

#23 - Systematized Review Approaches in the Assessment of Tobacco Toxicants: Acrolein as a Case Study

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Research questions in tobacco science, such as understanding the biological effects of smoke toxicants like acrolein, benefit from rapid, transparent, and reproducible methods of evidence synthesis and integration. A systematized review for acrolein toxicity, conducted in approximately seven months, analyzed, synthesized, and integrated scientific evidence using a more-rapid approach over a traditional systematic review, while still addressing a specific research question. The key question of interest was whether acrolein is a major driver of tobacco smoke-related toxicity, especially that associated with noncancer respiratory disease resulting from exposure to cigarette smoke. A search strategy using publicly available databases was executed initially, employing pre-specified selection criteria to extract data from reviews and regulatory documents, from which a preliminary mode of action was built. Data from primary research articles were then evaluated to better inform the assessment of acrolein toxicity relevant to toxic endpoints, dose-response relationships, mechanisms or modes of action, with information from different streams of evidence integrated to support the role of acrolein in tobacco smoke-related respiratory diseases. Key cellular processes in the proposed MOA for acrolein toxicity, inflammation and necrosis, were presented as narrative summaries, with accompanying graphical and tabular representation. This serves as an example of how scientific evidence can be evaluated, integrated, and presented in a timely yet reproducible and rigorous, stepwise manner.

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