 热应激对飞行员淋巴细胞 DNA 的影响

	检测细胞 总数 (个)	0 级		I 级		II 级		III 级	
		个数	%	个数	%	个数	%	个数	%
受热前	400	286	71.5	91	22.8	23	5.7	0	0
受热后	400	262	65.6	96	24	39*	9.7	3**	0.7

与受热前相比 * $P<0.05$ ** $P<0.01$

表 3 飞行员现患疾病对淋巴细胞 DNA 损伤的影响

分组	人数	受热前 (%)				受热后 (%)			
		平均损伤	I 级	II 级	III 级	平均损伤	I 级	II 级	III 级
患疾病组	6	49.1	38.3	10.8*	0	58.3	40.0	15.8*	2.5**
正常组	10	27.5	22.5	5.0	0	34.0	24.0	10.0	0

与正常组相比 * $P<0.05$ ** $P<0.01$

3 讨论

单细胞凝胶电泳检测技术是利用单细胞 DNA 在强碱性条件下, 将变性 DNA 进行电泳并借助荧光显微镜检测的综合性技术, 其方法简单、灵敏可信、重复性好, 已广泛应用于环境毒理、致癌机理、衰老死亡和生物学监测等研究领域^[2~6]。本研究应用这种技术, 初步探讨了急性热应激对飞行员淋巴细胞 DNA 损伤的影响。

本结果显示, 在本实验条件下, 飞行员

DNA 受损数增多, 受损程度加重, 说明急性热应激加速了细胞损伤。在正常情况下, 细胞再生、衰老死亡在一定的时间内保持平衡, 本实验结果表明, 37 $^{\circ}$ C 左右的急性热应激促使这一平衡向着不利的方向转化。我们同时也分析飞行员所患的慢性疾患与 DNA 损伤之关系, 这些慢性疾患主要有: 十二指肠溃疡、支气管炎等。结果发现, 慢性疾患组不论在受热前, 还是在受热后, 其淋巴细胞 DNA 损伤率均明显高于正常组。何东东等^[7]通过对 1950~1988

年飞行人员医学停飞疾病谱分析,发现其医学停飞的主要原因多为内科和神经科疾患所致。其DNA损伤能否作为评价医学停飞的客观辅助指标仍有待于进一步研究。

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TDI 吸入引起急性支气管炎两例报告

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甲苯二异氰酸酯(简称TDI)对呼吸道有原发性刺激作用,可引起急性支气管炎。现将我院诊治的两例吸入TDI所致急性支气管炎患者报告如下。

1 事故经过

1995年5月11日14时,某化学厂刷桶车间5名刷桶工刷洗盛过TDI的原料桶时,车间内一条长6米、宽2.5米的气炕(50~60℃)正烘干着13只刷洗完的盛过TDI的原料桶。厂房面积为400平方米,高3.5米。室内气温高达29℃,室内无机械通风,操作工无个体防护。其中刷桶工杨某与李某刷洗数分钟后,杨某出现咽部不适、呼吸困难、意识丧失。李某亦出现咽干、剧烈咳嗽、呼吸困难,另外3名工人也有不同程度的呼吸道刺激症状。约两小时后送我院急救。

2 临床资料

患者杨某,男,41岁,刷桶工。因呼吸困难、胸闷、气短、口吐白色泡沫,于当日16时急诊入院,既往体健,1993年曾有刷洗TDI原料桶过敏急救既往史。

体格检查:体温36.8℃,脉搏100次/分,血压18/10kPa,呼吸20次/分。急性重症病容,意识不清,口唇紫绀,口吐白色泡沫,呼吸困难,不能平卧。全身皮肤无黄染,双侧瞳孔等大等圆,对光反射存在,双肺底

闻及干湿性罗音,心律齐,腹平软,四肢活动尚好。

实验室检查:血常规检查大致正常。肝肾功能及X线胸片均未见异常。临床诊断为急性支气管炎。当即给予5%葡萄糖500ml加胞二磷胆硷750mg、地塞米松30mg、维生素C5.0g、青霉素800万单位静点,吸氧。第二天症状缓解,一周后病情好转出院。

患者李某,女,35岁,刷桶工。因咽干、剧烈咳嗽、呼吸困难,急诊入院。既往健康,1993年曾有TDI接触史。

查体:体温36.2℃,脉搏90次/分,血压13/8kPa,呼吸20次/分,意识清楚,剧烈咳嗽,口唇发紫,心律齐,双肺底闻及干湿性罗音,腹平软。实验室检查:血常规 $1.2 \times 10^9/L$,胸部X线未见异常。治疗同前。次日症状减轻,十天后病情好转出院。

3 讨论

甲苯二异氰酸酯(TDI)是一种具有刺激性的透明液体,遇热时TDI易逸散。TDI对呼吸道粘膜有明显的原发性刺激和致敏作用,长期接触可导致支气管哮喘。本次中毒是因接触过量的TDI所致支气管炎症状,并非过敏。

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Abstracts of Original Articles

Study on the Effect of Acute Heat Stress on the Lymphocytic DNA Damage of Pilot

Wu Tangchun .et al

The effect of acute heat stress on the lymphocytic DNA damage of pilot was studied with single cell gel electrophoresis assay. The study showed that acute heat stress could increase the occurrence rate of lymphocytic DNA damage of pilot and aggravate the damage degree of lymphocytic DNA. The analysis of the DNA damage of lymphocyte and the present diseases in pilots further showed that the occurrence rate of the DNA damage of lymphocyte in pilots with some diseases was higher than that of healthy pilot ($P < 0.05$). These results suggested that DNA damage of lymphocytes might be considered as a supplementary index for the evaluation of pilot's health condition.

Key words: acute heat stress, DNA damage of lymphocyte, single cell gel electrophoresis assay

Studies on the Function of Endocrine Glands of Welders

Cui Jinshan .et al

In order to study the effect of manganese on the pituitary, thyroid and adrenal cortex functions, we determined the levels of serum FT_3 , FT_4 , TSH and cortisol (CS) in 51 welders exposed to manganese by RIA method. It was found that the levels of FT_3 , FT_4 , TSH in serum of welders who were exposed to manganese at concentrations of $0.13 \sim 0.33 \text{ mg/m}^3$ in the air of their workplaces were not significantly different from those in the control group. The results indicated that the excretive functions of pituitary and thyroid glands were impaired by the manganese exposure. The levels of serum CS in welders who were exposed to manganese for more than 10 years were markedly lower than those in the control group and the differences were statistically significant ($P < 0.05$ and $P < 0.01$ re-

spectively). The study indicated that the excretive function of adrenal cortex of these welders was impaired to certain extent. We recommended that serum cortisol could be used as a biological marker to examine the early effect of manganese on the function of adrenal cortex in welders.

Key words: welder, free triiodothyronine (FT_3), free tetraiodothyronine (FT_4), cortisone, TSH

Epidemiological Survey of Malignant Tumor Among Workers in petro-chemical Plant

Wang Jinghe

A retrospective cohort study of cancer mortality at thirteen oil refineries in Jinzhou, Fushun, Lanzhou, Beijing, Dahan, Jinxi, Nianjing, Shanghai, Daqing and Maoming was conducted. 51 889 employees were studied, with 1 717 failed to follow-up (3.31%) in the survey. The results showed that the SMR of lung cancer in employees of shale oil refineries was remarkably high, with a dose-response relationship between SMR of lung cancer and exposure level. The OR value of lung cancer from 1977 to 1988 in heavily exposed employees of the coal-synthetic oil refineries was 9.25 by adjusting other environmental confusion effects with logistic regression analysis. OR for all-cancer mortality was high in employees of natural oil refineries, which showed annual increasing trend with the period of observation. SMR of stomach and liver cancer were 1.43 and 1.51 respectively with statistical significance.

Key words: petro-chemical plant, malignant tumor, cohort study

Experimental Study on the Fibrotic Effect of Zeolite Dusts in Lungs

Ning Binlian, et al

50 mg and 100 mg zeolite dusts were injected