Night shift work and its carcinogenicity

In June 2019, the International Agency for Research on Cancer (IARC) Monographs Vol 124 Working Group classified night shift work as a probable carcinogen to humans (Group 2A).[1] It was with great interest that we read their brief report in *The Lancet Oncology*.

Specifically, the IARC Working Group concluded that there was limited evidence in humans that night shift work causes breast, prostate, and colorectal cancer in this latest evaluation.[1] It is intriguing that the progression of breast, prostate, and colorectal cancer are each influenced by sex hormones.[2] Increased and mistimed sex hormone production has been described in night shift workers compared with day workers in both sexes. It could therefore be worthwhile to further investigate the potential carcinogenicity of night shift work on other sex hormone-sensitive cancers (eg, cancers of the ovaries and uterine endometrium, and some non–small-cell lung cancers),[2] and to explore gender differences regarding night shift work susceptibility for colorectal cancer and hormonally sensitive lung cancers in future studies.

Based on previous human evidence, several interesting facts related to individual characteristics, although not mentioned in this brief report, might still be of crucial importance. First, meta-analyses of breast cancer risk using Asian data observed lower pooled effect sizes than European and North American studies,[3] suggesting that racial differences might exist regarding night shift work tolerance. Such potential racial differences and related mechanisms (eg, racial differences in the ability to maintain a normal circadian pattern of melatonin during night shift work exposure)[4] merit further investigation. Second, individual chronotype has been suggested as a susceptibility marker that could modify the carcinogenicity of night shift work. A better alignment between night shift work and chronotype might be associated with less disrupted melatonin rhythms.[5] There is urgent need for future studies to characterise chronotype and to consider the joint effects of night shift work and chronotype in relation to cancer risk. In particular, the association between the mismatch of preferred sleep timing (chronotype), work timing (eg, night shift work), and cancer risk should be explored. Finally, the imprinting of maternal night shift work exposure on offspring cancer outcomes has never been investigated. It will be meaningful to examine whether there is an association between night shift work before and during pregnancy and cancer risk in offspring. In sum, some crucial links are still missing to fully understand the carcinogenic potential of night shift work.

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