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µCT Analysis in Preclinical Research

Micro-computed tomography (µCT) enables non-destructive, high-resolution 3D characterization of mineralized tissues and selected soft tissue applications.
We provide quantitative structural analysis to support preclinical research, including longitudinal in vivo imaging and endpoint ex vivo assessments.
By combining advanced imaging with standardized analysis workflows, µCT supports reliable, data-driven evaluation of disease progression, treatment effects, and biomaterial performance.

All assays are developed and validated according to study-specific requirements and high animal welfare standards.

Research Area	Specialized Analysis	Key Rodent Models
Bone & Mineralized Tissue	3D Microarchitecture (BV/TV, TbN,TbT), bone mineral density (BMD), fracture healing & callus quantification	Osteoporosis, fracture healing, osteoarthritis, genetic phenotyping
***in vivo* µCT Imaging**	Longitudinal scanning in rodents (same animal over time), whole-body and region-specific imaging, reduced animal numbers (supports 3R principles)	Therapy monitoring, time-course studies, intervention studies
Body compostion and Soft Tissue Imaging	Exploratory soft tissue characterization (e.g. adipose tissue estimation) and organ visualization depending on imaging protocol and contrast approach, High-resolution endpoint scans of biological samples	Obesity models, phenotype characterization, tumor studies, metabolic studies
Biomaterials & Implants (optional)	Osseointegration, scaffold sturucture and porosity analysis, bone-implant interaction	Orthopedic implants, tissue engineering

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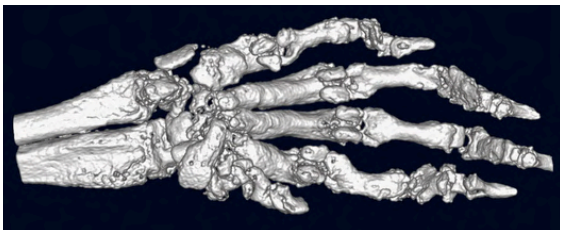
Micro-CT Applications & Capabilities

Concise overview of indications, endpoints, technology and workflow

Bone & Joint

- **Osteoporosis** – OVX & aged models; monitors bone loss & therapy response
- **Osteoarthritis** – surgical/spontaneous models; assess subchondral bone & cartilage
- **Fracture healing** – callus volume & mineral density; longitudinal kinetics
- **Rheumatoid arthritis** – detect erosions; quantify lesion volume, width & depth
- **Bone metastasis & oncology** – osteolytic/osteoblastic lesions; quantify bone & tumor volume

Parameter	Endpoint	Unit
Bone vol. fraction	BV/TV	%
Trabecular no.	Tb.N	mm^{-1}
Trabecular thick.	Tb.Th	µm
Trabecular sep.	Tb.Sp	µm
Cortical thickness	Ct.Th	µm
Bone mineral density	BMD	mg HA cm^{-3}



µCT of mouse paw in an arthritis model

Soft Tissue & Beyond

- **Obesity & body composition** – separate visceral & subcutaneous fat; body-fat %, lean mass
- **Muscular dystrophy & cachexia** – measure muscle thickness & tibial length; IMM index
- **Biomaterials & implants** – porosity, pore size & osseointegration; scaffold degradation
- **Phenotyping & transgenic models** – high-throughput ex vivo scans; organ volumes & phenotypes

Parameter	Endpoint	Unit
Body fat percentage	%BF	%
Muscle index	IMM	ratio
Lean mass	LM	g
Organ volume	-	mm^3

Technology & Capabilities

- Voxel size 10 µm; up to 90 kVp & 200 µA
- Typical fast high-resolution scans ~4 minutes
- FOV 18–86 mm with 163 mm bore for multi-species imaging
- Two-phase respiratory/cardiac gating for motion-free image

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Optimizing Your µCT Results: Sample Preparation Guidelines

A high-quality 3D reconstruction starts with perfect sample preparation. To ensure the best data for your rodent studies, please follow these standardized protocols before shipping your specimens to our facility.

Sample Preparation

- Fix samples in 4% PFA (24–48 h depending on size)
- Ensure complete tissue penetration during fixation
- Avoid over-fixation, especially for soft tissue applications
- After fixation, transfer samples to 70% ethanol (recommended for bone)
- Prevent drying at all stages
- Store samples at 4°C for long-term storage if required

Whole-Body Sample Preparation

- Whole animals should be properly euthanized and perfused prior to fixation
- Perfusion fixation is recommended to ensure optimal tissue preservation and image quality
- Fix in 4% PFA and keep samples hydrated during transport

Shipping & Handling

- Use sealed, leak-proof containers
- Clearly label all samples (ID, study, orientation if relevant)
- Protect fragile samples during transport

Information Required for Analysis

- Sample type and study design
- Target tissue / region of interest
- Specific analysis goals

µCT imaging is non-destructive and allows subsequent downstream analyses (e.g. histology or molecular assays) on the same samples.

Get in Touch

Ready to discuss your next study? Contact our expert team for a customized research plan.

1 **Consultation**
Define objectives & endpoints

2 **Preparation**
Optimise sample prep & shipping

3 **Imaging**
In vivo/ex vivo scanning & analysis

4 **Reporting**
Data interpretation & report

Schedule Consultation

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