X-ray IMPC_XRY_001

Purpose

Construct and analyse digital X-ray images in immobilised mice using a Faxitron X-Ray system or NTB digital X-ray scanner.

Experimental Design

- **Minimum number of animals :** 4M + 4F
- **Age at test:** Week 14

Procedure

Perform steps 3.1 and 3.2 unless the mouse is coming from DEXA analysis

3.1 Anesthetize the mice.

3.2 Monitor the animal carefully until unconsciousness by ensuring the mouse is adequately sedated.

3.3 Mount the anesthetized mouse onto an X-ray permeable plate. Curve the tail along the left side of the mouse. (Note: this will enable identification of the X-ray as a dorsal or ventral image.)

Faxitron X-ray system

3.3.1 Insert the plate into the Faxitron X-ray system.

3.3.2 Take an image using the software that is supplied by the X-ray scanner.

3.3.3 Set the machine to a voltage of 25kV with an integration time of 40ms.

3.3.4 Take an image using the iX-Pect software that is supplied by the X-ray scanner.

NTB digital X-ray scanner

3.4 Remove the mouse once the image is captured. Place the mouse on a heated mat, set at 37°C, in a cage and monitor closely until consciousness is fully regained.

3.5 Analyze the image.

3.6 Or continue with ABR.

Notes

The protocol described herein employs anaesthesia using intraperitoneal (IP) administration; however, anaesthesia using isoflurane is also suitable.

Digit integrity IMPC_XRY_031_001 *Definition:* **The state of being whole and undivided.**

Parameters and Metadata

Skull shape IMPC_XRY_001_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: skull_shape

Options: imageOnly, normal, abnormal, unobservable,

Zygomatic bone IMPC_XRY_002_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: zygomatic_bone

Options: imageOnly, normal, abnormal, unobservable,

Maxilla/Pre-maxilla IMPC_XRY_003_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: maxilla

Options: imageOnly, normal, abnormal, unobservable,

Mandibles IMPC_XRY_004_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: mandibles

Options: imageOnly, normal, abnormal, unobservable,

Teeth IMPC_XRY_005_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: teeth

Options: imageOnly, normal, abnormal, unobservable,

Scapulae IMPC_XRY_006_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: scapulae

Options: imageOnly, normal, abnormal, unobservable,

Clavicle IMPC_XRY_007_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: clavicle

Options: imageOnly, normal, abnormal, unobservable,

Number of ribs right IMPC_XRY_008_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_ribs_right

Number of ribs left IMPC_XRY_009_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_ribs_left

Shape of ribs IMPC_XRY_010_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: shape_of_ribs

Options: imageOnly, normal, abnormal, unobservable,

Fusion of ribs IMPC_XRY_011_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: fusion_of_ribs

Options: imageOnly, fused, not fused, unobservable,

Pelvis IMPC_XRY_012_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: pelvis

Options: imageOnly, normal, abnormal, unobservable,

Number of cervical vertebrae IMPC_XRY_013_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_cervical_vertebrae

Number of thoracic vertebrae IMPC_XRY_014_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_thoracic_vertebrae

Number of lumbar vertebrae IMPC_XRY_015_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_lumbar_vertebrae

Number of pelvic vertebrae IMPC_XRY_016_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_pelvic_vertebrae

Number of caudal vertebrae IMPC_XRY_017_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_caudal_vertebrae

Shape of vertebrae IMPC_XRY_018_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: shape_of_vertebrae

Options: imageOnly, normal, abnormal, unobservable,

Fusion of vertebrae IMPC_XRY_019_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: fusion_of_vertebrae

Options: imageOnly, yes, no, unobservable,

Processes on vertebrae IMPC_XRY_020_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: processes_on_vertebrae

Options: imageOnly, normal, abnormal, unobservable,

Humerus IMPC_XRY_021_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: humerus

Options: imageOnly, normal, abnormal, unobservable,

Radius IMPC_XRY_022_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: radius

Options: imageOnly, normal, abnormal, unobservable,

Ulna IMPC_XRY_023_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: ulna

Options: imageOnly, normal, abnormal, unobservable,

Femur IMPC_XRY_024_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: femur

Options: imageOnly, normal, abnormal, unobservable,

Tibia IMPC_XRY_025_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: tibia

Options: imageOnly, normal, abnormal, unobservable,

Fibula IMPC_XRY_026_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: fibula

Options: imageOnly, normal, abnormal, unobservable,

Joints IMPC_XRY_027_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: joints

Options: imageOnly, normal, abnormal, unobservable,

Number of digits IMPC_XRY_028_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Description: number_of_digits

Syndactylism IMPC_XRY_029_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: syndactylism

Options: imageOnly, Syndactylism, no syndactylism, unobservable,

---

Brachydactyly IMPC_XRY_030_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: completeness_of_digits

Options: imageOnly, yes, no, unobservable,

Digit integrity IMPC_XRY_031_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** true

Description: digit_integrity

Options: imageOnly, yes, no, unobservable,

Comment on XRay image IMPC_XRY_032_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: comment_on_xray_image

Tibia length IMPC_XRY_033_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Unit Measured: mm

Description: tibia_length

XRay Images Whole Body Dorso Ventral IMPC_XRY_034_001 | v1.3

seriesMediaParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: xray_images

Increments: Minimum 1

Alive IMPC_XRY_035_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: alive

Xray equipment ID IMPC_XRY_036_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: xray_equipment_name

Xray equipment manufacturer IMPC_XRY_037_001 | v1.4

procedureMetadata

Req. Analysis: true **Req. Upload:** false **Is Annotated:** false

Description: xray_equipment_manufacturer

Options: Faxitron X-Ray Corporation, Rigaku Corporation (Micro-CT), Bruker, Faxitron Bioptics LLC, Scintica,

---

Xray equipment model IMPC_XRY_038_001 | v1.4

procedureMetadata

Req. Analysis: true **Req. Upload:** false **Is Annotated:** false

Description: xray_equipment_model

Options: MX-20-DC12, MX-20-DC4, R_mCT (Micro-CT), MX-20, MS-FX Pro, UltraFocus 100, UltraFocus DXA, PathVision, Insight-VET-DXA,

---

Settings time of exposure IMPC_XRY_039_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Unit Measured: s

Description: settings_time_of_exposure

Settings level IMPC_XRY_040_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: settings_level

Experimenter ID (scan) IMPC_XRY_041_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: experimenter_scan_

Experimenter ID (analysis) IMPC_XRY_042_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: experimenter_analysis_

Voltage settings IMPC_XRY_043_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Description: voltage_settings

Scanner equipment ID IMPC_XRY_044_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: scanner_equipment_name

Scanner equipment manufacturer IMPC_XRY_045_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: scanner_equipment_manufacturer

Scanner equipment model IMPC_XRY_046_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Description: scanner_equipment_model

Date Xray equipment last calibrated IMPC_XRY_047_001 | v1.3

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

XRay Images Whole Body Lateral Orientation IMPC_XRY_048_001 | v1.2

seriesMediaParameter

Req. Analysis: false **Req. Upload:** true **Is Annotated:** false

Increments: Minimum 1

XRay Images Forepaw IMPC_XRY_049_001 | v1.1

seriesMediaParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Increments: Minimum 1

XRay Images Skull Lateral Orientation IMPC_XRY_050_001 | v1.2

seriesMediaParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Increments: Minimum 1

XRay Images Skull Dorso Ventral Orientation IMPC_XRY_051_001 | v1.2

seriesMediaParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Increments: Minimum 1

XRay Images Hind Leg and Hip IMPC_XRY_052_001 | v1.1

seriesMediaParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Increments: Minimum 1

Date Scanner equipment last calibrated IMPC_XRY_053_001 | v1.1

procedureMetadata

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

---

Free Ontology IMPC_XRY_054_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

---

Shape of spine IMPC_XRY_055_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, abnormal, imageOnly, unobservable,

Scoliosis IMPC_XRY_056_001 | v1.2

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: yes, no, imageOnly, unobservable,

Kyphosis IMPC_XRY_057_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: yes, no, imageOnly, unobservable,

Lordosis IMPC_XRY_058_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: yes, no, imageOnly, unobservable,

Shape of ribcage IMPC_XRY_059_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, abnormal, imageOnly, unobservable,

Transitional vertebrae IMPC_XRY_060_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: yes, no, imageOnly, unobservable,

Fusion of processes IMPC_XRY_061_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: yes, no, imageOnly, unobservable,

Polysyndactylism IMPC_XRY_062_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: yes, no, imageOnly, unobservable,

Cervical processes IMPC_XRY_063_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, abnormal, imageOnly, unobservable,

Thoracic processes IMPC_XRY_064_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, abnormal, imageOnly, unobservable,

Lumbar processes IMPC_XRY_065_001 | v1.1

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, abnormal, imageOnly, unobservable,

Sacral processes IMPC_XRY_066_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, abnormal, imageOnly, unobservable,

Caudal processes IMPC_XRY_067_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, abnormal, imageOnly, unobservable,

Missing cranial rib IMPC_XRY_068_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** false

Options: Yes, No,

Rib morphology IMPC_XRY_069_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: unobservable, abnormal, imageOnly, normal,

Cervical vertebrae morphology IMPC_XRY_070_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, unobservable, imageOnly, abnormal,

Thoracic vertebrae morphology IMPC_XRY_071_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, imageOnly, unobservable, abnormal,

Lumbar vertebrae morphology IMPC_XRY_072_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: abnormal, unobservable, imageOnly, normal,

Pelvic vertebrae morphology IMPC_XRY_073_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: normal, unobservable, imageOnly, abnormal,

Caudal vertebrae morphology IMPC_XRY_074_001 | v1.0

simpleParameter

Req. Analysis: false **Req. Upload:** false **Is Annotated:** true

Options: imageOnly, normal, abnormal, unobservable,