

Background & Motivation

A Brief History of the Chinese Hamster and the CHO Cell Line



Chinese Hamster
Cricetulus griseus

The use of the Chinese hamster in research dates back to 1919 where they were used in place of mice for typing pneumococci. They were subsequently found to be excellent vectors for transmission of kala-azar (also known as black fever or visceral leishmaniasis), facilitating research in epidemiology. In 1948, the Chinese hamster was brought to the United States for breeding in research laboratories. This immigration during the cold war era spurred much political controversy, resulting in the arrest of two scientists who assisted in their journey. It was thought that the United States would use these animals in biological warfare by infecting the hamsters with cholera or plague and parachuting them over enemies. Rather than being used as agents of biological warfare, the Chinese hamster became noteworthy for the cell lines that were derived from its tissues. In 1957, Theodore T. Puck obtained a hamster from Dr. George Yerganian's laboratory at the Boston Cancer Research Foundation and used it to derive the original Chinese hamster ovary (CHO) cell line. In 1980, Urlaub and Chasin isolated a CHO cell line deficient in DHFR enzyme. These mutants have become the most widely used host for recombinant protein production, churning out billions of dollars in therapeutics per annum. Although relatively few labs still breed Chinese hamsters the species is still of great economic value in biomedical research and in the biotechnology industry. As a host for expression of recombinant proteins, CHO cells have become the mammalian equivalent of *E. coli* in research and biotechnology today.

Resources for Genomics Research in Mammalian Cell Lines

Resources for 'Information Rich' Cell Lines

- Human, Mouse, Dog, and Monkey Cell Lines
 - Collections of ESTs
 - Chromosome maps
 - Pre-designed siRNA/RNAi
 - Verified Q-RT-PCR primers
 - Commercial microarrays

Resources for CHO and BHK Cell Lines

- Limited sequence information and resources for hamsters
- No plans for a hamster genome project

Organism	Cell Lines	Genome Sequencing Status	Nucleotide Sequences in Genbank
<i>H. sapiens</i> (Human)	HepG2, HeLa, HK293, MRC5, PERC6, WI38	Complete	> 11.6 Million
<i>M. musculus</i> (Mouse)	NS0/Sp2/0, 3T3, mouse hybridoma,	Complete	> 8.2 Million
<i>C. familiaris</i> (Dog)	MDCK	Complete	> 2.6 Million
<i>C. aethiops</i> (Green Monkey)	Vero, COS	In Progress	> 128,000
<i>C. griseus</i> (Chinese Hamster)	CHO	---	~ 12,500
<i>M. auratus</i> (Syrian Hamster)	BHK	---	~ 3,100