

## CHROMOSOME LOCALIZATION OF CODIS LOCI AND NEW PENTANUCLEOTIDE REPEAT LOCI

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Both physical and genetic methods were used to identify and confirm the chromosome location of all 13 CODIS core STR loci and 41 newly identified pentanucleotide repeat loci. The FBI has selected 13 STR loci for use as a core set in searching of the Combined DNA Indexing System (CODIS). This core group includes the loci CSF1PO, TPOX, TH01, vWA, D16S539, D7S820, D13S317, D5S818, FGA, D21S11, D8S1179, D18S51, and D3S1358. In addition, our research group has developed several new genetic markers containing pentanucleotide repeat motifs. These new loci, as a group, tend to display less intense stutter bands than the more commonly used tetranucleotide loci.

All markers were assigned to specific chromosomes using somatic cell hybrids available in the NIGMS Mapping Panel #2 (Coriell Cell Repositories, Camden, NJ). Sub-chromosomal localization was determined by radiation hybrid (RH) mapping with the GeneBride 4 panel (Research Genetics, Huntsville, AL) that provides a mapping resolution of approximately 300 kb. The Whitehead Center for Genomic Research (WICGR) web-based server was used to identify significant physical linkages (within 20 cR or 6 cM) of the markers to WICGR framework markers.

Standard genetic linkage mapping techniques employing up to eight families from the CEPH kindred reference panel were performed to confirm RH mapping results. Genotype data were evaluated using the CRI-MAP multi-point linkage program and two-point analyses with 371 markers in the 1996 Genome Screen Map from Washington University, MO, to identify linkages and to place the new loci into intervals between previously mapped markers. The odds for linkage were set at 1000:1 (LOD=3). Convergence of mapping data from all three methods was utilized for final localization.

The 13 CODIS core STR loci are located on 12 different chromosomes. The loci CSF1PO and D5S818 both reside on chromosome 5. Genetic linkage results indicate these two loci are separated by approximately 25 centiMorgans (cM). Two of the new low-stutter pentanucleotide loci are being developed for incorporation into new STR multiplex systems. The Penta E locus is being incorporated into a 9-locus multiplex, the *GenePrint*® PowerPlex™ 2.1 System. Both the Penta E and Penta D loci are included in the *GenePrint*® PowerPlex™ 16.2 System, a 16-locus multiplex which also contains all 13 CODIS core STR loci. The Penta E locus resides on chromosome 15, different from all CODIS core STR loci, while the Penta D locus resides on chromosome 21, approximately 50cM from the D21S11 locus.

