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Incorporation of an Epigenetic Evaluation into Safety Assessment: What we First Need to Know

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Abstract

The rapidly evolving field of epigenetic regulation of gene expression is having an impact across the spectrum of biomedical research. Toxicologists have embraced this area as evidenced by their increasing focus on discerning potential epigenetic mechanisms underlying mechanisms by which chemical and physical agents might cause toxicity. It is not surprising that an interest in epigenetic mechanisms of toxicity would lead to a desire to incorporate an epigenetic component into safety assessment. However, premature movement in this direction carries the risk of imposing more confusion than light. This commentary provides an overview of epigenetics, with an emphasis on how the various epigenetic parameters are integrated, as a basis for understanding the complexity behind the desire to include epigenetic evaluations in safety evaluations. Basically, we have much more to learn before turning the goal into a reality. However, considerable progress has been made with regard to using epigenetic profiles as signatures of xenobiotic exposure.

Key Words: DNA Methylation**,** Epigenetics, Histone Code, Micro RNA, Non-Coding RNA, Safety Assessment