

Gk<sup>lox</sup> 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 expression of glucokinase in specific cells causes hyperglycemia.

Keywords: [glucokinase](#) [Gck](#) [gck<sup>lox</sup>](#)

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## Mouse Information

Common Name	gk <sup>lox</sup>
Research Applications	Cre-lox system
MMRRC ID	<a href="#">011949-UNC</a>
Jackson Laboratories Stock No	<i>Not provided</i>
VCMR ID	<i>Not provided</i>
Additional Strain Information	<i>Not provided</i>

## Genetic Alteration


Mutation #1: Targeted Mutagenesis	
Type of Allele	Conditional Null
Targeted Gene	Name: Glucokinase Symbol: Gck NCBI: <a href="#">103988</a>
Allele	Name: targeted mutation 1.1 Symbol: Gck <sup>tm1.1Mgn</sup> MGI: <a href="#">MGI:2177709</a>

<b>Description of Targeting Vector</b>	A gene targeting strategy was used to flank exons 9 and 10 in the glucokinase gene with two tandemly-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.
<b>Vector Genbank File</b>	<a href="#">pBOB.gb</a>
<b>Allele Map</b>	<i>Not Provided</i>
<b>PCR Genotyping Protocol</b>	<i>Not provided</i>
<b>Citations</b>	<p><b>Publication</b></p> <p><u><a href="#">Dual roles for glucokinase in glucose homeostasis as determined by liver and pancreatic beta cell-specific gene knock-outs using Cre recombinase.</a></u> (1999) <i>J Biol Chem</i> <b>274</b>: 305-15 (Added 1/31/2014)  PMID: <a href="#">9867845</a></p>

## Background Strain Information

<b>Strain Type</b>	Congenic Strain
<b>Chimera/Founder Genetic Background</b>	129S6/SvEvTac
<b>Current Genetic Background</b>	C57BL/6J
<b>Number of Generations Backcrossed</b>	10
<b>Strain Description</b>	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 targeting

