Master Human Stem Cell Lines for Gene Expression and Knockdown

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Technology description

Human embryonic stem cells (hESCs) are a useful tool for unveiling the cellular and molecular mysteries of human development. Directed differentiation of hESCs could revolutionize pharmaceutical screening and regenerative medicine. But hESCs are difficult to genetically modify, and technical challenges have proven a major roadblock. UW–Madison researchers have developed a method for inserting transgenes (heterologous gene sequences) into specific ‘hot spots’ in the hESC genome where stable and high gene expression may occur.

Insertion is achieved via the Cre-Lox process—a type of site-specific recombination that has allowed researchers to manipulate a variety of genetic modifications to control transgene expression, delete undesired DNA sequences and modify chromosomes.

The method can be used to create ‘master’ hESC lines that serve as templates for inserting any gene of interest. Once a master hESC line is in place, establishing new transgenic lines becomes a basic laboratory routine.
The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for stable gene modification in human embryonic stem cells.

Additional Information

Application area

Genetically modifying hESCs
Creating master hESC lines

Advantages

No comparable method is available.
Master hESC lines can revolutionize directed differentiation, discovery of novel gene function, drug/toxicological screening and cell therapy.

Institution

Wisconsin Alumni Research Foundation

Inventors

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