InnoSer | a smart road to better health

Model Webpage

ALS Mouse Models

Target the distinct pathophysiological mechanisms of ALS using one of InnoSer's well-characterized mouse models

Developing effective treatments for Amyotrophic Lateral Sclerosis (ALS) starts with selecting the right model. At InnoSer, we offer a range of ALS mouse models designed to support preclinical research through **advanced behavioral, histopathological, and biomarker analyses.** To gain full confidence in the efficacy of your novel therapeutic, testing across multiple models is often essential. The best choice depends on how well a model mimics human pathology, including the **origin and onset of disease**, as well as the **extent of neuromuscular degeneration and motor function deficits.** With standardized and sensitive behavioral assessments, our models provide a translationally relevant platform for evaluating ALS-targeted therapies. The progression rate and severity of symptoms vary between models, making careful selection crucial for obtaining meaningful results. Our neurology study directors are available to help you identify the most appropriate model for your research. Reach out to our team to find the best fit for your study.

Evaluate the Efficacy of Your Compound Through Key Endpoints

Consult the available readouts

Thoroughly test your compound's efficacy with tailored readout options, providing you with translationally relevant insights to confidently advance your compound to clinical testing.

With flexible study designs and rapid start times, InnoSer neurology study experts take a collaborative approach when it comes to your research needs.

Biotechnical capabilities

- Acute and chronic administration (s.c., i.v., i.p., retro-orbital)
- Stereotaxic infusion (ICV in neonatal or adult mice)
- Cannula/osmotic minipumps

Behavioral Testing

- Motor function: Neurological scoring, Rotarod, Balance Beam, CatWalk™ gait analysis, Grip Strength, Wire Hanging, Nest Building, Spontaneous Behavior (PhenoTyper™ cages)

Analyses

- Sciatic nerve electrophysiology: compound muscle action potential (CMAP) and nerve conduction velocity (NCV) analyses
- CSF, blood and plasma collection for biomarker analyses (e.g., plasma NfL, cytokines)
- Tissue collection and histopathology analyses for biomarker analyses (e.g., TDP-43 accumulation, NfL, neuroinflammation)

SOD1-G93A Transgenic ALS Mouse Model

Develop novel targeted ALS therapies by modeling early-stage symptomatic ALS

One of the most widely used models is the **SOD1-G93A transgenic mouse**, which is highly relevant for evaluating compounds aimed at reducing **SOD1 aggregation, oxidative stress, motoneuron loss, and motor impairments.** This model exhibits progressive neuromuscular degeneration, making it a valuable tool for testing therapies that target early-stage ALS pathology. With standardized study protocols, we ensure consistency and reproducibility, allowing for reliable assessment of treatment efficacy.

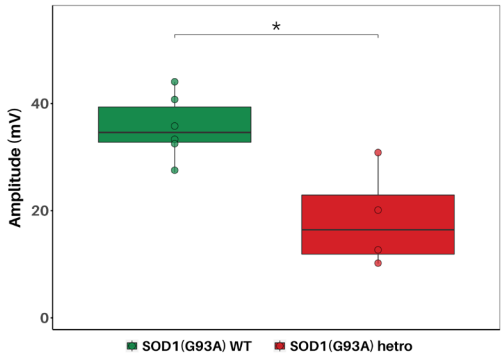

FIGURE 1. SOD1-G93A Transgenic ALS mice show reduced amplitude in nerve conduction velocity. Reduction of compound muscle action potential (CMAP) amplitude in SOD1G93A mice is observed at 11 weeks of age, before the onset of motor function impairments).

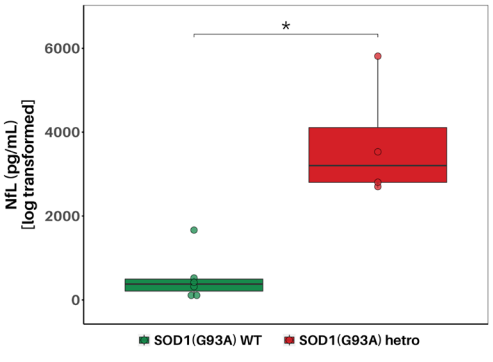

FIGURE 2. Compared to WT littermates, SOD1G93A mice show significantly higher concentrations of plasma NfL at 11 weeks of age (before onset of motor function impairments). Increasing NfL in blood (and CSF) is a marker of neuronal injury, confirming the extensive neurodegenerative phenotype.

TDP-43(Q331K) Transgenic Mouse Model

Target the pathological hallmark of FTD and almost all ALS patients

The human transgenic **TDP-43^{Q331K}mouse model** is another key tool for studying ALS and frontotemporal dementia (FTD). This model enables the evaluation of compounds targeting TDP-43 proteinopathy, motoneuron loss, and motor function decline, closely mimicking disease mechanisms observed in patients. Our expert study directors take a collaborative approach to tailor studies to your specific research needs, providing flexibility in study design and timelines.

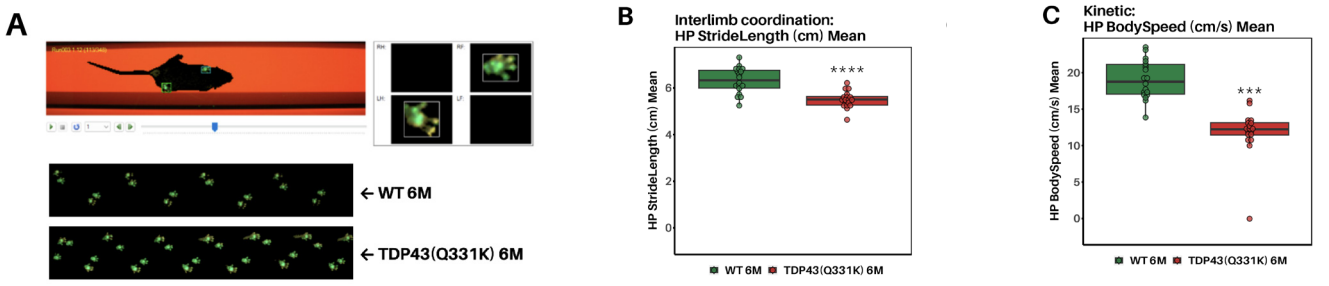

FIGURE 1. TDP43 mice walk abnormally in the CatWalk Gait Analysis. **(A)** In TDP-43 mice, the significant deficits in locomotor parameters reflect the degree of motor weakness allowing for an assessment of disease progression and prediction of disease severity. **(B-C)** Female TDP-43 mice show progressive worsening of walking patterns in all 5 major parameter groups (two shown here).

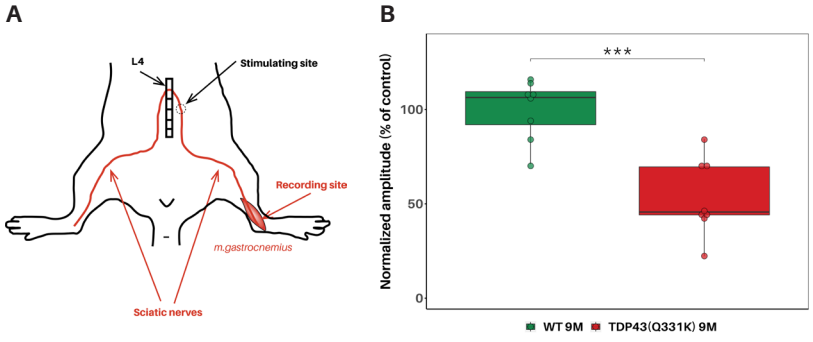

FIGURE 2. Sciatic nerve conduction electrophysiology in gastrocnemius muscle of TDP-43Q331K mice. **(A)** Experimental set-up for sciatic nerve conduction electrophysiology recording which includes compound muscle action potentials (CMAP) recordings. CMAP represents the summed electrical response generated by a group of muscle fibers in response to nerve stimulation. **(B)** Mutant TDP-43 mice show reduction of CMAP amplitude.

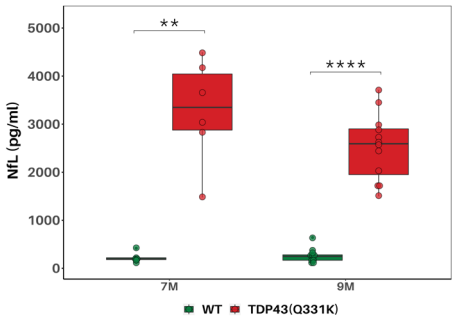

FIGURE 3. TDP-43Q331K mice show elevated plasma Neurofilament light chain (NfL) levels in the plasma. Compared to WT littermates, TDP-43 mice show significantly higher concentrations of plasma NfL at 7 months and 9 months of age.

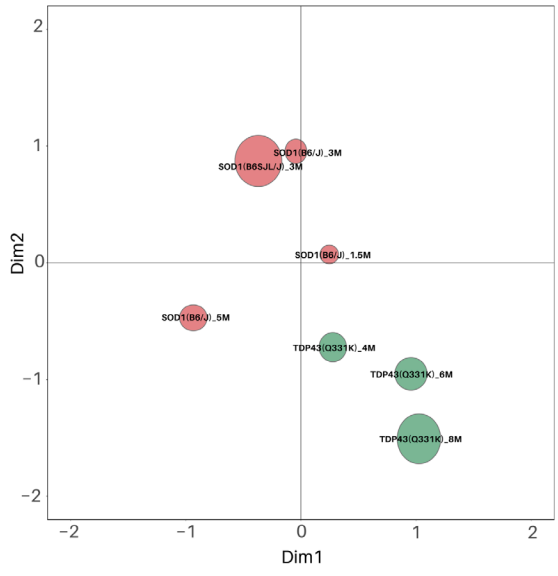

FIGURE 4. Principal component analysis (PCA) on multiple parameters in the PhenoTyper™ automated home-cage reveals consistent progression of the neurodegenerative phenotype of TDP-43 ALS mice. PCA bubble plot shows spontaneous behaviors of 2 ALS models (SOD1 and TDP43) progressively deteriorated by aging. SOD1 ALS models (both males and females) were tested at 1.5, 3 and 5M. While the 1.5M group showed small deviation vs control (center 0 point of the plot), the 3M groups showed a large deviation, with consistent results in 2 different SOD1 backgrounds (B6/J and B6SJL/J). At 5M, SOD1 model reached humane endpoint by paralysis symptoms, resulted in a bubble in different direction from the 1.5M and 3M. TDP43 ALS model (females) were tested at 4, 6 and 8M.

Other neurodegenerative disease models

Our Alzheimer's disease mouse models are part of our large neurodegenerative disease portfolio, including multiple Parkinsons's disease (transgenic and seeding) and Alzheimer's disease models (transgenic and seeding). Talk to our team to discover how we you can benefit from our innovative services using one of the models.