SHIFT-WORK AND CANCER RESEARCH: PRINCIPLES, PITFALLS AND PERSPECTIVES OF „WHITE-BOX“ EPIDEMIOLOGY

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Background and Aims: The 2007 IARC [International Agency for Research on Cancer] classification “Shiftwork that involves circadian disruption is probably carcinogenic to humans (Group 2A)” substantially rests on “sufficient evidence in experimental animals for the carcinogenicity of light during the daily dark period (biological night)”. Remarkably, a series of biologically plausible causal mechanisms suggested by experiments provides a unique case for “white-box” epidemiology. This presentation identifies principles, pitfalls and perspectives of necessary epidemiological research in coming years.
Methods: A synthesis of key results from a selective literature search into the issues concerned will be provided.
Results: That epidemiologists can use tantalizing mechanistic and experimental findings to refine studies is an asset of “white-box” epidemiology. Clearly, studies can be enhanced by employing biological insights to improve measurements of exposure, relevant covariates, cancer endpoints, and their relation. Equally clearly, strong experimental evidence should not mislead us to accept lower quality and replication standards of observational studies in this research area. In this vein, a critical pitfall to avoid is that biological plausibility may be invoked to facilitate publication of studies of inappropriate quality.
Conclusions: To contribute to much-needed quality studies, recommendations regarding how epidemiological research into biologically plausible links between shift-work and cancer should be (i) designed, (ii) reported and (iii) interpreted are provided. Key information to include in future studies will be the chronotype which may determine the susceptibility of individuals to work conditions at unusual biological times. Moreover, industry-based studies should be pursued with priority, allowing us to consider shift-work but also other occupational factors in appropriate detail, completeness and accuracy. Ultimately, individual shift-work histories that were collected in an independent fashion, rather than relying on post-hoc interview information, will be imperative to reliably assess - or exonerate - possible cancer risks for shift-workers.