PAHs (Cyclopenta[c,d]pyrene, Diben[a,h]anthracene, Diben[a,j]acridine, Diben[a,l]pyrene, 1-Nitropyrene, 6-Nitrochrysene) [CAS No. 27208-37-3, 53-70-3, 224-42-0, 191-30-0, 5522-43-0, 7496-02-8] Occupational carcinogen: Group 2A

The Japanese Society for Occupational Health (JSOH) has not judged the classification of polycyclic aromatic hydrocarbons (PAHs). The IARC judged the carcinogenicity of six PAHs, Cyclopenta[c,d]pyrene, Diben[a,h]anthracene, Diben[a,j]acridine, Diben[a,l]pyrene, 1-Nitropyrene, and 6-Nitrochrysene, as Group 2A. This time, the JSOH reviewed the references related to Cyclopenta[c,d]pyrene (1), Diben[a,h]anthracene (1-3), Diben[a,j]acridine (4-5), Diben[a,l]pyrene (6-7), 1-Nitropyrene (8-10), and 6-Nitrochrysene (11-13). There is no epidemiological study of workers exposed to each PAH independently. In experimental animals, there is sufficient evidence for carcinogenicity, e.g., lung adenoma for Cyclopenta[c,d]pyrene (1), sarcoma for Diben[a,h]anthracene (4), skin tumor for Diben[a,j]acridine (6), skin tumor and lung adenoma for Dibenzo[a,l]pyrene (1), lung tumor for 1-Nitropyrene (9), and lung tumor for 6-Nitrochrysene (13). Also, in the mechanistic aspect of experimental animal studies, there is sufficient evidence that the activated metabolites have genotoxicity, e.g., 3,4-dihydrocyclopenta (c,d) pyrene for Cyclopenta[c,d]pyrene (1), 3,4-diol-1,2-epoxide for Diben[a,h]anthracene (2), trans-3,4-dihydroxy-anti-1,2-epoxy-1,2,3,4-tetrahydroDBA (DBADE) for Diben[a,j]acridine (3), both anti-and syn-11,12-dihydroxy-13,14-epoxy-11,12,13,14-tetrahydrodibenzo[a,l]pyrene (DB[a,l]PDE) for Dibenzo[a,l]pyrene (4), 1-aminoypyrene for 1-Nitropyrene (5), and 1,2-dihydroxy-1,2-dihydro-6-aminochrysene for 6-Nitrochrysene (6). Based on these findings, the JSOH judged these six PAHs as Group 2A.

Year of Proposal: 2016 (Group 2A)

References

7) Xue W, Schneider J, Mitchell K et al. trans-3,4-dihydroxy-anti-1,2-epoxy-1,2,3,4-tetrahydrodibenzo[a,j]acridine involvement in dibenz[a,j]acridine DNA adduct formation in mouse skin consistent with Ha-ras mutation patterns in tumors. Chemical Research in Toxicology 2001, 14 (7): 871–878.