# Tissue-Specific Gene Inactivation of Beta-1 Integrin

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## BACKGROUND

Beta-1 integrin is a critical member of the large family of integrin proteins necessary for cell-extracellular matrix adhesion and bi-directional signaling across the cell membrane. Conventional deletion of beta-1 integrin from the mouse genome results in embryonic death soon after implantation of the blastocyst. Thus, analysis of beta-1 integrin function beyond post-implantation embryogenesis is not possible in a classic deletion model.

## DESCRIPTION

Researchers at the University of California have developed a novel mouse model in which the beta-1 integrin gene can be selectively inactivated in a specific tissue, at a specific time. First, transgenic mice are created by inserting two copies of LoxP, a recognition site for Cre recombinase, within introns of the beta-1 integrin gene. Mice homozygous for this insertion are phenotypically normal and express normal amounts of the Beta-1 integrin protein. These mice can then be mated to other mice containing a gene for Cre recombinase under the control of a promoter that can drive the expression of this enzyme in a tissue-specific and/or temporal manner. Cre recombinase deletes a portion of the beta-1 integrin gene enclosed within the inserted LoxP sites, resulting in mice with selective deletion of beta-1 integrin in a tissue-specific and/or temporal manner.

## APPLICATIONS

This invention may be used to analyze the functional importance of beta-1 integrin in specific tissues or cells, such as subsets of lymphocytes (e.g. T-lymphocytes), discrete cells of the vascular system (e.g. smooth muscle cells or endothelial cells), or discrete cells of the heart (e.g. atrial or ventricular cardiac myocytes).

## ADVANTAGES

The advantage of the present invention over previous systems, where the beta-1 integrin gene was deleted throughout the genome, is that mice can be analyzed for beta-1 integrin function during the course of normal development or postnatally, in a specific tissue, by controlling the temporal and spatial expression of Cre-recombinase.

## CONTACT

Paul Grijalva
paul.grijalva@tdg.ucla.edu
tel: 310-794-0612.



## INVENTORS

- Loftus, Joseph C.
- Ross, Robert S.
- Shai, Shaw-Yung

## OTHER INFORMATION

### CATEGORIZED AS

- **Agriculture & Animal Science**
  - Animal Science
- **Biotechnology**
  - Food
  - Genomics
  - Health

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1999-401-0



**UCLA Technology Development Group**
10889 Wilshire Blvd., Suite 920,Los Angeles,CA 90095
https://tdg.ucla.edu
Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu