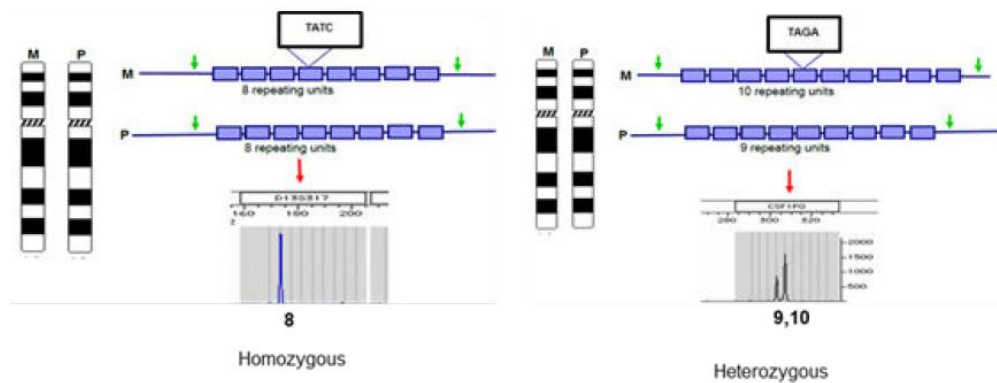


STR Profile

To characterize and authenticate the cell lines in the Cell Biology Collection, ATCC has developed a comprehensive database of short tandem repeat (STR) DNA profiles for all human cell lines.

Background

Short tandem repeat (STR) loci are among the most informative polymorphic markers in the human genome. Studies have shown that a minimum of **eight (8) core STR markers** are required to positively identify human cell lines. **Use of these 8 core STR markers (loci), D5S818, D13S317, D7S820, D16S539, vWA, TH01, TPOX, CSF1PO** are recommended to **(1) show relatedness between cell lines, (2) uniquely identify human cells and (3) for profile comparisons.**



Along with the others, **amelogenin** is also studied for gender determination.

The matching criterion is based on an algorithm that compares the number of shared alleles between two cell line samples, expressed as a percentage. **Cell lines with $\geq 80\%$ match are considered to be related; derived from a common ancestry. Cell lines with between a 55% to 80% match require further analysis for authentication of relatedness.**

Isoenzymes

Enzyme activities can also be compared qualitatively between cell strains using enzyme protein polymorphisms among species and, sometimes, among races, individuals, and tissues. within a species. These so-called *isoenzymes*, or *isozymes*, may be separated chromatographically or electrophoretically, and the distribution patterns (zymograms) may be found to be characteristic of species or tissue. Nims et al. [1998] determined that interspecies cell line crosscontamination can be detected with isoenzyme analysis if the contaminating cells represent at least 10% of the total cell population.

The species of origin of a cell line can be determined by the mobility of seven isoenzymes: nucleoside phosphorylase (NP), glucose-6-phosphate dehydrogenase (G6PD), malate dehydrogenase (MD), lactate dehydrogenase (LD), aspartate aminotransferase (AST), mannose-6-phosphate isomerase (MPI) and peptidase B (Pep B).

Some other isozymes are also used by ATCC: Esterase D (ES-D), Glyoxalase-I (GLO-I), Phosphoglucomutase 1 (PGM1), Phosphoglucomutase 2 (PGM2).