

# ADVANCING FORENSICS SCIENCE

## TRADITIONAL TECHNIQUES

Currently approved and accepted forensic anthropology methods include creating a so-called biological profile of a crime victim or set of remains. This involves taking several measurements, especially of skeletal and cranial features, that can indicate age, gender, stature, and even ancestry.



## DELVING INTO DNA

Genetic analyses have been used in crime solving since the 1980s. Investigators sequence the DNA of victims and/or suspects to establish presence or absence at a scene or familial relationships, among other applications. Traditionally, this sequencing involves older technologies, such as Sanger sequencing, and targets only small portions of the genome. More recently, some forensic scientists are advocating for the use of next-generation sequencing, which can capture whole genomes and fragments of degraded DNA too small for Sanger sequencing to capture, to provide more information about the individual of interest, including clues about ancestry and phenotypic traits.

## ISOTOPE ANALYSES

Over the last decade, forensic scientists have begun to adapt the mass spectrometry used by ecologists, archaeologists, and paleoclimatologists to uncover hidden dynamics or origins using isotopic ratios. Comparing the relative levels of different isotopes of certain elements—for example, strontium, carbon, oxygen, hydrogen, and nitrogen—in hair, teeth, or bones with abundances of these isotopes in soils or drinking water can suggest a geographic origin, diet, time of death, or travel history for an individual. For example, levels of  $^{18}\text{O}$ —a heavier stable isotope of oxygen than normal  $^{16}\text{O}$ —in hair can indicate how closely someone lived to a coastline, because drinking water in those regions is typically more  $^{18}\text{O}$  rich than inland areas.

