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Title: Field-Based Detection of Biological Samples for Forensic Analysis: Established Techniques, Novel Tools, and Future Innovations

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Highlights

- Forensic techniques have shifted from equipped laboratories to decentralised areas. Enabling factors of this paradigm shift and current obstacles are discussed. Historical usage of field-based forensic tests and their development are reviewed.
- Emerging technologies for forensic analysis are presented.

Abstract

Field based forensic tests commonly provide information on the presence and identity of biological stains and can also support the identification of species. Such information can support downstream processing of forensic samples and generate rapid intelligence. These approaches have traditionally used chemical and immunological techniques to elicit the result but some are known to suffer from a lack of specificity and sensitivity. The last 10 years has seen the development of field-based genetic profiling systems, with specific focus on moving the mainstay of forensic genetic analysis, namely STR profiling, out of the laboratory and into the hands of the non-laboratory user. In doing so it is now possible for enforcement officers to generate a crime scene DNA profile which can then be matched to a reference or database profile. The introduction of these novel genetic platforms also allows for further development of new molecular assays aimed at answering the more traditional questions relating to body fluid identity and species detection. The current drive for field-based molecular tools is in response to the needs of the criminal justice system and enforcement agencies, and