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.

### Abstracts

**BIOLOGICAL EFFECTS OF CLOTH CONTAINING SPECIFIC ORE POWDER IN PATIENTS WITH POLLEN ALLERGY**

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**Introduction**

Pollen allergy is major problem in Japan. The custom-homebuilding company, Cosmic Garden Co. Ltd., located in Okayama City, Japan was established in 1997 and uses specific natural ore powder (SNOP) in wall materials to improve allergic symptoms. In this study, we surveyed biological effects of short term stay in a room surrounded by SNOP cloth.

**Methods**

To investigate the biological effects of SNOP patients with a pollen allergy were recruited to stay in a room surrounded by cloth containing SNOP (CCSNOP), and their symptoms and various biological parameters were compared with those of individuals staying in a room surrounded by control non-woven cloth (NWC). Each stay lasted 60 min. Before and immediately after the stay, a questionnaire regarding allergic symptoms, as well as POMS (Profile of Mood Status) and blood sampling, was performed. Post-stay minus pre-stay values were calculated and compared between CCSNOP and NWC groups.

**Results**

Results indicated that some symptoms, such as nasal obstruction and lacrimation, improved, and POMS evaluation showed that patients were calmer following a stay in CCSNOP. Relative eosinophils, non-specific Ig E, epithelial growth factor, monocyte chemotactic protein-1, and tumour necrosis factor-α increased following a stay in CCSNOP.

**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.
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.

**1661 NEW EVIDENCE ON CHD RISKS DUE TO PSYCHOSOCIAL STRESS AT WORK AND PHYSICAL ACTIVITY**

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The topics of the session will cover interdisciplinary research on occupational and environmental agents (mainly stress, occupational physical activity, lifestyle) that may increase the risk of cardiovascular diseases (CVD). Those diseases are still a major health problem in Europe and, therefore, an efficient research on this topic is necessary. In the frame of the session it will be also presented results of WHO- ILO review on psychosocial risk factors (especially job insecurity and long working hours) and ischemic heart disease.

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**1661b EXPLORING THE COMBINED EFFECT OF JOB STRAIN AND OCCUPATIONAL PHYSICAL ACTIVITY ON CARDIOVASCULAR DISEASE INCIDENCE**

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Introduction Growing evidence has shown that occupational physical activity increases the risk for cardiovascular disease and mortality. Performing strenuous physical activities at work remains a daily reality for a significant part of workers in different sectors. There is thus a critical need to develop preventive measures against premature cardiovascular disease risk in workers with high physical demands. It is particularly important to elucidate structural preventive measures at the collective workplace level for primary prevention of cardiovascular disease in this group. The psychosocial work stress environment offers opportunities to counter the harmful effects of physical work demands.

Methods and results An overview will be presented of available studies addressing moderating effects of psychosocial stress measures in the relation between occupational physical activity and cardiovascular disease. A limited number of studies have shown that psychosocial resources – like social support at work and level of job control – may buffer the harmful effects of health from physical work demands. In addition, this presentation will focus on the potential mechanisms by which the psychosocial work environment might play a role in the effects of occupational physical activity on cardiovascular health outcomes.

Discussion Research showing that occupational physical activity does not produce cardiovascular health benefits – like leisure time physical activity does – has rapidly expanded over the past decade. On the contrary, more and more evidence confirms that engaging in high levels of occupational physical activity generates increased risk of cardiovascular disease. One of the current challenges in this research field is to investigate how the psychosocial work environment may play a role in this relation. Empirical evidence on the buffering effect of psychosocial stress measures in the relation between occupational physical activity and cardiovascular outcomes is still quite scarce. More detailed investigations using objective measurements are needed.

**1661a THE ROLE OF OCCUPATIONAL PHYSICAL ACTIVITY AND WORK STRESS IN CARDIOVASCULAR DISEASE**

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