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Repository of Human DNA Probes and Libraries
National Laboratory Gene Library Project

In 1983, members of the human genetics community petitioned the National Institutes of Health to develop a reliable and efficient means for researchers to exchange cloned human DNA. To fulfill these needs, a repository of human cloned DNA segments has been established at the American Type Culture Collection (ATCC) in Rockville, Maryland, under contract from the National Institute of Child Health and Human Development (NICHD) and the Division of Research Resources (DRR). Drs. Victor McKusick and Mark Skolnick are serving as advisors to the repository in addition to a panel of geneticists assembled by the NIH. ATCC will collect well-characterized probes from investigators, expand and verify the probes, and store multiple samples that will be distributed to other investigators. Active solicitation and acceptance of important probes has begun.

In order to accelerate the rate of probe production for gene mapping and genetic disease diagnosis, the Office of Health and Environmental Research of the U.S. Department of Energy is funding a collaborative project between Lawrence Livermore National Laboratory and Los Alamos National Laboratory to construct 2 complete sets of chromosome-specific libraries of all 24 different human chromosomal types. The National Laboratory Gene Library Project involves purifying chromosomes isolated from cultured human cells or human chromosome-containing hybrid cells by flow sorting. Once enough chromosomes of a given type are sorted, the DNA is extracted and purified. In phase I of the project, the purified DNA is digested to completion with EcoRI (Los Alamos) or Hind III (Livermore). The digested DNA is next inserted into a bacteriophage lambda vector, Charon 21A. The recombinant molecules are packaged in vitro into infectious phage particles and the resultant chromosome-specific library is amplified in an E. coli host as infectious phage. The use of two restriction enzymes allows the construction of two distinct libraries for each chromosome. The average length of the human DNA inserts in Charon 21A (accepts 0-9 kb) is about 4 kilobases. Since complete digestion by either restriction enzyme will yield some fragments larger than 9 kb which are not clonable, the construction of 2 libraries means that a sequence missing from one will probably exist in the other.

In phase II, chromosome-specific libraries will be constructed by partially digesting the sorted chromosomal DNA with a restriction enzyme to an average size in the 20-40 kb range. Lambda vectors or cosmid will be selected for library construction which accept inserts in this range. Thus, many complete genes with their flanking sequences will be contained in single clones of the Phase II libraries.

The phase I libraries are of particular value to researchers involved in chromosome mapping and the study and diagnosis of genetic disease, linkage, and pedigree analysis. The phase II libraries, containing larger cloned inserts, should be of special interest to molecular biologists studying gene structure and regulation.

The human chromosome-specific libraries developed at the Los Alamos and Lawrence Livermore National Laboratories are available from the repository through funding by the NIH Division of Research Resources. The availability of these libraries will greatly increase the rate at which important probes are produced. The phase II libraries will be placed in the repository as they are constructed.

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1. National Lab ID Code Prefix: LA designates a library constructed at the Los Alamos National Laboratory and deposited by Dr. Larry Deaven, LL designates a library constructed at the Lawrence Livermore National Laboratory and deposited by Dr. Marvin Van Dilla.

2. The average size of the human DNA inserts in the libraries is 4 kb.

For more information, contact ATCC at the address below.

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