Challenge Whole Body Plethysmography TCP_CHL_002

Purpose

The purpose of this procedure is to record the respiratory function of mice after sensitization with an inert allergen (ovalbumin; OVA) in response to challenge with a non-allergen airway agonist (Methacholine; MCh) using unrestrained whole-body plethysmography and assess the ability of the immune system to mount an acquired Type I allergic hypersensitivity immune response (allergic airway disease).

Experimental Design

- **Minimum number of animals :** 6M + 6F
- **Age at test:** Week 11
- **Sex:** We would expect the results of this test to show sexual dimorphism

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

Sensitization:

- Day 0: administrate OVA (20 µg) + Alum (2mg) ip
- Day 7: administrate OVA (20 µg) + Alum (2mg) ip
- Day 14: administrate aerosol 2.5% OVA (40min/day)
- Day 15/16: administrate aerosol 2.5% OVA (40min/day)
- Day 17/18: administrate aerosol 2.5% OVA (40min/day)
- Day 20: administrate aerosol 2.5% OVA (40min/day)

On the day of the Whole Body Plethysmography procedure:

1. Transfer the cohort to be tested to the test room.
2. Weigh each mouse in the cohort and record weight.

3. Turn on amplifier, nebulizer and computer, and calibrate the equipment.
4. Place each mouse in the cohort in an individual plethysmograph chamber and acclimatize for 30 minutes.
5. Methacholine (MCh) challenge:
    - Measure and record baseline data for 5 minutes
    - Nebulize with PBS for 2 minutes
    - Measure and record response to PBS for 5 minutes
    - Nebulize with 12.5mg/ml MCh for 2 minutes
    - Measure and record response to 12.5mg/ml for 5 minutes
    - Nebulize with 25mg/ml MCh for 2 minutes
    - Measure and record response to 25mg/ml for 5 minutes
    - Nebulize with 50mg/ml MCh for 2 minutes
    - Measure and record response to 50mg/ml MCh for 5 minutes
6. Remove each mouse from its chamber and place back in the home cage.
7. Sacrifice the mouse and collect samples:
    - Whole blood by cardiac punture to prepare for serum analysis of IgE and IgG
    - Bronchoalveolar lavage (BAL) fluid into 1.5ml eppendorf tube for analysis of inflammatory cells and cytokines
    - Whole lung tissue immersion fixation in 10% NBF for histopathology

Parameters and Metadata

Body weight TCP_CHL_001_001 | v1.2

simpleParameter

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

Unit Measured: g

Frequency of breathing (f) TCP_CHL_002_001 | v1.1

seriesParameter

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

Unit Measured: bpm

Increments: Minimum 1

Tidal volume (TV) TCP_CHL_003_001 | v1.1

seriesParameter

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

Unit Measured: ml

Increments: Minimum 1

Minute volume (MV) TCP_CHL_004_001 | v1.1

seriesParameter

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

Unit Measured: ml/min

Increments: Minimum 1

Peak expiratory flow (PEF) TCP_CHL_005_001 | v1.1

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

Peak inspiratory flow (PIF) TCP_CHL_006_001 | v1.1

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

Pause (PAU) TCP_CHL_007_001 | v1.1

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Inspiratory time (Ti) TCP_CHL_008_001 | v1.2

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Expiratory time (Te) TCP_CHL_009_001 | v1.1

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

Relaxation time (RT) TCP_CHL_010_001 | v1.1

seriesParameter

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

Unit Measured: s

Increments: Minimum 1

End-inspiratory pause (EIP) TCP_CHL_011_001 | v1.2

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

End-expiratory pause (EEP) TCP_CHL_012_001 | v1.2

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

Enhanced pause (Penh) TCP_CHL_013_001 | v1.1

seriesParameter

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

Unit Measured: ratio

Increments: Minimum 1

Rejection index (Rin) TCP_CHL_014_001 | v1.1

seriesParameter

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

Increments: Minimum 1

Rpef TCP_CHL_015_001 | v1.1

seriesParameter

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

Increments: Minimum 1

Delta Insp and Exp volume (dV) TCP_CHL_016_001 | v1.2

seriesParameter

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

Unit Measured: ml

Increments: Minimum 1

Flow at point 50% TV expired (EF50) TCP_CHL_017_001 | v1.1

seriesParameter

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

Unit Measured: ml/s

Increments: Minimum 1

Equipment ID TCP_CHL_018_001 | v1.0

procedureMetadata

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

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Experimenter ID TCP_CHL_019_001 | v1.0

procedureMetadata

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

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Equipment manufacturer TCP_CHL_020_001 | v1.0

procedureMetadata

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

Options: Buxco,

Equipment model TCP_CHL_021_001 | v1.0

procedureMetadata

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

Options: Aerosol Delivery System AUT 5110, Plethysmograph PLY3211, FP WBP Unite,

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Software for analysis TCP_CHL_022_001 | v1.0

procedureMetadata

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

Options: BioSystem XA for Windows v2.9.4, FinePointe Software Research Suite v2.3.1.9,

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Analysis Algorithm TCP_CHL_023_001 | v1.0

procedureMetadata

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

Options: Epstein,

Date equipment last calibrated TCP_CHL_024_001 | v1.1

procedureMetadata

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

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Type of restraint TCP_CHL_025_001 | v1.0

procedureMetadata

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

Options: Unrestrained,

Duration of measurement of response to PBS TCP_CHL_026_001 | v1.2

procedureMetadata

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

Unit Measured: min

Start of measurement of response to PBS timestamp TCP_CHL_027_001 | v1.1

procedureMetadata

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

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End of measurement of response to PBS timestamp TCP_CHL_028_001 | v1.1

procedureMetadata

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

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Duration of 12.5 mg/ml MCh measurement TCP_CHL_029_001 | v1.1

procedureMetadata

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

Unit Measured: min

Start of 12.5 mg/ml MCh measurement timestamp TCP_CHL_030_001 | v1.0

procedureMetadata

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

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End of 12.5 mg/ml MCh measurement timestamp TCP_CHL_031_001 | v1.0

procedureMetadata

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

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Duration of 25 mg/ml MCh measurement TCP_CHL_032_001 | v1.3

procedureMetadata

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

Unit Measured: min

Start of 25 mg/ml MCh measurement timestamp TCP_CHL_033_001 | v1.1

procedureMetadata

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

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End of 25 mg/ml MCh measurement timestamp TCP_CHL_034_001 | v1.1

procedureMetadata

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

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Duration of 50 mg/ml MCh measurement TCP_CHL_035_001 | v1.1

procedureMetadata

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

Unit Measured: min

Start of 50 mg/ml MCh measurement timestamp TCP_CHL_036_001 | v1.0

procedureMetadata

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

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End of 50 mg/ml MCh measurement timestamp TCP_CHL_037_001 | v1.0

procedureMetadata

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

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Methacholine challenge: duration of baseline measurement period TCP_CHL_038_001 | v1.0

procedureMetadata

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

Unit Measured: min

Methacholine challenge: start of baseline measurement timestamp TCP_CHL_039_001 | v1.0

procedureMetadata

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

Methacholine challenge: end of baseline measurement timestamp TCP_CHL_040_001 | v1.0

procedureMetadata

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

TB (duration of breaking) TCP_CHL_041_001 | v1.0

seriesParameter

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

Unit Measured: %

Increments: Minimum 1

TP (duration of pause) TCP_CHL_042_001 | v1.0

seriesParameter

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

Unit Measured: %

Increments: Minimum 1