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Editorial

Toxicological Testing Relevance in Tobacco Transfer Methods.

Matthew Fernest

Mario School of Pharmacy, Rutgers University, 160 Frelinghuysen Road, Piscataway, NJ 08554, USA.

***Corresponding Author :**
Matthew Fernest, Mario School of Pharmacy, Rutgers University, 160 Frelinghuysen Road, Piscataway, NJ 08554, USA.

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Although there is a long history of tobacco smoking, usage patterns have evolved over time. In the beginning, it was eaten by chewing or as a leaf that was burned in a pipe. Early in the 20th century was when cigarette use began to become more common. The 1920s and the post-war era saw a sharp increase in demand for cigarettes, which led to a strong economic push towards mass production. Because of the speed at which this new tobacco use strategy developed and maybe because it was well-known, no one gave any thought to the harmful consequences of breathing in about 7000 chemicals into the deepest regions of the lung. Since tobacco products and the main addictive substance nicotine are widely known to have harmful effects, the business has been forced to look for alternative ways to distribute these goods. The degree of societal unacceptability has increased along with awareness of the harmful effects of cigarette smoking. As a result, the adoption of alternate delivery methods is increasing. Examples of these include electronic heated tobacco products (eHTP) and electronic nicotine delivery systems (ENDS). Although it may be true that these processes are safer than typical cigarette smoke, we cannot tell for sure without conducting adequate toxicological testing. These technologies introduce new potentially hazardous materials in a number of ways. Flavourings, the impact of elevated temperatures on the components, new particles, and the dissolution of metals and other elements from the electrode are among them. We face the risk of making the same mistakes as in the past and neglecting a serious public health concern if appropriate toxicological testing of these devices and the vapours they release is not conducted.

Nonetheless, this poses a fresh technological difficulty in terms of how to carry out such toxicological. Specifically, which data should regulatory authorities take into account? An age-old conundrum is raised by this unique challenge: how to accurately replicate the in vivo environment for testing? Studies on the genotoxicity and cytotoxicity of single chemicals are often carried out under submerged circumstances. Although the data from these studies is easily comprehensible, its applicability to real-world scenarios is not as precise. A more complicated but possibly more practical technique is represented by the employment of complete aerosols to expose at an air-liquid interface. It does, however, come with the challenge of maintaining precise dosage and, more importantly, uniform exposure across systems.

Keyser et al. have used the Vitrocell smoke system with the Ames module in this issue of Applied In Vitro Toxicology to create a system that provides enough replicates to meet OECD criteria for testing at different doses. Several criteria have been employed in this configuration to guarantee precise and consistent aerosol deposition. To enable comparisons of equivalency, they have also tested this system using a variety of tobacco delivery methods. This paper emphasises how crucial it is to understand and characterise aerosol delivery inside a test system. As previously indicated, the study used various analyses and customised them based on the type of aerosol being produced. This is a legitimate method for generating precise delivery data, but for comparison, an analyte that is the same across systems is required. Nicotine supplied that reliable analyte in all three of the methods employed here. Glycerol was another analyte used by the authors in the ENDS. Given that flavourings, nicotine levels, and even temperature might differ, this comparison analyte could prove to be highly valuable when used across numerous devices. The demand for precise and consistent testing will only grow as the usage of electronic nicotine delivery devices spreads. In order to provide data to regulatory agencies and perform reliable toxicological assessments, it is imperative to utilise and characterise systems as demonstrated by Keyser et al. We are getting closer to having a trustworthy testing platform thanks to this work.