B6.129S6-Gck$^{tm1.1Mgn}$

VANDERBILT UNIVERSITY labnodes

Gk{lox} mice may be used to generate cell specific knock-outs of glucokinase, depending which cre-expressing transgenic mouse is used. In humans, glucokinase gene mutations cause maturity onset diabetes of the young (MODY-GK), a disease that is characterized by early onset and persistent hyperglycemia. Thus, these mice are useful in determining how diminished experssion of glucokinase in specific cells causes hyperglycemia.

Keywords: glucokinase | Gck | gck^{lox}

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Mouse Information

Common Name	gk^{lox}
Research Applications	Cre-lox system
MMRRC ID	011949-UNC
Jackson Laboratories Stock No	*Not provided*
VCMR ID	*Not provided*
Additional Strain Information	*Not provided*

Genetic Alteration

Mutation #1: Targeted Mutagenesis

Type of Allele	Conditional Null
Targeted Gene	Name: Glucokinase Symbol: Gck NCBI: 103988
Allele	Name: targeted mutation 1.1 Symbol: Gck$^{tm1.1Mgn}$ MGI: MGI:2177709

Description of Targeting Vector	A gene targeting strategy was used to flank exons 9 and 10 in the glucokinase gene with two tandomly-oriented loxP sites. This strain allows for the tissue specific knock-out of glucokinase to be made. For example, crossing the $gk^{lox/lox}$ mice with an insulin-cre transgenic mouse generates a beta cell specific knock-out of glucokinase. Genotype by DNA PCR using primers 5'-TGT CTC AAT TTG CTG TGT CCT CCA-3' and 5'-TCT GTT AAT GCA AAT GCT CGT GTT-3'. A 710 bp band will be amplified for the gk^{lox} allele and a 605 bp band for the wild type allele. Homozygous $gk^{lox/lox}$ mice are viable but have a blood glucose concentrations slightly higher than wild types (194 +/- 3 mg/dl vs. 175 +/- 8 mg/dl). This finding suggests that the insertion of a loxP site (and some flanking sequences) between exons 8 and 9 may have caused a slight attenuation in glucokinase gene expression compared to mice with two wild type alleles.
Vector Genbank File	pBOB.gb
Allele Map	*Not Provided*
PCR Genotyping Protocol	*Not provided*
Citations	**Publication** Dual roles for glucokinase in glucose homeostasis as determined by liver and pancreatic beta cell-specific gene knock-outs using Cre recombinase. (1999) *J Biol Chem* **274**: 305-15 (Added 1/31/2014) PMID: 9867845

Background Strain Information

Strain Type	Congenic Strain
Chimera/Founder Genetic Background	129S6/SvEvTac
Current Genetic Background	C57BL/6J
Number of Generations Backcrossed	10
Strain Description	After achieving germline transmission mice carrying the gk^{lox} allele were backcrossed for ten generations into a C57Bl/6J background.

Attachments

gk_g__w__pcr_protocol.doc - Added on July 27, 2010 at 9:52 AM by Jill Lindner

PCR protocol for genotyping mice.

GK_lox_target.jpg - Added on July 19, 2010 at 10:17 AM by Mark Magnuson

GK lox targeting