Challenge Whole Body Plethysmography IM PC_CHL_001

Purpose

The purpose of this procedure is to record the respiratory function of mice, when submitted to methacholine or hypoxia challenge. Other similar protocols, for allergen sensitization and for LPS challenges, will also be available.

Ontological description: MP:0002327 - abnormal respiratory function

Experimental Design

- **Minimum number of animals :** 4M + 4F
- **Age at test:** Week 13

Equipment

1. Scale/balance
2. Flow chambers
3. Plethysmographs
4. Nebulizers
5. Computer connected to flow chamber
6. Challenge reagents
7. Personal safety equipment (masks, gloves, etc.)

Procedure

1. Before starting, make sure the chambers are calibrated
2. Weigh the mouse and transfer to test room
3. Turn on amplifier, nebulizer and computer
4. Place the mouse in the chamber
5. Methacholine challenge:
    1. Nebulize with PBS for 2 minutes
    2. Measure response to PBS for 5 minutes
    3. Nebulize with 12.5mg/ml MCh for 2 minutes
    4. Measure response to 12.5mg/ml for 5 minutes
    5. Nebulize with 25mg/ml MCh for 2 minutes
    6. Measure response to 25mg/ml for 5 minutes
    7. Nebulize with 50mg/ml MCh for 2 minutes
    8. Measure response to 50mg/ml MCh for 5 minutes

6. Additional optional hypoxia challenge:
    1. Measure response unchallenged for 5 minutes
    2. Measure response baseline for 5 minutes
    3. Measure response to challenge with 10% O2 for 5 minutes
    4. Measure response to challenge with 21% O2 for 5 minutes
7. Remove the mouse from its chamber and place back in the home cage.

Notes

If any animal is manifesting difficulties at any stage of the procedure, regardless of the test, it should be removed from the nebulizing chamber and allowed to recover. It should not go through the rest of the test nor re-tested.

Aerosolized methacholine leads to bronchoconstriction; Asthmatic patients should not handle this substance nor be present in the room where the challenge takes place due to high risk of asthma attack and health hazard.

Parameters and Metadata

Body weight IMPC_CHL_001_001 | v1.1

simpleParameter

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

Unit Measured: g

Frequency of breathing (f) IMPC_CHL_002_001 | v1.5

seriesParameter

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

Unit Measured: bpm

Increments: Minimum 1

Tidal volume (TVb) IMPC_CHL_003_001 | v1.2

seriesParameter

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

Unit Measured: ml

Increments: Minimum 1

Minute volume (MVb) IMPC_CHL_004_001 | v1.2

seriesParameter

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

Unit Measured: ml/min

Increments: Minimum 1

Peak expiratory flow (PEFb) IMPC_CHL_005_001 | v1.2

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

Peak inspiratory flow (PIFb) IMPC_CHL_006_001 | v1.2

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

Pause (PAU) IMPC_CHL_007_001 | v1.2

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Inspiratory time (Ti) IMPC_CHL_008_001 | v1.2

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Expiratory time (Te) IMPC_CHL_009_001 | v1.3

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Relaxation time (Tr) IMPC_CHL_010_001 | v1.2

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Time of pause (Tp) IMPC_CHL_011_001 | v1.3

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Enhanced pause (Penh) IMPC_CHL_012_001 | v1.2

seriesParameter

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

Increments: Minimum 1

Rejection index (Rinx) IMPC_CHL_013_001 | v1.2

seriesParameter

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

Increments: Minimum 1

Rpef IMPC_CHL_014_001 | v1.2

seriesParameter

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

Increments: Minimum 1

TB IMPC_CHL_015_001 | v1.2

seriesParameter

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

Unit Measured: %

Increments: Minimum 1

Compensation (Comp) IMPC_CHL_016_001 | v1.2

seriesParameter

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

Increments: Minimum 1

Flow at point 50% TV expired (EF50) IMPC_CHL_017_001 | v1.2

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

Equipment ID IMPC_CHL_018_001 | v1.0

procedureMetadata

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

---

Experimenter ID IMPC_CHL_019_001 | v1.0

procedureMetadata

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

---

Equipment manufacturer IMPC_CHL_020_001 | v1.1

procedureMetadata

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

Options: Buxco,

Equipment model IMPC_CHL_021_001 | v1.1

procedureMetadata

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

---

Date equipment last calibrated IMPC_CHL_022_001 | v1.2

procedureMetadata

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

---

Chamber temperature (Tc) IMPC_CHL_026_001 | v1.1

procedureMetadata

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

Unit Measured: C

Relative Humidity (RH) IMPC_CHL_027_001 | v1.0

procedureMetadata

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

Unit Measured: %

Hypoxia challenge data present in submission IMPC_CHL_029_001 | v1.1

procedureMetadata

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

---

Methacholine challenge: duration of PBS measurement period IMPC_CHL_023_001 | v1.0

procedureMetadata

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

Unit Measured: min

Description: Length in minutes of the period for measuring reaction to PBS.

Methacholine challenge: duration of 12.5 mg/ml MCh measurement period IMPC_CHL_024_001 | v1.2

procedureMetadata

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

Unit Measured: min

Description: Length in minutes of the period for measuring reaction to 12.5mg/ml MCh.

Methacholine challenge: duration of 25 mg/ml MCh measurement period IMPC_CHL_025_001 | v1.1

procedureMetadata

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

Unit Measured: min

Description: Length in minutes of the period for measuring reaction to 25mg/ml MCh.

Methacholine challenge: duration of 50 mg/ml MCh measurement period IMPC_CHL_030_001 | v1.3

procedureMetadata

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

Unit Measured: min

Description: Length in minutes of the period for measuring reaction to 50mg/ml MCh.

Methacholine challenge: start of PBS measurement timestamp IMPC_CHL_031_001 | v1.1

procedureMetadata

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

Methacholine challenge: end of PBS measurement timestamp IMPC_CHL_032_001 | v1.1

procedureMetadata

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

Methacholine challenge: start of 12.5 mg/ml MCh measurement timestamp IMPC_CHL_033_001 | v1.2

procedureMetadata

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

---

Methacholine challenge: end of 12.5 mg/ml MCh measurement timestamp IMPC_CHL_034_001 | v1.2

procedureMetadata

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

---

Methacholine challenge: start of 25 mg/ml MCh measurement timestamp IMPC_CHL_035_001 | v1.3

procedureMetadata

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

---

Methacholine challenge: end of 25 mg/ml MCh measurement timestamp IMPC_CHL_036_001 | v1.2

procedureMetadata

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

---

Methacholine challenge: start of 50 mg/ml MCh measurement timestamp IMPC_CHL_037_001 | v1.2

procedureMetadata

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

---

Methacholine challenge: end of 50 mg/ml MCh measurement timestamp IMPC_CHL_038_001 | v1.2

procedureMetadata

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

---

Hypoxia challenge: duration of Unchallenged measurement period IMPC_CHL_028_001 | v1.1

procedureMetadata

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

Unit Measured: min

Hypoxia challenge: start of Unchallenged measurement timestamp IMPC_CHL_039_001 | v1.2

procedureMetadata

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

---

Hypoxia challenge: end of Unchallenged measurement timestamp IMPC_CHL_040_001 | v1.1

procedureMetadata

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

---

Hypoxia challenge: duration of 10% O2 measurement period IMPC_CHL_041_001 | v1.0

procedureMetadata

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

Unit Measured: min

Hypoxia challenge: start of 10% O2 measurement timestamp IMPC_CHL_042_001 | v1.1

procedureMetadata

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

---

Hypoxia challenge: end of 10% O2 measurement timestamp IMPC_CHL_043_001 | v1.1

procedureMetadata

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

---

Hypoxia challenge: duration of 21% O2 measurement period IMPC_CHL_044_001 | v1.0

procedureMetadata

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

Unit Measured: min

Hypoxia challenge: start of 21% O2 measurement timestamp IMPC_CHL_045_001 | v1.1

procedureMetadata

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

---

Hypoxia challenge: end of 21% O2 measurement timestamp IMPC_CHL_046_001 | v1.1

procedureMetadata

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

Hypoxia challenge: duration of Baseline measurement period IMPC_CHL_047_001 | v1.0

procedureMetadata

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

Unit Measured: min

Hypoxia challenge: start of Baseline measurement timestamp IMPC_CHL_048_001 | v1.1

procedureMetadata

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

---

Hypoxia challenge: end of Baseline measurement timestamp IMPC_CHL_049_001 | v1.1

procedureMetadata

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

---