Eye Morphology IMPC_EYE_001

Purpose
To detect abnormalities in eye morphology.

Experimental Design

- **Minimum number of animals**: 7M + 7F
- **Age at test**: Week 15
- **Sex**: We do not expect the results of this test to show sexual dimorphism

Procedure

1. Examine the anterior of both eyes (e.g. with slit lamp) and record any abnormalities
2. Test the iris/pupil light response
3. Image abnormal eyes as a minimum or all eyes if capacity permits
4. Dilate both eyes
5. Examine the anterior and posterior of both dilated eyes (e.g. with slit lamp and ophthalmoscope) and record any abnormalities
6. Image abnormal eyes as a minimum or all eyes if capacity permits

OCT:

1. Turn on the OCT and start the database
2. Anaesthetize mouse
3. Prepare mouse eyes with drops and place contact lens (focal length 10 mm) on the right eye
4. Enter mouse data in the “Create new patient file” area and switch to the “Acquisition” window
5. Move the OCT camera to the right position and activate measurement modus
6. Place mouse collaterally to the OCT camera on the right side of a platform that is fixed in front of the OCT lens
7. Search the contact lens in the live picture of the fundus image field and place the pupil of the mouse eye in the centre of the window
8. Move the OCT camera such that OCT lens and contact lens touch each other
9. Focus the fundus picture by slightly moving up/down or forward/backward
10. Save fundus images
11. Set the "Ref.Arm" ruler such that the section of the retina is placed in the centre of the blue rectangle
12. Set the mode of measurement on "vertical, horizontal line"
13. Move the blue horizontal line in the fundus image field to the optic nerve level
14. Save images of retinal sections
15. Move the OCT camera to the left position
Repeat measurement procedure for the left eye

Scheimpflug Imaging:

1. Turn on the Pentacam and start the patient data management
2. Apply one drop 0.5% Atropine to each mouse eye for pupil dilation
3. Enter mouse data in the “Patient” group box and switch to the Scan menu
4. Activate the “1 Picture” modus in the “Image Options” area
5. Move Pentacam to the right position
6. Hold the mouse on a platform such that the vertical LED 475 nm light slit is orientated in the center of the right eye ball
7. Guarantee optimal focus by using the fine adjustment software tool in the adjustment window
8. Start imaging manually by pressing the “Start Scan” button
9. Scheimpflug images are saved automatically
10. Move Pentacam to the left position
11. Repeat measurement procedure for the left eye

Notes

- As a minimum, all abnormalities should be imaged.
  - Where capacity permits, all mice can be imaged
- Majority of parameters can be analysed using the standard approach for assessing categorical data. To increase power for analysis purposes, where an abnormality is detected in the left, right or both eyes, the data may be combined to generate one "abnormal" category.

Data QC

Image QC is typically performed during data collection to ensure high quality images are captured whilst eyes are dilated etc.

Parameters and Metadata

**Eye** IMPC_EYE_001_001 | v1.0

_simpleParameter_

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

**Description:** eye

**Options:** present, absent left eye, absent right eye, absent both eyes,
**Bulging eye**  IMPC_EYE_002_001 | v1.0

simpleParameter

**Description:** bulging_eye

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

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**Eye Hemorrhage or Blood Presence**  IMPC_EYE_003_001 | v1.0

simpleParameter

**Description:** eye_hemorrhage_or_blood_presence

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

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**Eyelid morphology**  IMPC_EYE_004_001 | v1.0

simpleParameter

**Description:**
Description: eyelid_morphology

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

Eyelid closure IMPC_EYE_005_001 | v1.0

Description: eyelid_closure

Options: normal, no data left eye, no data right eye, left eye closed, right eye closed, both eyes closed, no data for both eyes, no data left eye, right eye closed, no data right eye, left eye closed,

Narrow eye opening IMPC_EYE_006_001 | v1.0

Description: narrow_eye_opening

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,
Cornea  IMPC_EYE_007_001  |  v1.0

Description: cornea

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

Corneal opacity  IMPC_EYE_008_001  |  v1.0

Description: corneal_opacity

Options: absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

Corneal vascularization  IMPC_EYE_009_001  |  v1.0

Description: corneal_vascularization
Options: absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

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Iris/Pupil IMPC_EYE_010_001 | v1.0

_description: Iris/Pupil

simpleParameter


Description: iris_pupil

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

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Pupil Position IMPC_EYE_011_001 | v1.0

_description: Pupil Position

simpleParameter


Description: pupil_position

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

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Pupil Shape IMPC_EYE_012_001 | v1.0
simpleParameter

**Pupil Dilation** IMPC_EYE_013_001 | v1.0

**Description:** pupil_dilation

**Options:** normal, no data left eye, no data right eye, left eye dilated, right eye dilated, both eyes dilated, no data for both eyes, no data left eye, right eye dilated, no data right eye, left eye dilated,

simpleParameter

**Pupil Light Response** IMPC_EYE_014_001 | v1.0

**Description:** pupil_light_response
Iris Pigmentation IMPC_EYE_015_001 | v1.0

simpleParameter


Description: iris_pigmentation

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

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Lens IMPC_EYE_016_001 | v1.0

simpleParameter


Description: lens

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,
**Lens Opacity** IMPC_EYE_017_001 | v1.0

*simpleParameter*

**Description:** lens_opacity

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

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**Fusion between cornea and lens** IMPC_EYE_018_001 | v1.0

*simpleParameter*

**Description:** fusion_between_cornea_and_lens

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

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**Synechia** IMPC_EYE_019_001 | v1.0

*simpleParameter*

**Description:** synechia
Options: absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

Retina  IMPC_EYE_020_001  | v1.1

simpleParameter


Description: retina

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

Retinal Pigmentation  IMPC_EYE_021_001  | v1.1

simpleParameter


Description: retinal_pigmentation

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,
Retinal Structure  IMPC_EYE_022_001  | v1.1
simpleParameter


Description: retinal_structure

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

Optic Disc  IMPC_EYE_023_001  | v1.0
simpleParameter


Description: optic_disc

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

Retinal Blood Vessels  IMPC_EYE_024_001  | v1.0
simpleParameter


Description: retinal_blood_vessels
Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

Retinal Blood Vessels Structure IMPC_EYE_025_001 | v1.0

simpleParameter


Description: retinal_blood_vessels_structure

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

Retinal Blood Vessels Pattern IMPC_EYE_026_001 | v1.0

simpleParameter


Description: retinal_blood_vessels_pattern

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes, no data left eye, right eye abnormal, no data right eye, left eye abnormal,
Persistence of hyaloid vascular system IMPC_EYE_027_001 | v1.0

simpleParameter


Description: persistence_of_hyaloid_vascular_system

Options: absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

Slit Lamp observation IMPC_EYE_028_001 | v1.1

simpleParameter


Description: slit_lamp_observation

Ophthalmoscope Observation IMPC_EYE_029_001 | v1.1

simpleParameter


Description: ophthalmoscope_observation
Slit Lamp Equipment ID IMPC_EYE_030_001 | v1.2

**Description:** slit_lamp_equipment_id

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Slit Lamp Equipment Manufacturer IMPC_EYE_031_001 | v1.2

**Description:** slit_lamp_equipment_manufacturer

**Options:** Zeiss, Haag-Streit, MuLe, Kowa, CSO, Phoenix Research Labs, Topcon

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Slit Lamp Equipment Model IMPC_EYE_032_001 | v1.2

**Description:** slit_lamp_equipment_model

**Ophthalmoscope Equipment ID**  IMPC_EYE_033_001 | v1.2

**Description:** ophthalmoscope_equipment_id

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**Ophthalmoscope Equipment Manufacturer**  IMPC_EYE_034_001 | v1.2

**Description:** ophthalmoscope_equipment_manufacturer

**Options:** Haag-Streit, Heine, Phoenix, Kowa, Karl Storz / Nikon, Phoenix Research Labs, Heine / Volk, Keeler LTD,

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**Ophthalmoscope Equipment Model**  IMPC_EYE_035_001 | v1.2

**Description:** ophthalmoscope_equipment_model

**Options:** Sigma 150K, Omega 500 Unplugged, Micron III, Genesis-D, OMEGA 180 / Superfield NC, Xenon Nova 175W light source + HOPKINS optic 1218AA / Nikon D5100 + 85 mm f/1.8 lens, Omega 180 / 60D, SL4 4AA, Genesis, Genesis-DF,
**Experimenter ID**  IMPC_EYE_036_001 | v1.1
procedureMetadata

**Optical Coherence Tomography Equipment ID**  IMPC_EYE_037_001 | v1.1
procedureMetadata

**Optical Coherence Tomography Equipment Manufacturer**  IMPC_EYE_038_001 | v1.2
procedureMetadata

**Description:**
- experimenter_id
- optical_coherence_tomography_equipment_id
- optical_coherence_tomography_equipment_manufacturer

**Options:** Bioptigen, Heidelberg Engineering,
Optical Coherence Tomography Equipment Model  IMPC_EYE_039_001 | v1.2

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

Description: optical_coherence_tomography_equipment_model

Options: EnvisuTM R-Series SDOIS, Envisu R2200, Spectralis,

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Scheimpflug Equipment ID  IMPC_EYE_040_001 | v1.1

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

Description: scheimpflug_equipment_id

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Scheimpflug Equipment Manufacturer  IMPC_EYE_041_001 | v1.4

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

Description: scheimpflug_equipment_manufacturer

Options: Oculus GmbH,
Scheimpflug Equipment Model  IMPC_EYE_042_001  | v1.4

Description: scheimpflug_equipment_model
Options: Pentacam,

Dilation Method  IMPC_EYE_043_001  | v1.0

Description: dilation_method
Options: Atropine, Tropicamide, Tropicamide+Phenylephrin, None, Cyclopentolate hydrochloride, Phenylephrine hydrochloride, Atropine sulphate, Cyclopentolate hydrochloride+Phenylephrine hydrochloride,

Topical Anesthetic  IMPC_EYE_044_001  | v1.1

Description: topical_anesthetic
Options: Atropine, Oxybuprocain, No anesthesia, Mydriacyl, Phenylephrine hydrochloride, Hydrochloride, Atropine sulphate,

General Anesthetic  IMPC_EYE_045_001 | v1.1

ProcedureMetadata


Description: general_anesthetic

Options: Ketamine+Xylazine, No anesthesia, Isoflurane, Euthatal, Avertin, Ketamine+Medetomidine,

Date Slit Lamp equipment last calibrated  IMPC_EYE_046_001 | v1.1

ProcedureMetadata


Date Ophthalmoscope equipment last calibrated  IMPC_EYE_047_001 | v1.1

ProcedureMetadata

Date Scheimpflug equipment last calibrated  IMPC_EYE_048_001 | v1.1
procedureMetadata

Is Annotated: false


Date OCT equipment last calibrated  IMPC_EYE_049_001 | v1.1
procedureMetadata

Is Annotated: false


Images Ophthalmoscopy  IMPC_EYE_050_001 | v1.1
seriesMediaParameter

Is Annotated: false


Images Slit Lamp  IMPC_EYE_051_001 | v1.1
seriesMediaParameter

Is Annotated: false

Sheimpflug Lens description IMPC_EYE_052_001 | v1.1

simpleParameter


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Scheimpflug description IMPC_EYE_053_001 | v1.0

simpleParameter


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Min left eye lens density IMPC_EYE_054_001 | v1.2

simpleParameter

Unit Measured: %

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Max left eye lens density IMPC_EYE_055_001 | v1.1

simpleParameter

Unit Measured: %
Mean left eye lens density IMPC_EYE_056_001 | v1.1

simpleParameter


Unit Measured: %

Min right eye lens density IMPC_EYE_057_001 | v1.1

simpleParameter


Unit Measured: %

Max right eye lens density IMPC_EYE_058_001 | v1.1

simpleParameter


Unit Measured: %
Mean right eye lens density  IMPC_EYE_059_001  | v1.1

simpleParameter


Unit Measured: %

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Right corneal thickness  IMPC_EYE_060_001  | v1.2

simpleParameter


Unit Measured: um

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Right anterior chamber depth  IMPC_EYE_061_001  | v1.2

simpleParameter


Unit Measured: um

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Right total retinal thickness  IMPC_EYE_062_001  | v1.2

simpleParameter

Unit Measured: um

Right inner nuclear layer IMPC_EYE_063_001 | v1.2


Unit Measured: um

Right outer nuclear layer IMPC_EYE_064_001 | v1.2


Unit Measured: um

Right posterior chamber depth IMPC_EYE_065_001 | v1.2


Unit Measured: um
Left corneal thickness  IMPC_EYE_066_001  | v1.2

SimpleParameter


Unit Measured: um

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Left anterior chamber depth  IMPC_EYE_067_001  | v1.2

SimpleParameter


Unit Measured: um

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Left total retinal thickness  IMPC_EYE_068_001  | v1.2

SimpleParameter


Unit Measured: um

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Left inner nuclear layer  IMPC_EYE_069_001  | v1.2

SimpleParameter
Left outer nuclear layer  IMPC_EYE_070_001 | v1.2
simpleParameter

Left posterior chamber depth  IMPC_EYE_071_001 | v1.2
simpleParameter

B-scan of right retina  IMPC_EYE_072_001 | v1.1
seriesMediaParameter
**B-scan of left retina** IMPC_EYE_073_001 | v1.1

seriesMediaParameter


**VIP of right fundus** IMPC_EYE_074_001 | v1.1

seriesMediaParameter


**VIP of left fundus** IMPC_EYE_075_001 | v1.1

seriesMediaParameter


**B-scan of right cornea and lens** IMPC_EYE_076_001 | v1.1

seriesMediaParameter


**B-scan of left cornea and lens** IMPC_EYE_077_001 | v1.1
VIP of right eye  IMPC_EYE_078_001 | v1.1

VIP of left eye  IMPC_EYE_079_001 | v1.1

Corneal Sclerization  IMPC_EYE_080_001 | v1.1

Options: absent, no data left eye, no data right eye, no data for both eyes, present left eye, present right eye, present both eyes, no data left eye, present right eye, no data right eye, present left eye,
**Corneal deposits**  
IMPC_EYE_081_001 | v1.1

simpleParameter

**Options:** absent, no data left eye, no data right eye, no data for both eyes, present left eye, present right eye, present both eyes, no data left eye, present right eye, no data right eye, present left eye,

**Iris transilumination**  
IMPC_EYE_082_001 | v1.1

simpleParameter

**Options:** normal, no data left eye, no data right eye, no data for both eyes, left eye abnormal, right eye abnormal, both eyes abnormal, no data left eye, right eye abnormal, no data right eye, left eye abnormal,

**Vitreous**  
IMPC_EYE_083_001 | v1.1

simpleParameter

**Options:** normal, no data left eye, no data right eye, no data for both eyes, left eye abnormal, right eye abnormal, both eyes abnormal, no data left eye, right eye abnormal, no data right eye, left eye abnormal,
**Corneal mineralization**  IMPC_EYE_084_001  | v1.0  

**simpleParameter**

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

**Options**: absent, present left eye, present right eye, present both eyes, no data left eye, no data right eye, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

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**Corneal ulcer**  IMPC_EYE_085_001  | v1.0  

**simpleParameter**

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

**Options**: absent, present left eye, present right eye, present both eyes, no data left eye, no data right eye, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,

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**Lacrimation**  IMPC_EYE_086_001  | v1.0  

**simpleParameter**

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

**Options**: absent, present left eye, present right eye, present both eyes, no data left eye, no data right eye, no data for both eyes, no data left eye, present right eye, no data right eye, present left eye,
**Right vitreous humor thickness** IMPC_EYE_087_001 | v1.0

simpleParameter

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

Unit Measured: nm

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**Left vitreous humour thickness** IMPC_EYE_088_001 | v1.0

simpleParameter

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

Unit Measured: nm

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**Ophthalmoscope Lens Model** IMPC_EYE_089_001 | v1.1

procedureMetadata

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

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**Right eye diameter** IMPC_EYE_090_001 | v1.0

simpleParameter

Req. Analysis: false  
Req. Upload: false  
Is Annotated: true
Unit Measured: mm

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**Left eye diameter** IMPC_EYE_091_001 | v1.0

`simpleParameter`


Unit Measured: mm

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**Retina (combined)** IMPC_EYE_092_001 | v1.0

`simpleParameter`


Derivation:
retinaCombined('IMPC_EYE_020_001', 'IMPC_EYE_021_001', 'IMPC_EYE_022_001')