regions of DNA in each of us; variability arises because STRs are different, with respect to their length, for different people. Subsequent to the PCR process, DNA analysis involves measuring the differences in length of several of these STR regions to determine an individual's DNA profile. This "photocopying" process yields great sensitivity to the analysis, because it allows scientists to make as many copies of these STR regions as is required to obtain a unique DNA profile. Thus, very small quantities of the original sample (e.g. a pinhead-sized blood stain) or a sample of poor quality (e.g. a piece of flesh found in a drain pipe) can be analyzed.

Why then are forensic DNA laboratories spending considerable time trying to determine the "whodunit" of incidents within food companies? Although rare, there are documented reports of consumers finding body parts, of both human and animal origin in food. More frequently, there are matters of deliberate product tampering where the foreign substance or object is suspected to originate from an outside source or employee sabotage. If a food product is contaminated by an object that came in contact with a body fluid (e.g. saliva on a cigarette butt or blood on a bandage), testing could provide a DNA profile that can be matched to the "perpetrator."

However, should the "event" not be dealt with by the food company, the end result could equate to a substantial loss of revenue.

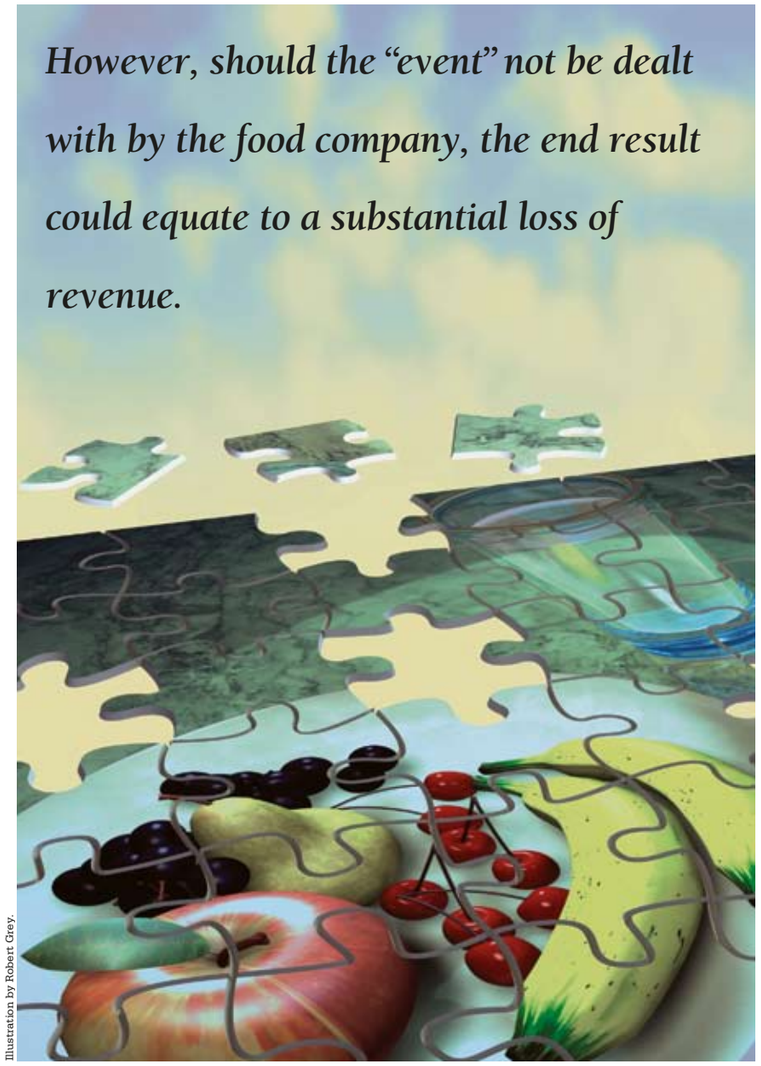

Illustration by Robert Grey.

When a consumer produces a contaminated food item, companies will request a DNA sample from the complainant for comparison. Typically, this is the simple, painless mouth swab that is performed repeatedly on *CSI*. Due to the power of DNA testing, if the contaminant is not from the complainant, they will be excluded as the source. Should the consumer not be interested in providing a mouth swab for comparison, the company may, and after seeking legal advice, use an investigator to collect discarded items that can be used for DNA testing and comparison. Eating and drinking utensils (spoons, water bottles, coffee cups) cigarette butts, chewed gum, soiled facial tissue and expectorated saliva can be excellent sources of DNA. If, after testing, the DNA profile from the contaminated food item matches that from the complainant or a suspected perpetrator, that someone is likely to be questioned by the company's version of Horatio Caine.

The classic food case is a suspected body fluid on, or in food. Often, potentially contaminated items (including band-aids, cigarette butts, fingernail clippings and clumps of hair) are submitted for the identification of blood and saliva, even semen, urine and nasal secretion are not foreign to food cases. Suspected contaminants have been found on hamburger and hot dog buns, on ice cream cones, in milk, salads, granola and protein bars and on the packaging of the food product itself. Tangential to this, more than one food company has used DNA testing to investigate internal matters of assembly line incidents, fraud, theft and human resources-related concerns. Threatening mail sent by disgruntled current and former employees and damaging, but false reports of inappropriate manufacturing practices (often sent by mail) have been the source of large investigations for select food companies. Notable of course, are those newsworthy incidents where a severed finger has been found in food.

Up to fourteen standardized DNA tests will determine the gender of the confirmed body fluid, determine whether or not the body fluid is human in origin and yield a unique DNA profile to be used for identification. Contrary to *CSI*, where investigation and resolution takes less than 60 minutes, the time required for testing of a sample is approximately three weeks, although results can be expedited in three to five days (for a surcharge fee). Most items requiring body fluid identification cost $300 to $500 per item. DNA testing of a confirmed body fluid costs an additional $500 to $700 per sample. As such, a typical forensic food case, which is comprised of two or three items requiring body fluid identification and/or DNA testing, costs approximately $3,000.

Some of these food-related matters do turn out to be hoaxes and frauds perpetrated in an attempt to extort money from businesses. However, should the "event" not be dealt with by the food company, the end result could equate to a substantial loss of revenue. It can also be argued that food companies have a corporate responsibility to ensure public safety. To contend with these issues, companies conduct their own due diligence and investigation, often using the services of a forensic DNA laboratory. The use of an independent, accredited (ISO 17025) lab may resolve the matter quickly, bring legitimacy to the company's investigative findings and position the company well should the matter be litigated. The primary goal for all involved parties is to shield the company from liability, protect the brand name and maintain an uncompromised reputation. ■

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