TACONIC
Models For **Life.**

Random Integration & Targeted Transgenic Mouse Models

Choosing the Right Technology for Your Research

Deciding between a random integration or targeted transgenic mouse model can be particularly challenging. At Taconic, we do not expect our customers to be experts in model generation. Instead, our ecosystem of support provides a collaborative and consultative approach to model generation from initial concept design to project completion, ensuring our customers are provided with the best solution to achieve their project goals.

Get in touch for more information about our products and services.
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Start with the **project goal...**

Transgenic models provide an efficient method to introduce exogenous DNA sequences into the mouse genome for overexpression and/or tissue-specific expression of the gene-of-interest and, thus, these models can be particularly useful for studying therapeutic-target engagement.

Random Integration Transgenesis

- Transgene DNA injected into embryos is randomly integrated into the mouse genome
- Mosaic transgenic F0 founder mice may harbor multiple transgenic alleles, thus their germline-transmitted F1 heterozygous offspring will carry a unique allele, each with a different copy number, configuration and genomic location
- Transgene copy number determination and expression and phenotype analysis in F1 mice is recommended to ensure a suitable allele is chosen to establish the transgenic line
- Repeating copy number determination in F2 mice is recommended to track the stability of the integration
- Transgene mapping via Cergentis Targeted Locus Amplification is available to identify the genomic location and configuration of the transgenic allele

Targeted Transgenesis

- Targeting vectors are used to insert transgene cassettes into a well characterized safe-harbor locus (e.g. ROSA26, Col1a11, TIGRE) in embryonic stem cells (ESC)
- Transgene sequence is inserted as a single copy in a known genomic location that can be tracked
- Molecular validation of targeted ESC clones ensures proper integration of the transgene and absence of unwanted rearrangements or off-target alleles
- Germline-transmitted F1 heterozygous mice all carry the same allele and are genetically identical. Characterization of multiple founder lines is unnecessary

STANDARD TIMELINES FOR ESTABLISHING TRANSGENIC LINES

Every technology comes with considerations, so determining which model is best suited for a particular research study can be challenging. A summary for random integration and targeted transgenic mouse models is provided below as an introduction, but at Taconic, our team of experts will work with the customer to ensure the right model is developed using the best technology.

Random Integration Transgenesis

ADVANTAGES

- Faster timeline to generation of founder mice compared to a targeted transgenic approach using ESC technology
- Each founder animal is unique with regards to copy number, expression level, and genomic location of the transgene and, therefore, multiple founder lines can be propagated with varying expression levels between them
- Can be performed on a range of genetic backgrounds
- The timeline to experimental cohort can be accelerated through the ExpressMODEL®: Random Integration Transgenic service option by completing transgene expression analysis on F0 founder mice

RISKS & CONSIDERATIONS

- Randomly integrated transgenes are subject to position-effect variegation and may be influenced by adjacent regulatory elements at the integration site and/or epigenetic silencing
- Transgene integrations may disrupt important endogenous genes and regulatory regions
- Transgene integrations may be unstable and may not persist to the F1 and F2 generations.
- Without transgene mapping, the location of the transgene will be unknown and may make planning of intercrossing strategies challenging
- Founders might be infertile or have health issues due to expression of the transgene, making it impossible or difficult to propagate the line

Targeted Transgenesis

ADVANTAGES

- Transgene is inserted as a single copy into a known location (*safe harbor*) and can therefore be easily genotyped and tracked while intercrossing
- No risk of a randomly integrated transgene disrupting endogenous genes
- Upfront molecular validation in ESCs prior to animal generation provides a more defined and reliable timeline to model generation
- The timeline to an experimental cohort can be accelerated through the ExpressMODEL®: Embryonic Stem Cell service option by increasing the number of F1 heterozygous mice produced

RISKS & CONSIDERATIONS

- Longer timeline to germline-transmitted F1 mice compared to a random integration approach
- Limited to genetic backgrounds for which ESC lines are available

...then let Taconic's experts provide the **best solution**

THE COMPLETE SOLUTION

MODELS TO DRIVE DRUG DISCOVERY
Taconic Biosciences is uniquely positioned to enable drug discovery through animal models by being the only company that partners with customers to provide expertise, quality, and availability, along with downstream services:

- Expertise at every step
- Highest quality standards in the industry
- Availability and access to drive global research

MODEL GENERATION SOLUTIONS
Taconic's Model Generation Solutions empower our customers with a unique combination of capabilities, specifically tailored to each individual discovery program:

- Most experienced model generation and breeding company
- Most comprehensive toolkit
- Exclusive programs
- Concierge approach to partnering with customers

COLONY MANAGEMENT SOLUTIONS
Taconic's fully-integrated colony management solutions bring innovative models from design to study-ready cohorts with unprecedented speed and transparency:

- Most experienced model generation and colony management company
- The complete toolkit
- Colony management solution process
- Partnering with our customers
- Expanded applications and opportunities

YOUR PARTNER

WHAT WE DO
Taconic Biosciences is a fully-licensed, global leader in genetically engineered rodent models and services. Founded in 1952, Taconic provides the best animal solutions so that customers can acquire, custom-generate, breed, precondition, test, and distribute valuable research models worldwide.

WHO WE ARE
Taconic has created a unique ecosystem of experts to provide our customers with the best animal model solutions. Whether it is choosing the right model for your study, designing a custom model, creating an efficient breeding plan, or providing expertise in critical support functions like veterinary science, genetics, and embryology; Taconic is ready to help you drive your research from idea to cure.

CONTACT US
To get started, contact one of our customer service team members. Contact us at **info@taconic.com**.

VISIT TACONIC.COM
There is so much more to learn. Visit taconic.com to see our full breadth of animal model solutions and valuable resources.

A UNIQUE APPROACH TO PARTNERING WITH CUSTOMERS

FOCUSED ON THE CUSTOMER AND LED BY PH.D. SCIENTISTS
Planning and execution demands a team of experts. At Taconic, this team is made up of three functional groups, the **Scientific Program Management** group, the **Strategy Design Group**, and the **Project Management Group**. This ecosystem of support serves as the foundation of Taconic's collaborative and consultative approach to model generation.