Using DNA Probes

A DNA probe is a short piece of single-stranded DNA bound to some kind of detectable tag (usually a fluorescent molecule). A sample of DNA can be heated to separate the two strands and then the probe is added. Because the probe is single-stranded, it can bind to any strand of DNA containing a complementary sequence.

1. Why is a fluorescent molecule attached to the probe?

2. How can a probe be used to find a particular DNA sequence?

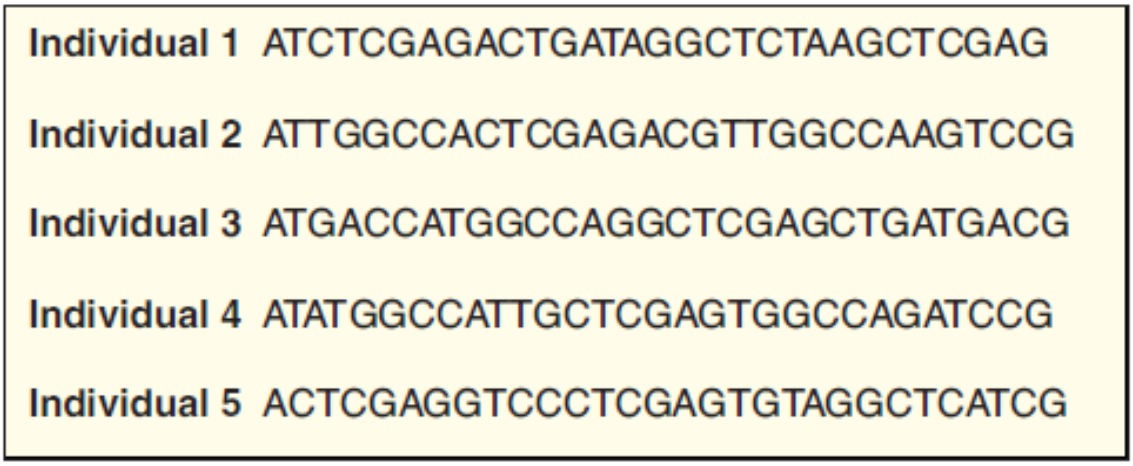

Figure 1

DNA sequences from five individuals are shown in Figure 1. DNA from each invidiual is placed on a piece of filter paper and bathed in the probe to allow the probe to hybridize with any complementary sequences. Excess probe is removed by washing. The sequence of the probe is TCCGAG.

3. a) Which individuals have DNA that would be indentified by the probe?
b) How is it possible that more than one person was identified by this particular probe?

4. What can you conclude if the filter paper from an individual does not have any fluorescence?

5. a) What changes would you make to this procedure if you wanted the probe to identify a single person?
b) Design a probe that would identify only one of the five individuals given.