Scientists currently use noncoding **DNA loci** called **short tandem repeats (STRs)** in forensic DNA testing. **An STR is a small sequence of bases that is repeated.** The number of times that the unit is repeated varies from person to person. For example, an STR with the **base sequence** AATC may be repeated between 12 and 24 times.

As with all of your DNA, the alleles for this example STR locus would be inherited from your parents.

Each individual would have **two alleles for this STR locus** (recall that each person inherits one allele from each parent).

So, an individual's **genotype for this locus could be 13, 14 (meaning that the allele this person inherited from one parent repeats the STR base sequence 13 times and the other allele repeats 14 times).**

To make an **STR profile,** the DNA sample is tagged with a **fluorescent label.** The label is detected by a **laser,** which sends a **signal to a computer.** This signal produces a peak on a computer printout.

The pattern of peaks on an STR profile (see **Figure 7**) represents the alleles at each locus (recall that there are two alleles at each locus). If you see only **one peak** for a locus, the individual has **two alleles that are alike. They are homozygous** at that locus.

In the sample locus to the right, note that there are **numbers below each peak.**

These two numbers are used to designate the person's **genotype.**

In this example, the genotype is **13, 14**.

The 13 allele has the STR "phrase" AATC repeated 13 times. The 14 allele has the STR phrase AATC repeated 14 times.

The **letter and number above the peaks** are **abbreviations** that represent the different STR loci.

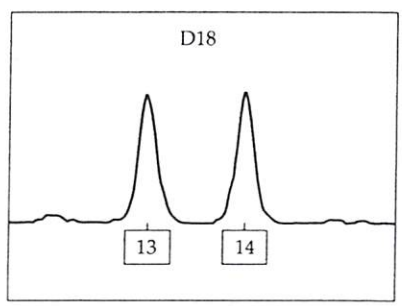


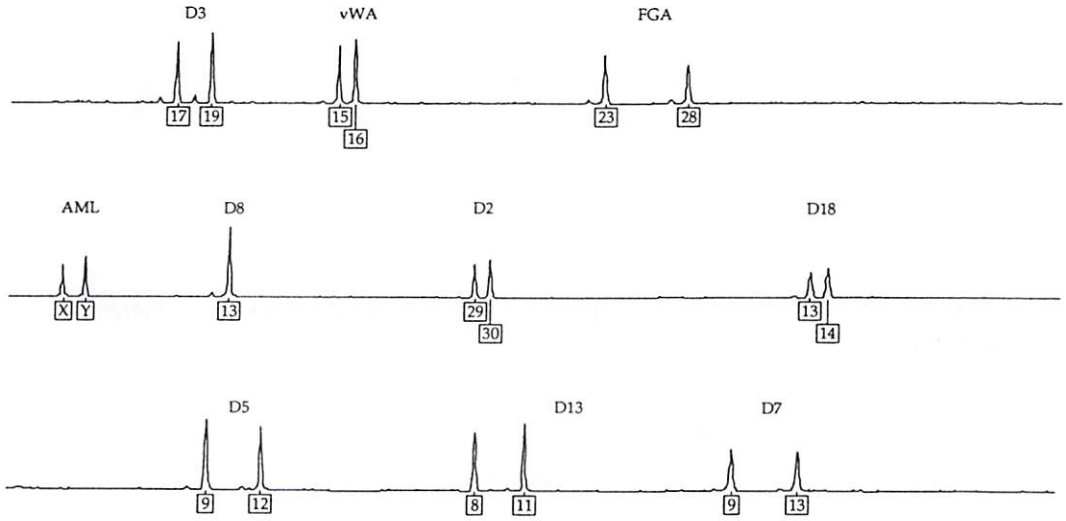
FIGURE 7. Computer Printout of Sample Alleles at One STR Locus

As with RFLP, an STR profile doesn't consist of only one locus. **Multiple loci are used to develop a DNA profile.** The forensic community has adopted **13 core STR loci** that are tested by all forensic laboratories. By having all labs perform the same test, results from around the country can be compared. These results are currently being stored and compared in a **computer database system** called **CODIS (Combined DNA Index System).**

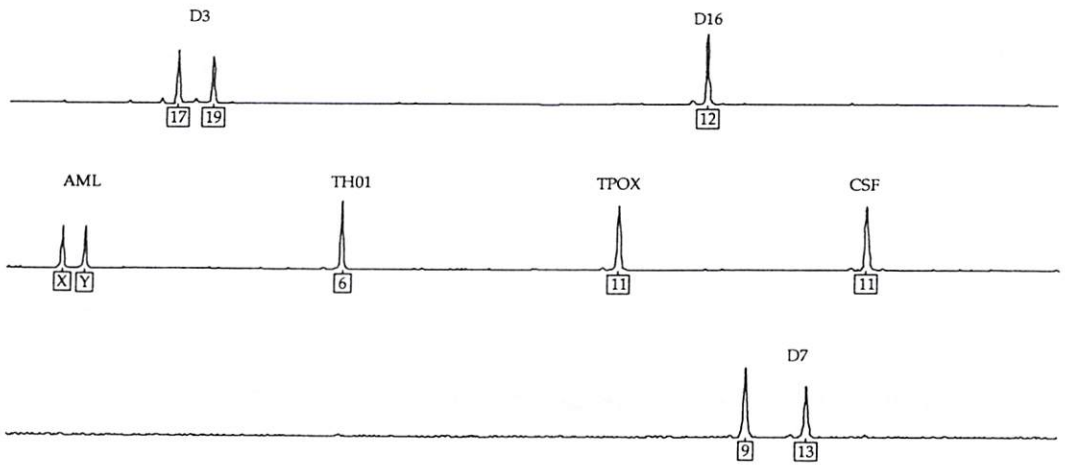
DNA samples are frequently analyzed in **two STR sets. Group 1** contains **nine STR loci** plus one locus used for gender identification, abbreviated **AML (XX or XY).**

Group 2 contains **the remaining four STR loci, plus the AML locus, plus two STR loci from Group 1 that are repeated** as a **control in Group 2,** to ensure that samples originated from the same individual.

A complete STR profile is shown in **Figure 8.**



Group 1



Group 2

Michael Garvey

FIGURE 8. Example of an STR Profile

Comprehension Check

1. **(Circle one answer.)** This DNA profile was taken from a **male / female. Explain** your answer.

2. Using the STR abbreviations on the profile, which two loci are the **controls** (repeated in both Groups 1 and 2)?

3. How many alleles in **Group 1** of the STR profile are homozygous? _____

   How many are heterozygous? _____

   How many alleles in **Group 2** of the STR profile are homozygous? _____

   How many are heterozygous? _____

   Explain your answers.

4. What do the numbers 9 and 13 designate in the **D7 locus** of Group 2?