

particles (UFP) in the environment, particularly in urbanised areas. In the last years, there is an increasing use of biomass-derived fuels because they are a renewable source of energy that may mitigate climate change through the reduction of net CO<sub>2</sub> with respect to conventional fossil fuels. Although there is a general agreement on biofuels ability to reduce conventional pollutants, new and potentially harmful pollutants can be formed during biofuel combustion. In particular, the emission of sub-10nm particles is strongly increased with respect to that of larger soot particles.

**Methods** Organic sub-10nm particles are separated from larger sizes particulate matter by collection in water suspension for toxicological and inflammatory tests. After exposure to sub-10nm particles, the effects on proliferation, apoptosis and secretion of cytokines, chemokines and growth factors networks production is analysed in immortalised non-tumorigenic human dermal keratinocyte cell line (HaCaT) and human alveolar epithelial-like cells (A549).

**Results** Nanoparticles exert different cytotoxic effects in the two cell lines, suggesting that the dermal way of exposure is more sensitive than the inhalant way. These differences are most evident in the secretion of pro-inflammatory, angiogenic and proliferative cytokines and chemokines whose expression is more finely modulated in HaCaT cells compared to A-549 cells.

**Conclusion** Considering the size of these particles, it is important to promote the culture of prevention also for the dermal way in particularly exposed workers.

#### 1708d ALTERATION OF IMMUNE CELLS IN SILICOSIS: ROLES IN DEVELOPMENT OF AUTOIMMUNITY AND LUNG FIBROSIS

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In addition to lung fibrosis, silicosis (SIL) patients often suffer from complicated autoimmune disorders such as rheumatoid arthritis, systemic sclerosis and anti-neutrophil cytoplasmic antigen-related vasculitis/nephritis. Thus, chronic and recurrent exposure to silica particles located in the lung and lymph nodes can result in alterations in the function of immune cells, which can lead to the dysregulation of autoimmunity in addition to the development of lung fibrosis. Regarding B cells which produce various antibodies, in SIL many autoantibodies are often detected in autoimmune diseases, and specifically autoantibodies against apoptosis-related molecules. Responder T helper (rTh) cells which respond to foreign and auto-antigens have been reported to survive longer and have apoptosis inhibited. Additionally, regulatory T (Treg) cells seem to proceed to early apoptosis. This imbalance between rTh and Treg cells may make SIL patients prone to autoimmune disorders. Although the role of dendritic cells (DCs) including alveolar macrophages and T helper 17 (Th17) cells in the dysregulation of immune tolerance in SIL remains poorly understood, these cells play a role in pulmonary inflammation and the development of fibrosis via specific receptor and signalling molecules. Further studies are required to delineate the roles of DCs and Th17 cells in the disturbance of autoimmunity found in SIL, and investigation of the immunological alterations that lead

to autoimmune dysregulation may assist in the recognition, prevention, and treatment of complicated autoimmune diseases found in SIL.

#### 1707 ALLERGIES IN THE WORKPLACE

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**Aim of the session** To discuss occupational allergies in basic mechanisms, testing and newer clinical topics

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#### 1707a TESTING FOR ALLERGY TO CHEMICAL PRESERVATIVES IN OCCUPATIONAL SETTINGS

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**Introduction** Methylchloroisothiazolinone/Methylisothiazolinone (MCI/MI) and methylisothiazolinone (MI) are chemical preservatives found in cosmetics, industrial and household products. There is a reported epidemic of allergic reactions to these substances in several countries (e.g. increases of 4.1% per annum over 16 years in England). Workers that come into contact with the agents may develop occupational contact dermatitis. Therefore, detecting these allergens is important to better manage workers' skin condition and exposure. The aim of this study was to determine the prevalence of contact dermatitis to MCI/MI and MI before and after changes in allergen testing was introduced.

**Methods** A retrospective assessment of workers referred to the NIOH Dermatology Clinic between 2006 and 2017 was conducted. Workers with work-related dermatitis were patch tested for sensitisation to MCI/MI and/or MI using the European baseline series (Chemotechnique). Frequencies of sensitisation to the allergens (MCI/MI and MI) were calculated using Microsoft Excel.

**Results** A total of 583 occupational referrals were seen and 413 were patch tested to determine a possible allergic aetiology for the dermatitis. Sixteen patients (3.9%) were positive to either one or both allergens (MCI/MI and MI) during the period January 2006 to June 2017. The testing concentration of the MCI/MI was doubled in 2014 and MI was introduced in 2015. More cases were identified (6/86; 7%) after changes were introduced post 2014 compared to previous allergen concentrations (10/327; 3.1%). The workers identified with sensitisation to the chemicals were from occupations such as