# 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:** Unrestricted
- **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

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### Frequency of breathing (f) TCP_CHL_002_001 | v1.1

seriesParameter

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

**Unit Measured:** bpm

**Increments:** Minimum 1

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## Tidal volume (TV) TCP_CHL_003_001 | v1.1

seriesParameter

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

**Unit Measured:** ml

**Increments:** Minimum 1

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## Minute volume (MV) TCP_CHL_004_001 | v1.1

seriesParameter

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

**Unit Measured:** ml/min

**Increments:** Minimum 1

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## 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

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## Peak inspiratory flow (PIF) TCP_CHL_006_001 | v1.1

seriesParameter

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

**Unit Measured:** ml/s

**Increments:** Minimum 1

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## Pause (PAU) TCP_CHL_007_001 | v1.1

seriesParameter

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

**Unit Measured:** s

**Increments:** Minimum 1

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## Inspiratory time (Ti) TCP_CHL_008_001 | v1.2

seriesParameter

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

**Unit Measured:** s

**Increments:** Minimum 1

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## Expiratory time (Te) TCP_CHL_009_001 | v1.1

seriesParameter

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

**Unit Measured:** s

**Increments:** Minimum 1

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## Relaxation time (RT) TCP_CHL_010_001 | v1.1

seriesParameter

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

**Unit Measured:** s

**Increments:** Minimum 1

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

seriesParameter

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

**Unit Measured:** ml/s

**Increments:** Minimum 1

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

seriesParameter

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

**Unit Measured:** ml/s

**Increments:** Minimum 1

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## Enhanced pause (Penh) TCP_CHL_013_001 | v1.1

seriesParameter

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

**Unit Measured:** ratio

**Increments:** Minimum 1

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## Rejection index (Rin) TCP_CHL_014_001 | v1.1

seriesParameter

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

**Increments:** Minimum 1

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## Rpef TCP_CHL_015_001 | v1.1

seriesParameter

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

**Increments:** Minimum 1

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

seriesParameter

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

**Unit Measured:** ml

**Increments:** Minimum 1

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

seriesParameter

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

**Unit Measured:** ml/s

**Increments:** Minimum 1

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## 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,

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## 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,

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## 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,

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## 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

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## 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

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## 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

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## 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

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## 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