Challenge Whole Body Plethysmography

MPC_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:** true

*Unit Measured: bpm*

*Increments: Minimum 1*

**Tidal volume (TVb)** IMPC_CHL_003_001 | v1.2

*seriesParameter*
Unit Measured: ml
Increments: Minimum 1

**Minute volume (MVb)** IMPC_CHL_004_001 | v1.2

Unit Measured: ml/min
Increments: Minimum 1

**Peak expiratory flow (PEFb)** IMPC_CHL_005_001 | v1.2

Unit Measured: ml/s
Increments: Minimum 1

**Peak inspiratory flow (PIFb)** IMPC_CHL_006_001 | v1.2
Unit Measured: ml/s
Increments: Minimum 1

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**Pause (PAU)** IMPC_CHL_007_001 | v1.2

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

Unit Measured: s
Increments: Minimum 1

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**Inspiratory time (Ti)** IMPC_CHL_008_001 | v1.2

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

Unit Measured: s
Increments: Minimum 1

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**Expiratory time (Te)** IMPC_CHL_009_001 | v1.3

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

Unit Measured: s
Increments: Minimum 1

**Relaxation time (Tr) IMPC_CHL_010_001 | v1.2**

SeriesParameter


Unit Measured: s

Increments: Minimum 1

**Time of pause (Tp) IMPC_CHL_011_001 | v1.3**

SeriesParameter


Unit Measured: s

Increments: Minimum 1

**Enhanced pause (Penh) IMPC_CHL_012_001 | v1.2**

SeriesParameter


Increments: Minimum 1
Rejection index (Rinx)  IMPC_CHL_013_001 | v1.2
seriesParameter


Increments: Minimum 1

Rpef IMPC_CHL_014_001 | v1.2
seriesParameter


Increments: Minimum 1

TB IMPC_CHL_015_001 | v1.2
seriesParameter


Unit Measured: %

Increments: Minimum 1

Compensation (Comp) IMPC_CHL_016_001 | v1.2
seriesParameter
Flow at point 50% TV expired (EF50) IMPC_CHL_017_001 | v1.2

**Series Parameter**

- **Unit Measured:** ml/s
- **Increments:** Minimum 1

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**Equipment ID** IMPC_CHL_018_001 | v1.0

**Procedure Metadata**

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

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**Experimenter ID** IMPC_CHL_019_001 | v1.0

**Procedure Metadata**

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

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**Equipment manufacturer** IMPC_CHL_020_001 | v1.1
**Equipment model**  IMPC_CHL_021_001 | v1.1

**Date equipment last calibrated**  IMPC_CHL_022_001 | v1.2

**Chamber temperature (Tc)**  IMPC_CHL_026_001 | v1.1

**Relative Humidity (RH)**  IMPC_CHL_027_001 | v1.0

Unit Measured: C
Hypoxia challenge data present in submission IMPC_CHL_0
29_001 | v1.1

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

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


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


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

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

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

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

Methacholine challenge: start of 25 mg/ml MCh measurement timestamp  IMPC_CHL_035_001 | v1.3
Methacholine challenge: end of 25 mg/ml MCh measurement timestamp IMPC_CHL_036_001 | v1.2

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

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

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

Hypoxia challenge: start of Unchallenged measurement

**timestamp** IMPC_CHL_039_001 | v1.2

**procedureMetadata**


Hypoxia challenge: end of Unchallenged measurement

**timestamp** IMPC_CHL_040_001 | v1.1

**procedureMetadata**


Hypoxia challenge: duration of 10% O2 measurement

**period** IMPC_CHL_041_001 | v1.0

**procedureMetadata**


Unit Measured: min

Hypoxia challenge: start of 10% O2 measurement

**timestamp** IMPC_CHL_042_001 | v1.1

**procedureMetadata**
Hypoxia challenge: end of 10% O2 measurement

**timestamp** IMPC_CHL_043_001 | v1.1

procedureMetadata

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Hypoxia challenge: duration of 21% O2 measurement

**period** IMPC_CHL_044_001 | v1.0

procedureMetadata

**Unit Measured:** min

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Hypoxia challenge: start of 21% O2 measurement

**timestamp** IMPC_CHL_045_001 | v1.1

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

procedureMetadata


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

procedureMetadata

Unit Measured: min

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

procedureMetadata


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

procedureMetadata
