

STOCK Tg(Camk2a-tTA)1Mmay Fgf14^{Tg(tetO-MAPT*P301L)4510Kha} /J

Stock No: 024854 | rTg4510

Transgenic

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Also Known As:rTg4510

These bitransgenic mice have tau^{P301L} expression in forebrain, and that expression can be greatly reduced by administration of the tetracycline analog doxycycline. The transgenes are the same as those in the "rTg4510" mouse line. They may be useful for studying the formation of neurofibrillary tangles associated with Alzheimer's disease, neurodegenerative tauopathies and frontotemporal dementia.

The CaMK2a-tTA transgene integrated into chromosome 12 causing a 508 Kb deletion that spans the 3' half of *Vipr2*, the entire *Wdr60*, *Esyf2*, *D430020J02Rik* and *Ncapg2* loci and the first two exons of *Ptpm2*. Homozygous mice will therefore have a functional knock-out of the deleted loci, and altered or null expression of *Vipr2* and *Ptpm2*. Founder line 1 has >20 transgene copies [Goodwin *et al.* 2019 *Genome Res.* 29:494].

The tetO-MAPT*P301L transgene integrated into chromosome 14 causing a 244 kbp deletion in the fibroblast growth factor 14 locus (*Fgf14*) - creating a *Fgf14* null allele [Goodwin *et al.* 2019 *Genome Res.* 29:494]. Furthermore, Gamache *et al.* 2019 *Nat Commun.* 10:2479 identified there were ~70 transgene copies integrated.

READ MORE +

GENETIC OVERVIEW

Genetic Background

Generation

F1

(2020-01-08 00:00:00)

Tg(Camk2a-tTA)1Mmay

Alele Type

Transgenic (Null/Knockout, Transactivator)

Fgf14Tg(tetO-MAPT*P301L)4510Kha

Alele Type

Transgenic (Inducible, Null/Knockout, Inserted expressed sequence, Humanized sequence)

V I E W G E N E T I C S

RESEARCH APPLICATIONS

Neurobiology Research

V I E W A L L R E S E A R C H A P P L I C A T I O N S

BASE PRICE

Starting at:

\$278.00 Domestic price for female 4-week

556.00 Domestic price for breeder pair

V I E W P R I C E L I S T

Details

Detailed Description

The CaMK2a-tTA transgene has the tetracycline-controlled transactivator protein (tTA) under regulatory control of the forebrain-specific calcium-calmodulin-dependent kinase II (CaMK2a) promoter. The tetO-MAPT*P301L transgene has the Tet-responsive element (TRE or *tetO*) and mouse prion protein promoter sequences (PrP or *Pmp*) directing expression of the P301L mutant variant of human four-repeat microtubule-associated protein tau (4R0N tau^{P301L}). As such, these

bitransgenic mice (also called rTg(τ^{P301L})4510 bitransgenic mice) have τ^{P301L} expression in the forebrain, and that expression can be greatly reduced by administration of the tetracycline or its analog doxycycline (dox).

The CaMK2a-tTA transgene integrated into chromosome 12 causing a 508.12 Kb deletion that spans the 3' half of *Vipr2* (vasoactive intestinal peptide receptor 2), the entire *Wdr60* (WD repeat domain 60), *Esy2* (extended synaptotagmin-like protein 2), *D430020J02Rik* (RIKEN cDNA D430020J02 gene) and *Ncapg2* (non-SMC condensin II complex, subunit G2) loci and the first two exons of *Ptpm2* (protein tyrosine phosphatase, receptor type, N polypeptide 2). Homozygous mice will therefore have a functional knock-out of the deleted loci (*Wdr60*, *Esy2*, *D430020J02Rik*, *Ncapg2*), and altered or null expression of *Vipr2* and *Ptpm2*. Founder line 1 has a copy number of greater than 20 [Goodwin et al. 2019 Genome Res. 29:494].

The tetO-MAPT*P301L transgene was discovered to have integrated into chromosome 14 causing a 244 kbp deletion in the fibroblast growth factor 14 locus (*Fgf14*) - creating a *Fgf14* null allele [Goodwin et al. 2019 Genome Res. 29:494]. Furthermore, Gamache et al. 2019 Nat Commun. 10:2479 identified there were ~70 transgene copies integrated.

Similarly made bitransgenic mice are described with τ^{P301L} expression levels approximately 13-fold greater than endogenous murine tau. This high τ^{P301L} expression in forebrain results in age-independent behavioral and pathological abnormalities, as well as age-dependent functional and structural abnormalities, associated with the progression of Alzheimer's disease. Learning and memory tests performed on bitransgenic mice indicate impairments in the hippocampus and amygdala dysfunction. In addition, significant tau burden is observed in the amygdala. The behavioral and amygdala pathologies mimic the neurodegenerative tauopathy, frontotemporal dementia with parkinsonism linked to chromosome 17(FTDP-17). After bitransgenic mice are administered dox, neuronal death ceases and the ability to acquire and retain new spatial memories is restored.

When maintained under doxycycline conditions, these bitransgenic mice may be expected to have the same phenotype as mice singly transgenic for tetO-MAPT*P301L: the untranslated sequence from *Pmp* results in moderate levels of τ^{P301L} expression in brain before Tet-induction, but do not result in tauopathies. When hemizygous for each transgene, bitransgenic mice are viable and fertile.

Of note, bitransgenic mice on the hybrid FVBx129S6 background exhibit a sex-dependent phenotype. Females develop an earlier and more aggressive phenotype than males, developing higher levels of hyperphosphorylated tau by 5.5 months. Higher tau levels result in more severe impairment in spatial learning and memory than is observed in age-matched males. The Jackson Laboratory colony is maintained on an FVBxC57BL/6 background, male and female phenotypes have not been compared on this background.

TetO-MAPT*P301L transgenic mice prove to be better breeders than CaMK2a-tTA transgenic mice. As such, The Jackson Laboratory breeds female TetO-MAPT*P301L transgenic mice to male CaMK2a-tTA transgenic, with no reciprocal crosses, to maintain a productive colony.

+ Development

+ Expression Data

+ Control Suggestions

+ Selected References

- Genetics

+ Tg(Camk2a-tTA)1Mmay

+ *Fgf14*^{Tg(tetO-MAPT*P301L)}4510Kha

– Disease/Phenotype

+ Disease Terms

+ Research Areas By Phenotype

+ Mammalian Phenotype Terms by Genotype

+ References

– Technical Support

C O N T A C T T E C H N I C A L S U P P O R T

Genotyping Protocols

Standard PCR:[Tg\(Camk2a-tTA\)1Mmay](#)

Probe:[Generic tTA/rtTA](#)

Probe:[Tg\(MAPT\) cDNA- Probe](#)

Standard PCR:[Tg\(tTA\)](#)

Standard PCR:[Generic tTA](#)

QPCR:[Tg\(MAPT\) cDNA](#)

Probe:[Tg\(Camk2a-tTA\)1Mmay Probe](#)

[Genotyping resources and troubleshooting](#)

Dietary Information

LabDiet® 5K52 formulation (6% fat)

Breeding Considerations

Transgene carrier mice from Stock No. [015815](#) FVB-Tg(tetO-MAPT*P301L)#Kha/JlwsJ are bred every generation to transgene carrier mice from Stock No. [007004](#) B6.Cg-Tg(Camk2a-tTA)1Mmay/DboJ. TetO-MAPT*P301L transgenic mice prove to be better breeders than CaMK2a-tTA transgenic mice. As such, The Jackson Laboratory breeds female TetO-MAPT*P301L transgenic mice to male CaMK2a-tTA transgenic, with no reciprocal crosses, to maintain a productive colony.

[Additional Breeding and Husbandry Support](#)

Mating System

See "Breeding Considerations"

Citation

When using the rTg4510 mouse strain in a publication, please [cite the originating article\(s\)](#) and include JAX stock #024854 in your Materials and Methods section.

Animal Health Reports

[Facility Barrier Level Descriptions](#)

 [AX12 \(Maximum\)](#)

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	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
4 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
4 weeks	Female	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
4 weeks	Female	Noncarrier Noncarrier	\$78.51
	Male	Noncarrier Noncarrier	\$78.51
5 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
5 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
5 weeks	Female	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
5 weeks	Female	Noncarrier Noncarrier	\$78.51
	Male	Noncarrier Noncarrier	\$78.51
6 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
6 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
6 weeks	Female	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
6 weeks	Female	Noncarrier Noncarrier	\$78.51
	Male	Noncarrier Noncarrier	\$78.51

Tg(tetO-

7 weeks	SEX	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
7 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
7 weeks	Female	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
7 weeks	Female	Noncarrier Noncarrier	\$78.51
	Male	Noncarrier Noncarrier	\$78.51
8 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
8 weeks	Female	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
	Male	Hemizygous for Tg(Camk2a-tTA)1Mmay, Noncarrier	\$278.00
8 weeks	Female	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
	Male	Noncarrier, Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha}	\$278.00
8 weeks	Female	Noncarrier Noncarrier	\$78.51
	Male	Noncarrier Noncarrier	\$78.51

BREEDER PAIR			
SEX	GENOTYPE		PRICE
Female	Hemizygous for Fgf14 ^{Tg(tetO-MAPT*P301L)4510Kha} (015815)		\$556.00
Male	Hemizygous for Tg(Camk2a-tTA)1Mmay (007004)		

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