Discovery Solutions

perceptive discovery

Preclinical Dosimetry Studies

Turning biodistribution data into actionable dose insights

When developing a new radiopharmaceutical, understanding the dose delivered to healthy tissues and organs is essential for developing a safe asset. Preclinical dosimetry studies translate biodistribution data into quantitative radiation dose estimates to inform clinical translation, helping researchers optimize therapeutic index, refine dosing, and prepare regulatory submissions with confidence.

Why Dosimetry Matters

Dosimetry provides the **quantitative link between biodistribution and patient safety**. By modeling how much cumulative dose a radioactive payload deposits within organs, one can anticipate toxicity, evaluate different radionuclides, and design optimal dosing strategies before clinical testing.

Incorporating dosimetry early in the workflow enables:

- **Predictive safety modeling** to de-risk translation
- **Extrapolated human dose estimates** for IND submissions
- **Rational isotope and dose selection** for optimal therapeutic windows
- **Confidence in first-in-human dose planning**

The Perceptive Discovery Advantage

Perceptive Discovery combines **quantitative imaging, biodistribution science, and advanced dosimetry modeling** to deliver highly accurate, regulatory-ready dose estimates for radiopharmaceutical development.

Core Capabilities

End-to-End or Standalone Dosimetry Support

Full-service study design, execution, analysis, and IND-enabling reporting—or rapid analysis using sponsor-provided biodistribution data

Advanced Human Dosimetry Modeling (OLINDA 2.2.3)

FDA-aligned workflows across adult, pediatric, and organ-specific models led by a dedicated health physics team

Accurate Alpha and Beta Dosimetry

Proprietary modeling strategies that address known limitations in standard workflows, improving dose estimation for red marrow and osteogenic cells

Radionuclide Translation and Surrogate Pairing Expertise

Proven workflows translating isotopes (e.g., ^{203}Pb to ^{212}Pb, ^{111}In/^{89}Zr to ^{225}Ac) for efficient preclinical-to-clinical bridging

Quantitative Imaging and Biodistribution Integration

PET/SPECT imaging, cut-and-count studies, and time-activity curve generation integrated into MIRD-based dose calculations

Sub-Organ Dosimetry (Kidney)

Advanced segmentation and modeling to estimate regional dose within kidney substructures for improved toxicity assessment

Intrathecal (IT) Dosimetry Expertise

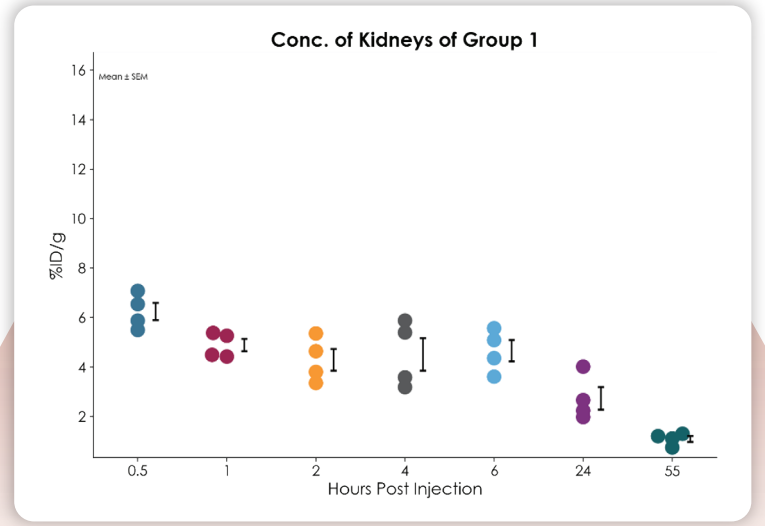
Specialized modeling to accurately estimate dose to spinal cord and CSF regions

Case Study:

Dosimetry Workflow: Translating Preclinical Data into Absorbed Dose Estimates

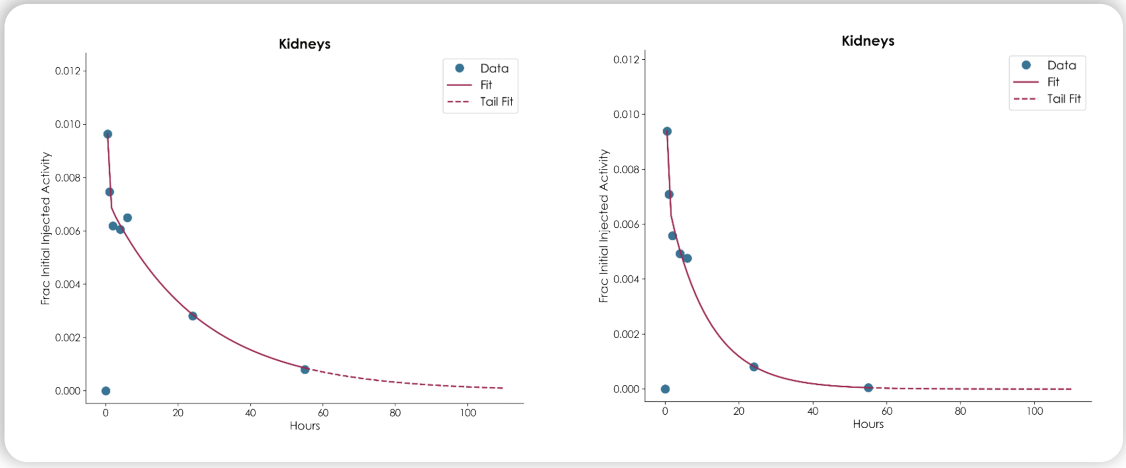
This example illustrates how **Perceptive Discovery's preclinical dosimetry workflow** converts biodistribution data into quantitative absorbed dose calculations. Using Pb-203 gamma counting data from kidney samples, time–activity curves (TACs) are generated and translated to Pb-212 after applying isotope-specific half-life corrections. Time integrated activity coefficients (TIACs) are calculated and used as input for OLINDA modeling to calculate organ-level absorbed doses, which can be further translated into equivalent doses using established weighting factors. This integrated approach provides the quantitative foundation needed to support IND-enabling dosimetry and clinical dose planning.

Biodistribution Data Pb-203 Gamma Counting



TAC directly calculated from gamma counting data

Translation to Pb-212 after applying appropriate half-life correction



TACs and curve fitting used to calculate TIACs input into OLINDA to calculate absorbed doses, which are then translated into equivalent doses using weighting factors of 5 for alpha radiation.

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