BRN Reviews EDITOR'S NOTE

New Environmental Hazards for Our Lungs

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The first monographic issue of BRN Reviews for 2021 focuses on novel environmental risk factors related to respiratory diseases. Now that COVID-19 is taking most of our attention, it is especially relevant to recall the role of mankind in aggressively disrupting the environment in a way that facilitates the occurrence of diseases, including pandemics like the current one.

The first review pays attention to **noise**, an environmental hazard largely ignored until recent years and poorly studied in relation to respiratory outcomes. The review is authored by *Maria Foraster*, a talented junior pharmacist and environmental researcher from the *Barcelona Institute of Global Health (ISGlobal)* and *Universitat Ramon Llull* in Barcelona, Spain. The paper reports that, despite the scarcity of research to date (15 articles were included in the review), there are solid signs of an association between environmental noise (both objective noise level and reported noise annoyance) and adverse short- and long-term respiratory effects, including asthma, chronic obstructive pulmonary disease (COPD), pneumonia, respiratory symptoms and poor lung function. Importantly, although noise mostly comes from road traffic, research consistently suggests that its effects are independent of air pollution levels. To bring some light into biological plausibility, the author also nicely reviews the mechanisms that could lie under the observed associations, including but not limited to autonomic nervous, endocrine and immune systems derangements.

The second paper draws attention to the respiratory harms of **new occupational exposures**. It is authored by *Subhabrata Moitra* and *Prasun Haldar*, both junior occupational researchers from *University of Alberta,* Canada, and *Midnapore City College,* India, respectively. Many readers, including this Editor, could have thought that respiratory occupational disorders had been sufficiently studied and that preventative measures are appropriately implemented in workplaces. Nothing further from the truth. The authors, almost scandalously, present how new technologies to produce daily-use products such as cosmetics, artificial stones or photocopiers, expose workers to new agents such as indium compounds or engineered nanomaterials at the same time that new processes, like sandblasting to fade jeans or fracking to extract oil and gas, result in novel ways of exposing workers to known substances. These new exposures have been related in the literature to diverse respiratory ailments such as interstitial lung diseases,

lung cancer, bronchial asthma, persistent airflow limitation, or obliterative bronchiolitis. Again, the authors reinforce clinical and epidemiological observations with a review of experimental and toxicological research that supports biological plausibility of findings. The review concludes with a plea on the need to prevent, increase awareness and monitor occupational respiratory diseases, highlighting that the use of personal protection equipment should only be the choice strategy when elimination or replacement of harmful agents, as well as engineering and administrative control measures, have resulted impossible or have failed.

The third review enlightens a highly controversial topic: whether or not **vegetation** has true beneficial effects on respiratory health or that these are only the result of reduced air pollution in greener areas. The manuscript, authored by *Iana Markevych*, an environmental scholar from *Jagiellonian University* in Poland, includes 18 studies reporting on the interplay between vegetation and air pollution in relation to asthma, rhinitis, eczema and allergic sensitisation. Three working hypotheses are raised. First, the possibility that benefits of vegetation are only due to the fact that vegetated places are less polluted seems not to be supported by existing evidence, hence suggesting that vegetation plays a role independent of pollution; second, the notion that vegetation actively reduces concentrations of air pollutants has been poorly explored but results reinforce this contention; and, third, whether or not the effect of vegetation on respiratory and allergic diseases differs according to the levels of air pollution appears to be more complex to respond while the type of vegetation (e.g., allergenic or not), seems to play a disturbing role against its benefits. The review wraps up by stating the need to better consider and report air pollution in the studies about the beneficial effects of vegetation.

Finally, the fourth review reports on the lung function effects of **organic pollutants**, a cluster of chemicals present in daily consumer products that have the ability to interfere with hormonal signalling systems. The authors, *Alicia Abellan* and *Maribel Casas* from *ISGlobal*, Spain, focus on prenatal exposure because during pregnancy the development of the lung is critically related to hormone regulation and these compounds can cross the placental barrier. In spite of the strong and consistent evidence about the effects of organic pollutants on respiratory symptoms, only 11 original prospective cohort studies were identified in relation to lung function. Unfortunately, the results are highly inconsistent, most likely due to differences in consumer products between countries, the high temporal variability of organic pollutant levels in human samples, the difficulties of having available repeated measures of lung function in childhood, and the complexity of disentangling effects for single compounds when multiple exposures take place at the same time. As in the first two reviews, the authors nicely describe the biological mechanisms underlying the health effects for each of the studied chemicals. The review closes reminding the need to reduce chemical exposures in the community, particularly in pregnant women, even in the presence of limited and inconsistent evidence.

The reviews included in the present monography just focus on four very specific issues

relating environment with respiratory health. However, human beings are exposed to many more agents, and harmful effects of environmental hazards go far beyond the respiratory system. Although apparently diverse, all four papers suggest three take-home straight messages: (1) environmental exposures are ubiquitous; thus, although their effects at individual level may seem small, they are really large when translated into population effects; (2) research about respiratory effects of environmental risk factors is still very limited, especially if we open the view beyond the usual suspects (e.g., air pollution). At research level, further high-quality studies are needed. At clinical level, enquiries about exposures during medical anamnesis and monitoring of certain workers should be widely implemented. At societal level, awareness can be a good ally to minimise exposures; and, (3) even in the absence of solid evidence and due to the likely large health implications of no-action, the precautionary principle should prevail by putting in place appropriate preventative/protective measures. (Does the latter statement ring a (COVID-related) bell?)

Enjoy the reading!

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