Editorial: advances in analytical methods for drugs of abuse testing

Health & Medicine

Editorial on the Research Topic

Advances in Analytical Methods for Drugs of Abuse Testing

This collection focuses on innovative approaches and analytical advancement in drugs of abuse testing and monitoring. Substance abuse negatively impacts all facets of society. Drug testing programs have been developed in many jurisdictions to service law enforcement agencies for drug intelligence, criminal justice systems for prosecution of drug-related crimes, and the health industry for harm minimization.

One significant challenge in drugs of abuse testing is the continuous emergence of new psychoactive substances (NPS) in the illicit drug market. Routine methods of analysis are no longer effective in screening NPS due to the lack of structural information and commercial reference materials which are needed for performing targeted analysis of these NPS. Scientists are developing non-targeted approaches to overcome this difficulty. In this regard, the use of high-resolution mass spectrometry (HRMS) operated in data dependent acquisition (DDA) mode or more often data independent acquisition (DIA) mode has drawn a wide interest among forensic toxicologists and chemists to advance the non-targeted approach for NPS detection (Pasin et al., 2017). In this topic collection, Klingberg et al . investigated the mass fragmentation during the collision-induced dissociation process of a series of synthetic opioids including fentanyl derivatives, AH series opioids, U series opioids, W series opioids and MT-45, and identified a number of common fragments that can potentially be used as markers to indicate the presence of a particular synthetic opioid class of compounds within a sample.

Another significant advancement in the area of non-targeted analysis is the development of activity-based assays such as the one for the detection of synthetic cannabinoid receptor agonists (SCRAs) based on interactions of the compounds with CB_1 and CB_2 receptors (Cannaert et al., 2017). Availability of such a method can potentially be used to screen biofluids for the presence of SCRAs without the chemical structural information. The assay can also be used to evaluate the “ intrinsic potency” of SCRA formulations, as demonstrated by Antonides et al . who synthesized enantiospecifically 4 indazole-3-carboxamide-type SCRA for aiding their detection in seized drug samples.

Pasin, D., Cawley, A., Bidny, S., and Fu, S. L. (2017). Current applications of high-resolution mass spectrometry for the analysis of new psychoactive substances: a critical review. *Analyt. Bioanalyt. Chem.* 409, 5821–5836. doi: 10. 1007/s00216-017-0441-4