

# **Precision Dosing for Preclinical Success**

Expert Delivery Methods to Support Neurogenetic Disease Research

A preclinical CRO's ability to offer a broad range of dosing capabilities is essential for accurately modeling clinical scenarios and advancing drug development. At Inotiv, our neuroscientists are skilled in a wide range of compound administration techniques to support robust and flexible preclinical studies. We carefully select and tailor dosing methods to align with each study's objectives and the compound's pharmacokinetic and pharmacodynamic profile. This strategic approach ensures precise delivery, enhances therapeutic relevance, and supports confident, data-driven decisions in early drug development.

# **Dosing Capabilities**

- Standard IP, SC, PO, and IV Administration
- Postnatal Day 2 Temporal Vein Injection
- Intrathecal Dosing (via Implanted Catheter)
- Intranasal Dosing
- Intracerebroventricular (ICV) Injections
- Neonatal ICV Injections
- Intraparenchymal Cranial Injections
- Retroorbital Injections
- Intradermal Injections
- Intra-articular Injections
- Stereotaxic Surgery for Targeted Brain Region Injections

# Why Do Routes of Administration Matter in Preclinical Research?

- Influence on Drug Behavior
  The route of administration directly affects
  how a compound is absorbed, distributed, and
  metabolized shaping its pharmacological profile.
- Support for Targeted Research Specialized techniques like CNS and neonatal dosing enable precise delivery for complex conditions.
- Comprehensive Evaluation
  Versatility in administration ensures studies are aligned
  with therapeutic goals and regulatory expectations,
  supporting better decision-making in drug development.

#### Figure 1 Ipsilateral Depletion of Dopaminergic Neurons Following Unilateral MFB Lesioning

Expression of tyrosine hydroxylase (TH), the rate limiting enzyme in dopamine synthesis, was detected in perfusion fixed, paraffin embedded sections of brain from a rat that received a unilateral injection of 6-OHDA into the medial forebrain bundle (MFB). TH-positive neurons were detected in the striatum (**A**; ST) and the substantia nigra (**B**; SN) on the contralateral side of the 6-OHDA-induced lesion while TH immunoreactivity was absent in both nuclei on the ipsilateral side.



At Inotiv, our expert team of scientists bring proven experience across a wide spectrum of dosing routes to accelerate drug development in a variety of disease areas. Whether your program targets **oncology**, **inflammation**, **metabolic disorders**, or **rare diseases**, we tailor administration strategies to maximize translational impact and streamline your path to the clinic.



# Connecting Dosing Strategies with Behavioral Insights

Our expertise in targeted dosing enables precise compound administration. When paired with specialized behavioral assays that assess motor, cognitive, and social function, these capabilities provide powerful, translational insights to guide early drug development and support confident decision-making. Inotiv offers a full suite of behavioral assays designed to evaluate a wide range of functional endpoints across neurodevelopmental and neurodegenerative disease models.

#### Locomotor Activity

- Cylinder test
- Drug-induced rotational behavior
- Home cage activity

#### Motor Coordination

- Beam walk
- Dynamic weight bearing
- Gait analysis
- Grip strength
- Rotarod

#### **Anxiety-Like Behavior**

- Elevated plus maze
- Light-dark box
- Nestlet shredding/nest building
- Open field arena

### Depression-Like Behavior

- Swim test
- Sucrose preference test

#### Learning & Memory

- Barnes maze
- Contextual/Cue fear conditioning
- Novel object recognition
- Morris water maze
- Y-maze

#### Pain

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- Hargreaves test
- Tail flick test
- Von Frey test

## **Developmental Milestones** • Air righting

- Auditory startle
- Bar holding
- Cliff aversion
- Forelimb grasping
- IRWIN/FOB
- Negative geotaxis
- Surface righting

#### **Motivational Behavior**

- Conditioned place preference
- Two-bottle choice test

#### **Additional Behaviors**

- Marble burying
- Racine scoring system

#### Figure 2 Motor Coordination Assessment of SOD1G93A Rats

Motor coordination was assessed in SOD1G93A rats (orange line) and wild type controls (red line). SOD1G93A rats exhibited significantly more foot faults than wild type controls during the beam walk test (A) and fell off the rotarod at lower revolutions per minute (RPM) than wild type controls (B).





## Additional Services for Drug Development

Inotiv's capabilities extend beyond models and behavioral testing. Other services include GLP and non-GLP in vivo and in vitro assays that can be customized to provide solutions for your drug development program.

- Tissue harvesting
- Oxidative stress enzymology
- Neurotransmitter and metabolite quantification
- CBC/clinical chemistry analysis

- Mass spectrometry proteomics
- Primary neural cell culturings
- Human stem cell and brain organoid culturing

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R

RPM 15

Aax 10

## Contact us at inotiv.com/contact to discuss how we can support your research program.

Inotiv's robust study capabilities are built on the expertise and innovation of its legacy companies, including: Bolder BioPATH – preclinical pharmacology and pathology CRO | Histotox Labs – routine and specialized histology, immunohistochemistry, histopathology, image analysis/digital pathology | Protypia – protein/peptide bioanalysis | Envigo – research models and related services