confined in several occupations. Thus, we aimed to evaluate PAHs exposure across a wide range of occupations using its urinary metabolite 1-hydroxypyrene (1-OHP).

Methods To evaluate PAHs exposure across occupations, we collected the urine 1-OHP data from the Korean National Environmental Health Survey which is a nationwide bio-monitoring survey. The data contained information about urine 1-OHP levels, cigarette smoking status, and standard occupational codes. We calculated summary statistics of urine 1-OHP levels for each occupation. In addition, we calculated the relative exposure indicators which are the proportions of exceeding the quartile levels. Since cigarette smoking is a single most influential factor of PAHs exposure, we repeated the analyses by excluding current smokers.

Results Overall geometric means (GM) of all populations and non-smoker populations were 0.13μg/L and 0.10μg/L, respectively. For the major group of occupation, ‘Craft and Related Trades Workers’ and ‘Equipment, Machine Operating and Assembling Workers’ showed the highest urine 1-OHP levels, while ‘Homemaker’ showed the lowest level. For the sub-major group of occupation, ‘Video and Telecommunications Equipment Related Occupations’ showed the highest percentage (61%) of exceeding the third quartile (Q3) level of all populations. While ‘Legal and Administration Professional Occupations’ showed the lowest percentage of exceeding the Q3 level of all populations. For the minor group of occupation, ‘Horticultural and Landscape Workers’ showed the highest percentage (64%) of exceeding the Q3 level of all populations. While ‘Kindergarten teachers’ showed the lowest percentage of exceeding the Q3 level of all populations.

Conclusions Our results will provide ancillary information about PAHs exposure across occupations, especially in occupations where PAHs exposure has not well known.

06D.4 ASSOCIATION OF OCCUPATIONAL EXPOSURES WITH EX VIVO FUNCTIONAL IMMUNE RESPONSE IN WORKERS HANDLING CARBON NANOTUBES AND NANOFIBERS

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Animal toxicology studies suggest that workers exposed to carbon nanotubes or nanofibers (CNT/F) may experience pulmonary or systemic health effects; however, direct human evidence is lacking. Our study’s objective was to evaluate associations between CNT/F exposure and ex vivo responses of leukocytes challenged with secondary stimulants, adjusting for potential confounders, in a cross-sectional study. We measured multi-day exposure using CNT/F structure count (SC) and elemental carbon air concentrations among 102 U.S. workers. Demographic, lifestyle, and other occupational information was obtained via in-person interview. Workers’ whole blood was incubated for 18 hours with and without two microbial stimulants (lipopolysaccharide and staphylococcal enterotoxin type B) using TruCulture® technology to evaluate immune cell activity. Following incubation, collected supernatants were preserved and subsequently analyzed for cytokine and chemokine concentrations. The ratio of stimulant-null response for each protein was analyzed using multiple linear regression, principal components (PC) analysis, and Ingenuity® Pathway Analysis (IPA) to determine whether patterns of protein response were associated with CNT/F exposure. We found that CNT/F metrics (most consistently, the SC-based) were significantly (p<0.05) inversely associated with stimulant-null ratios of GM-CSF, IFN-γ, interleukin (IL)–2, IL-4, IL-5, IL-10, IL-17, and IL-23. CNT/F metrics were significantly inversely associated with PC1 (a weighted mean of most biomarkers that explained 25% of the variance in the set of protein ratios) and PC2 (a biomarker contrast that explained 14%). Among other occupational exposures, only solvent exposure was significantly (and was inversely) related to PC2. IPA suggested a CNT/F-associated generalized inhibition of all leukocyte responses when challenged with a secondary stimulus. We found that CNT/F exposure metrics were uniquely related to a pattern of reduced stimulant responses in challenged circulating leukocytes. This approach, if replicated in other exposed populations, may present a relatively sensitive method to evaluate human response to CNT/F or other occupational exposures.