microstructures of monocytes were observed by TEM and SEM, and titanium was identified by energy dispersion type X-ray spectroscopy (EDX). Adherent monocytes were pre-cultured with Alexa 568 dextran (A-Dex) to visualise endosomes.

Results TNS exposure induced apoptosis of PBMC in the 7 days culture, the dose dependency of which was similar to asbestos, although apoptosis was not induced at the early stage of day 2 unlike asbestos. The apoptosis was inhibited by Q-VD-OPh pan-caspase inhibitor. Isolated CD4+ T cells as well as monocytes showed apoptosis caused by TNS exposure, whereas monocytes showed giant vacuole formation prior to apoptosis. TNS-like compounds in vacuoles were observed by TEM, and SEM images showed rough surface of the inner layer of vacuolar membrane, in which titanium was identified by EDX. Most of vacuoles showed co-localization with fluorescence of A-Dex.

Conclusion These results indicate that TNS have toxic effect to cause caspase-dependent apoptosis of immune cells. In particular, TNS showed characteristic toxicity for monocytes, in which engulfed TNS were thought to enter into the endosomal pathway, leading to vacuole formation followed by apoptosis. Those findings suggest hazardous risk of occupational exposure to TNS.

BIOLOGICAL EFFECTS OF CLOTH CONTAINING SPECIFIC CLINICAL EVALUATION OF CENP-B AND SCL-70 AUTOANTIBODIES IN SILICOSIS PATIENTS

Introduction Silicosis patients (SIL) suffer from respiratory disorders and dysregulation of autoimmunity. Frequent complications such as rheumatoid arthritis, systemic sclerosis (SSc) and vasculitis are known in SIL. Furthermore, we reported previously that some SIL exhibited better respiratory conditions in association with a worse immunological status. In this study, the clinical roles of anti-CENP-B and Scl-70 autoantibodies in SIL were analysed.

Methods Plasma samples were collected from Healthy Volunteers (HV), SIL, Systemic Sclerosis (SSc). Plasma factors and autoantibodies were determined by ELISA. Statistical analysis were performed by SPSS (IBM).

Results The titer index (Log10) of anti-CENP-B autoantibody in SIL was higher than that of HV and that of SSc was higher than those of HV and SIL. This titier index was positively correlated with an assumed immune status of 1 for HV, 2 for SIL, and 3 for SSc. Moreover, although factor analysis revealed that the titer index of the anti-CENP-B autoantibody formed the same factor with the anti-Scl-70 autoantibody, IgG value and age in SIL cases, another extracted factor indicated that the IgA value and anti-Scl-70 antibody were positively related, but anti-CENP-B showed an opposite pattern in the results of the factor analysis.

Conclusion These findings indicated that the titer index of anti-CENP-B autoantibody may be a biomarker for dysregulation in SIL cases. Future clinical follow-up of SIL may therefore require both respiratory and immunological assessment.

Cardiology in Occupational Health

THE ASSESSMENT OF OCCUPATIONAL RISKS OF ACCELERATED AGEING AMONG RUSSIAN PROFESSIONAL DRIVERS

Introduction We know the phenomenon of differential ageing to be the result of unequal environment conditions pressure. It is necessary to assess the difference between calendar and biological age (BA) in order to reveal the effects induced by combined occupational hazards in professional lorry-drivers. We have compared the physical (PWC) and mental work capacity (MWC), BA and ageing rates of lorry-drivers (experienced group) and labourers (control group) in connexion with their chronological age (CA), driving experience, occupational environment, work schedule and social-demographic characteristics.

Methods 150 male lorry-drivers (mean age 41.3 ± 0.9) and 150 male labourers (mean age 44.8 ± 0.9) were examined according to the multiply-regression model of BA evaluation based on...
the estimation of PWC and MWC parameters. Integrated indices such as BA on MWC, BA on PWC, BA on (MWC + PWC) were calculated.

**Results**
Statistically significant differences between MWC, PWC levels and ageing rates in the studied groups were revealed (p<0.001–0.05). BA indices and ageing rates of lorry-drivers were significantly higher in comparison with control group (p<0.001). The results presented showed that in equal conditions of submaximum physical load in both groups a significant premature decrease in adaptation ability of lorry-drivers’ cardiovascular system was observed (p<0.001). Analysis of correlations between length of service and CA of lorry-drivers from one side and MWC, PWC, BA indices and ageing rates from the other showed that most of criteria under study depend on driving experience significantly more than on CA of lorry-drivers (p<0.001–0.05). The 40–49 year-old lorry-drivers with 15–19 years of driving experience were identified as a risk group with the symptoms of premature ageing.

**Conclusion**
The above studies revealed the occupational environment and long driving experience being the risk factors for the accelerated ageing of lorry-drivers, which can result in health problems, occupational and work-related diseases.