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Rat embryonic stem cells create new era in development of transgenic rat models

Kazushi Kawaharada, Masaki Kawamata, Takahiro Ochiya

Abstract

Embryonic stem (ES) cells are isolated from the inner cell mass (ICM) of a blastocyst, and are used for the generation of gene-modified animals. In mice, the transplantation of gene-modified ES cells into recipient blastocysts leads to the creation of gene-targeted mice such as knock-in and knock-out mice; these gene-targeted mice contribute greatly to scientific development. Although the rat is considered a useful laboratory animal alongside the mouse, fewer gene-modified rats have been produced due to the lack of robust establishment methods for rat ES cells. A new method for establishing rat ES cells using signaling inhibitors was reported in 2008. By considering the characteristics of rat ES cells, recent research has made progress in improving conditions for the stable culture of rat ES cells in order to generate gene-modified rats efficiently. In this review, we summarize several advanced methods to maintain rat ES cells and generate gene-targeted rats.

Key words: Embryonic stem cells; Transgenic rat

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In 2008 **rat** stem cells were successfully isolated enabling the **creation** of a ... **transgenic** animals, but do not have protocols for the establishment of **ES cell** culture, ... to **create** translationally relevant animal **models** for the **development** of **new** ...

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2008年12月26日 - Establishment of authentic **rat ES cells** will **make** possible ... function and **create** disease **models** via the generation of **transgenic**, ... conditions **developed** for mouse **ES cells**; however, no authentic **rat** [PMC free article] [PubMed]; Keller G. **Embryonic stem cell** differentiation: emergence of a **new era** in ...

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create disease **models** via the generation of **transgenic**, chimeric, and knock-out ... of the lack of **rat ES cells**, the generation of novel **rat models** for studying specific ... these findings, we **developed** a culture medium containing three inhibitors (3i): **Embryonic stem cell** differentiation: emergence of a **new era** in biology and ...

Embryonic stem cell differentiation: emergence of a new era ...

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emergence of a **new era** in biology ... While **ES cells** have been used extensively for **creating** ... ing **ES cell**-based developmental **models** and for the gen- ... **model** embryonic **development** in vitro for studying the transplanted into a myelin-deficient **rat model** of mul- High-level sustained **transgene** expression in hu-

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This review will discuss the **development**, mechanism of action, and ... to establish a similar knockout **rat** approach by **manipulating rat ES cells**. Until recently, the **creation** of **rat models** required **manipulation** of the ... In 2008 **rat** stem cells were successfully isolated enabling the **creation** of a p53 knockout **rat** using HR.

Embryonic stem cell differentiation: emergence of a new era ...

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作者: G Keller - 2005 - 被引用次数: 976 - 相关文章

Along with the capacity to induce **genetic** modifications, **ES cells** provided the basis for ... **ES cells** display a remarkable capacity to **form** differentiated cell types in culture ... In addition to providing a model of early **development**, the **ES cell** transplanted into a myelin-deficient **rat model** of multiple sclerosis (Brustle et al.

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2012年2月24日 - Moreover, groups of scientists keep **developing new** ways to use mice in ... is **making** individual mutant **embryonic stem cell** lines in which one of the **New York, New York** is providing a **genetically engineered rat model** of