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**DNA PROFILING**

Forensic science plays a major role in criminal investigation thanks to a technique for identifying DNA known as DNA profiling. This procedure identifies distinctive patterns of DNA in an individual. A DNA profile is the detailed analysis of the genetic material found in minuscule samples of body tissue or fluid, and DNA profiles from crime scenes are kept on record in a national database. Initially, a sample can be obtained from biological evidence, such as bloodstains or strands of hair found at the scene of the crime. Then, should a sample be required from a suspect, police usually ask for saliva. Following analysis, if a DNA sample matches an existing profile in the database, it can confirm the identity of the perpetrator, since the likelihood of one profile matching two unrelated individuals is one in a billion. However, if no exact match emerges, but a profile on the database is similar to one found at a crime scene, it could belong to a close relative of the offender. Criminals have been tracked down via blood relations whose profiles closely resemble their own.

DNA profiling was developed in the 1980s by geneticist Alec Jeffreys, who had intended it as a means of screening people for hereditary diseases and genetic defects. Reaching the crime-solving potential of DNA profiling, the police requested his help in a murder case. Not only did it identify the perpetrator, it also eliminated a man as the prime suspect who might otherwise have been wrongly convicted. Soon after, DNA profiling was being used by police everywhere, and now many countries maintain national DNA databases. The largest, funded by the United States Federal Bureau of Investigation (FBI), contains profiles of over six million habitual offenders. To date it has assisted in more than 70,000 investigations.

The concept of a DNA database is not without its critics, however. Some governments retain DNA samples taken from people who were arrested but subsequently acquitted or released without charge. Civil rights advocates argue that this infringes on civil liberties and that only the profiles of convicted criminals should be kept on record.

1. **What does the author say about DNA profiling?**
   a. It can produce the same profile for people who are closely related.
   b. It was first used as an investigative tool in the US.
   c. It is a highly accurate means of proving a criminal’s identity.
   d. It is used primarily to eliminate innocent suspects.

2. **Why does the author mention bloodstains and strands of hair?**
   a. It can solve medical conditions.
   b. It has two distinctive kinds of DNA patterns.
   c. It involves the study of DNA.
   d. It is a method of investigating DNA.

3. **Why was DNA profiling first developed?**
   a. to preserve DNA for a long period of time.
   b. It was first used as an investigative tool in the US.
   c. It is a highly accurate means of proving a criminal’s identity.
   d. It is used primarily to eliminate innocent suspects.

4. **What is one benefit of creating the Frozen Ark?**
   a. It is large enough to hold the DNA of most endangered species.
   b. Genetic data about long-extinct species can be retrieved.
   c. Research into animals that die out can continue.
   d. It can preserve mainly reproductive cells and molecules.

5. **According to the text, if a species declines in number, …**
   a. its ability to reproduce becomes limited.
   b. most of the genetic information about it is lost.
   c. its cells become less effective in treating disease.
   d. it is more difficult to collect DNA samples from it.

6. **A FROZEN NOAH’S ARK?**

   The biblical story of Noah’s Ark tells of a large sailing vessel built to save the world’s species from a massive flood. Today too, thousands of mammal and bird species face imminent extinction due to human proliferation, urban expansion, and the rampant destruction of ecosystems. In response to this crisis, a project called The Frozen Ark is underway, with the aim of deep-freezing the DNA of all endangered animals. DNA is a template containing the complete specifications of an organism and is thus a treasure trove of knowledge about the organism and the species as a whole.

   Until the Frozen Ark’s creation, a major problem facing zoologists was that when a species became extinct, the knowledge of its genetic code was lost. However, specimens of skin tissue, embryos, sperm, and eggs are now being collected from animals on the most-endangered list, meaning important information about each animal’s biology, behavior, ecology, and evolution can now be preserved. At low temperatures, DNA can remain intact indefinitely, once frozen, molecules and cells can be safeguarded for centuries to come. Scientists can therefore continue studying a species, even after extinction.

   Furthermore, as a species declines, the fewer specimens there are. Consequently, the gene pool becomes more limited, which has an adverse effect on its genetic diversity. Freezing cells may enable biologists to reverse the dangerous loss of genetic variation that causes infertility and early death in such species. In addition, the cells of certain animals are proving effective in the treatment of some diseases. Should these animals die out, the benefits provided by their cells can be maintained. And when extinction does occur, if an animal’s reproductive cells have been stored, it could theoretically be recreated by implanting the cells in a surrogate mother of a different species. One day, albeit not in the foreseeable future, it may even be possible to reconstruct an extinct animal from its DNA alone.

   However, time is of the essence. Of the approximately 16,000 animal species facing extinction within the next 50 years, samples from only a small proportion have been collected to date.

7. **What does the author say about the cells in the Frozen Ark?**
   a. to test for genetically related medical conditions
   b. to help cure genetic diseases and defects
   c. to help the police identify a murderer
   d. to free a wrongly convicted murderer

8. **What does the author say about the benefits of the Frozen Ark?**
   a. It is large enough to hold the DNA of most endangered species.
   b. Genetic data about long-extinct species can be retrieved.
   c. Research into animals that die out can continue.
   d. It can preserve mainly reproductive cells and molecules.

9. **According to the text, if a species declines in number, …**
   a. its ability to reproduce becomes limited.
   b. most of the genetic information about it is lost.
   c. its cells become less effective in treating disease.
   d. it is more difficult to collect DNA samples from it.

10. **What conclusion does the author reach about the Frozen Ark?**
    a. Only a small proportion of them are from species facing extinction.
    b. The variety of cells being stored should be as broad as possible.
    c. They are proving useful in finding cures for certain animal diseases.
    d. They may eventually be used to artificially reproduce an extinct species.

11. **What conclusion does the author reach about the Frozen Ark?**
    a. Its success depends on how fast the project can be accomplished.
    b. It can prevent the extinction of only a few species.
    c. Collection of samples should have begun 50 years ago.
    d. It will take half a century to complete the collection process.