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Carcinogenicity Evaluation of Xenobiotics in Real-life Scenarios †

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Abstract: In real-life scenarios, the general population is never exposed to one single chemical but experiences uncontrolled multi-chemicals exposure from many different sources, at doses around or well below the regulatory limits. The chronic toxicity evaluations for chemicals to set the appropriate reference doses have been performed until now only for single chemicals each time. Even though these levels are considered safe, epidemiological studies have shown that several chemicals are involved in the pathogenesis of chronic diseases or cancers after long-term exposure to safe levels. All these determined the international scientific community to realize the need for a new methodology to test mixtures toxicity. These new methodologies should present the advantages to be easily applied, low time consuming, low cost, and easy to apply for investigating the carcinogenic effects of low and realistic doses of non-commercial mixtures composed of chemicals to which we are exposed every day. In this study, we will present the currently used methodologies for carcinogenicity evaluation, the limitations in the real-life scenario, and how new approaches can solve these issues. There is a need for validated and harmonized methods that integrate all the factors that can influence the mixture toxicity to better predict carcinogenicity for mixtures of chemicals with already known toxicity.

Keywords: mixtures; carcinogenicity; real-life; risk assessment.

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Conflicts of Interest

The authors declare no conflict of interest.