



Air Pollution and Health Effects. Srikanth S. Nadadur and John W. Hollingsworth (eds). Springer-Verlag, London. 2015. xv + 439 pages. Price: £ 135.00/149.99 €. ISBN: 978-1-4471-6668-9; DOI: 10.1007/978-1-4471-6669-6.

Years of epidemiological studies have established the association between air pollution and human health. Despite epidemiological evidences relating pollution with pulmonary, cardiovascular, nervous system-related diseases, cellular mechanisms that trigger harmful effects due to specific pollutant exposure are still uncertain¹. This initiates the scope of contemporary scientific evidences on inextricable linkages of air pollution and human health. Nadadur and Hollingsworth have put great effort to overcome these knowledge gaps by integrating all possible mechanisms in a comprehensive manner which has potential to be recommended for scholars and medical practitioners. The book discusses pollution-induced health risks, mortality and global disease burden coupled with a review on biological mechanisms involved in air pollution-induced diseases. The disquisition of the literature is compact and decisive, which would be an asset to new research scholars in the field along with medical practitioners, institutions and policy-makers.

The book contains 15 chapters with subjects relating epidemiological findings with possible explanations that trigger differences in reaction pathways. It opens by introducing chemical and physical behaviour of ambient toxicants exerting direct or indirect effects on human health. P. K. Hopke discusses the concentration of reactive species, their

formation mechanism from various precursors in endogenous environment. The entire discussion recognizes evolution and mode of action of toxicant species by compiling multiple studies. Emphasis is made on explaining formation mechanisms of major reactive oxygen species through atmospheric gas-phase reactions like in NO_x, HO_x radicals, biogenic volatile organic carbons (VOCs) and polycyclic aromatic hydrocarbons (PAHs) oxidation process with proper techniques for their ground measurements. We find these explanations are relevant and informative for research scholars to explore new horizons in the field of integrative toxicology. Succeeding chapters have explored a wide range of diseases induced by air pollutants, such as reproductive health and pregnancy outcomes, asthma, cancer, diabetes and metabolic syndrome, atherosclerosis, central nervous system, immunity and genetics. Pedan and Redai have elucidated well the effects of air pollutants on initiating asthma and chronic obstructive airway diseases with specific examples of bacterial endotoxin (bio-aerosol), particulate matter and ozone exposure modulating cellular processes. Molecular mechanisms of specific biological processes, viz. activation of innate immunity, induction of oxidative stress, IgE-mediated immunity and apoptosis are especially discussed with reference to air pollution-induced chronic, progressive and irreversible lung damages. Mudipalli presents details of various mechanistic pathways for formaldehyde, PAHs, benzene and tobacco-induced normal cell proliferation, mutation and genotoxicity. For the present discussion, Mudipalli have grouped health effects of airborne particulates and trace gases under dysfunction, destruction and neoantigen formation, before introducing more complex mechanisms of cellular dysregulation. Molecular epidemiological studies on exposure of ultrafine airborne toxicants have been discussed in terms of personal exposure, damage to nucleic acid, gene susceptibility, oxidative damages to nucleobases and neurodegenerative diseases. Although the authors have put great effort in explaining mechanisms of diseases, we have found some repetition of contents, which could have been avoided. Zhang and Day have broadly presented the worldwide scenario of annual particulate matter emission with different international

standards coupled with regional trends of emission from various sources, specifically from coal combustion, open burning and fossil fuels. While discussing emission potential of different energy sources, emphasis has been given to emissions of lead and gaseous pollutants in developing countries. There are multiple evidences for significant contributions from waste incineration, biomass burning to the emissions of airborne pollutants, in low-economy countries², which occasionally have exaggerated the pollutants of trans-boundary origin³. Although the authors have attempted to establish dose–response relationship, the discussions lack specific analyses. Balmes introduces indoor air pollution associated health problems and briefly discusses the mechanism of various airborne particulate-induced diseases such as asthma, cataract, cardiovascular diseases, lung cancer, pneumonia, tuberculosis and chronic obstructive pulmonary diseases. The book concludes with a discussion on the fate of scientific data of various studies. Sack introduces the concept of data coalescence and translation for policy makers by providing scientific observations in the process of effective policy formulations.

Editor's efforts should be appreciated for maintaining a balance between fundamentals and research-oriented information, use of illustrations and case studies highlighting explicitly the knowledge gaps, which will possibly initiate interest for formulating specific researches. The book may be useful to institutions, academicians and policy makers.

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