The Jackson Laboratory

STOCK *Igs2* $^{tm2(ACTB-tdTomato,-EGFP)Zng}$ /J

Stock No: **022977** | TG11ML (MADM-ML-11 ^{TG})

Targeted Mutation

Typically mice are recovered in 10-14 weeks. Contact Customer Service to place an order or for more information.

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crossed to mice harboring a reciprocal mutation at the same locus (GT11ML; Stock No. 022976). Compared to the single *loxP* approach of the original MADM designs, the multiple self-recognizing *lox* variant sites present in the MADM-ML system result in significantly improved recombination efficiency (4-8 fold higher) with no negative impact on G2-X segregation percentage (G2-X segregation produces the desired fluorescent homozygous mutant daughter cells). This MADM-ML system allows Cre and/or FLP recombinase-induced fluorescent labeling of daughter cells to ascertain lineal relationships and pleiotropic gene function in multicellular organisms. These mice may also be useful in studies of cell differentiation, mitosis, and imprinting.

Donating Investigator

Hui Zong, University of Virginia School of Medicine

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GENETIC OVERVIEW

Genetic Background	Generation

Igs2$^{tm2(ACTB-tdTomato,-EGFP)Zng}$

Allele Type	Gene Symbol	Gene Name
Targeted (Reporter, Null/Knockout)	*Igs2*	intergenic site 2

VIEW GENETICS

RESEARCH APPLICATIONS

Neurobiology Research

Research Tools
Cell Biology Research

VIEW ALL RESEARCH APPLICATION

BASE PRICE

Starting at:

$2,854.50 Domestic price Cryo Recovery

VIEW PRICE LIST

Details

Detailed Description

Homozygous TG11ML (MADM-ML-11^{TG}) mice are viable and fertile with no gross behavioral or observable abnormalities. The TG11ML allele has the CMV enhancer/chicken beta-actin core promoter, the N-terminal portion of tdTomato, a beta-globin intronic sequence (containing *frt-lox5171-lox2272-frt-loxP*-Neo-*loxP*), and the C-terminal portion of mut4-EGFP, all inserted into the *Hipp11* locus near the centromere of chromosome 11 (cytoband A1 at ~3cM between the *Eif4enif1* and *Drg1* loci).

These TG11ML mutants are designed for MADM (mosaic analysis with double markers), and must be crossed to GT11ML mice harboring a reciprocal mutation at the same locus (Stock No. 022976).

The resulting GT11/TG11 offspring have one copy of each reciprocal mutation on homologous chromosomes ("trans-heterozygous"), and must also be bred to harbor a Cre- or FLP-recombinase to induce fluorescent protein expression. Prior to Cre- or FLP-recombination, trans-heterozygous mutant mice do not have colored cells: the chimeric genes do not produce functional proteins because their coding sequences are interrupted by the beta-globin intron in different reading frames. After DNA replication (G2 phase) in double mutant mice, introduction of Cre- or FLP-recombinase that facilitates inter-chromosomal recombination aligns the respective N- and C-terminal coding sequences for each of the reporter genes on the same chromosome. The subsequent chromatid segregation (X or Z) determines daughter cell phenotype: recombinant sister chromatids into the same daughter cell (a G2-Z event) leads to double reporter expression or no reporter expression, while independent segregation into separate daughter cells (a G2-X event) leads to expression of either EGFP or tdTomato-MYC. If an additional targeted mutation of interest is introduced distal to the MADM-11 (*Hipp11*) locus on chromosome 11, only homozygous cells will be singly labeled following G2 *cre* or *FLP* introduction. The homozygous mutant and wildtype cells can then be distinguished by which single reporter they express. Most heterozygous cells will be unlabeled, but some heterozygous cells will be yellow (both markers expressed). Reporter protein tissue specificity, expression levels, and frequency of recombination are thus determined by the promoter controlling Cre- or FLP-recombinase expression. Using this MADM system, a researcher can generate genetic mosaics in which an individual organism contains somatic cells of different genotypes. This allows the researcher to ascertain lineal relationships and pleiotropic gene function in multicellular organisms. These mice may also be useful in studies of studies of cell differentiation, mitosis, and imprinting.

Other important features of the MADM-ML-11 system are listed below:

Compared to the single *loxP* approach of the original MADM-11 designs (MADM-11^{GT} [Stock No. 013749] and MADM-11^{TG} [Stock No. 013751]), the multiple self-recognizing *lox* variant sites present in the MADM-ML-11 system result in significantly improved recombination efficiency (4-8 fold higher) with no negative impact on G2-X segregation percentage (G2-X segregation produces the desired fluorescent homozygous mutant daughter cells).

Because of its placement ~3 kbp from the centromere, MADM-ML-11 allows >99% of genes on chromosome 11 to be subjected to MADM-based mosaic analyses. Cre- or FLP-recombinase introduction in cell phase G0 or G1 results in double reporter expression. Similar to the MADM-11 design, MADM-ML-11 allows direct fluorescent visualization of both EGFP and tdTomato in live animals/cells: permitting genotypes of distinctly labeled cells in mosaic animals to be unequivocally determined prior to fixation and/or immunostaining. Also, MADM-ML-11 contains multiple *lox* sites and two *frt* sites; allowing the induction of MADM-labeling by either Cre recombinase or FLP recombinase.

The donating investigator (Dr. Hui Zong [University of Virginia]) and Dr. Liqun Luo (Stanford University/HHMI) have several mice available with MADM applications on different chromosomes:

On chromosome 6, the *Gt(ROSA)26Sor* knockin mutations include MADM-6^{GR} (Stock Nos. 006041 / 006075),
MADM-6^{RG} (Stock Nos. 006067 / 006080),
MADM-6^{GG} (Stock Nos. 006053 / 006071),
R26^{GT} (Stock No. 017912),
R26^{TG} (Stock No. 017921),
R26^{TT} (Stock No. 017922),
and R26$^{G\text{-}tTA2}$ (Stock No. 017909).

On chromosome 7, the centromeric insertions are MADM-7^{GT} (*Hipp7*^{GT}; Stock No. 021457) and MADM-7^{TG} (*Hipp7*^{TG}; Stock No. 021458).

On chromosome 10, the centromeric insertions are MADM-10^{GT} (*Miya10*^{GT}; Stock No. 017923) and MADM-10^{TG} (*Miya10*^{TG}; Stock No. 017932).

On chromosome 11, the centromeric insertions are the single *loxP* MADM-11^{GT} (*Hipp11*^{GT}; Stock No. 013749), the single *loxP* MADM-11^{TG} (*Hipp11*^{TG}; Stock No. 013751), the "multiple lox" GT11ML (MADM-ML-11^{GT}; Stock No. 022976) and the "multiple lox" TG11ML (MADM-ML-11^{TG}; Stock No. 022977).

On chromosome 12, the centromeric insertions are MADM-12^{GT} (*John12*^{GT}; Stock No. 021460) and MADM-12^{TG} (*John12*^{TG}; Stock No. 021461).

Development

Expression Data

Control Suggestions

Selected References

Genetics

Igs2$^{tm2(ACTB\text{-}tdTomato,\text{-}EGFP)Zng}$

Disease/Phenotype

Disease Terms

Research Areas By Phenotype

Mammalian Phenotype Terms by Genotype

References

Technical Support

CONTACT TECHNICAL SUPPORT

Genotyping Protocols

Separated PCR:Igs2GT/TG Alternate2
Probe:Igs2TG Probe Alternate1
Genotyping resources and troubleshooting

Breeding Considerations

When maintaining a live colony, homozygous mice may be bred together. The Jackson Laboratory colony of TG11ML mice has shown black coat color to date (April 2015).

Additional Breeding and Husbandry Support

Mating System

Homozygote x Homozygote

Citation

When using the TG11ML (MADM-ML-11^{TG}) mouse strain in a publication, please cite the originating article(s) and include JAX stock #022977 in your Materials and Methods section.

Animal Health Reports

Facility Barrier Level Descriptions

Production of mice from cryopreserved embryos or sperm occurs in a maximum barrier room, G200

Pricing & Availability

Cryo Recovery

Typically mice are recovered in 10-14 weeks. Contact Customer Service to place an order or for more information.

Domestic Internatic

Pricing effective for USA, Canada and Mexico shipping destinations

CRYORECOVERY - DOMESTIC NOT-FOR-PROFIT & ACADEMIC PRICING		
SERVICE/PRODUCT	DESCRIPTION	PRICE
Cryo Recovery	Heterozygous or wildtype for Igs2<tm2(ACTB-tdTomato,-EGFP)Zng>	$2,854.50

RELATED PRODUCTS AND SERVICES		
Frozen Mouse Embryo	STOCK Igs2<tm2(ACTB-tdTomato -EGFP)Zng>/J Frozen Embryo	$2595.00

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