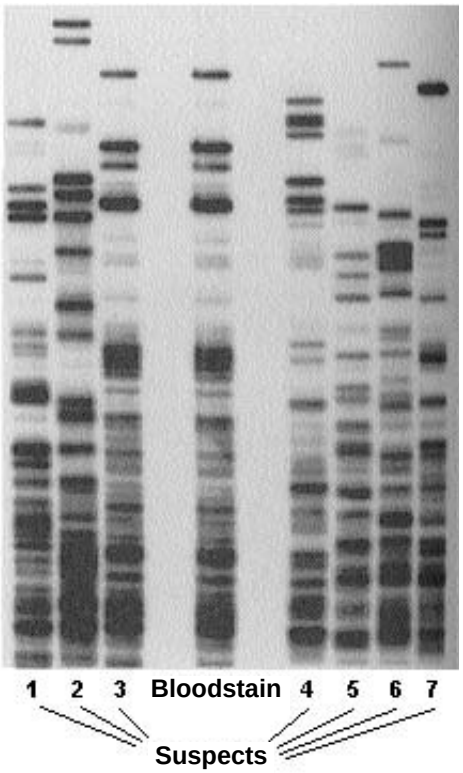
teachers'domain

DNA Forensics: Crime

Shown to the right are multilocus DNA "fingerprints" taken from seven (7) suspects (the numbered columns). A quick comparison of these seven "DNAprints" leads to the conclusion that the patterns of DNA bands are unique for each individual.

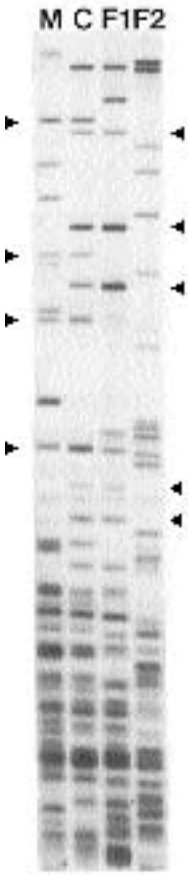
The isolated column in the center is the DNA banding pattern taken from a bloodstain at the scene of a crime. Your task is to compare the crime scene sample with the patterns of the seven suspects to determine if one of the suspects has any similarity at all with the crime scene sample.

Current practice in the use of DNA samples for crime investigations and paternity suits does not use multilocus DNA analysis but utilizes highly polymorphic single locus genes such as the VNTR genes. Due to the large number of distinguishable alleles in most populations, it is possible to establish a "DNA signature" for almost any individual.

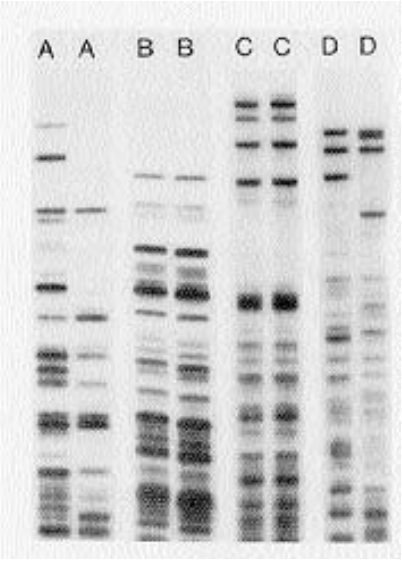


Paternity Testing

Shown to the right are DNA "fingerprints" from the mother (M) of a child (C) and two possible fathers (F1, F2). The pointers on the left side indicate DNA bands shared by the child and the mother. The pointers on the right side indicate DNA bands shared by the child and possible father F1. Possible father F2 appears to share only one band (at the top) with the child and is less likely to have been the actual father of the child than is F1.



Photograph by Cellmark Diagnostics, Abingdon, Oxfordshire, England



DNA Patterns from four sets of twins

Shown to the left are DNA banding patterns (restriction fragment length polymorphisms) from four sets of twins. If the band patterns are identical, then the twins should be identical (maternal) but if the band patterns of two twins are different, then the twins are non-identical (fraternal). Non-identical twins should share some of their DNA bands since they share 50% of the genes. Which twins are identical?