**Eye Morphology IMPC_EYE_003**

**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
16. 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


Description: eye

Options: present, absent left eye, absent right eye, absent both eyes,

**Bulging eye** IMPC_EYE_002_001 | v1.0

simpleParameter
**Bulging eye**

*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

*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

*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

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**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,

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**Corneal vascularization** IMPC_EYE_009_001 | v1.0

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**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

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**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,
**Pupil Dilation**

**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,

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

**Description:** pupil_light_response

**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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**Iris Pigmentation** IMPC_EYE_015_001 | v1.0

**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,
**Lens**  IMPC_EYE_016_001 | v1.0

**simpleParameter**

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

**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,

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**Lens Opacity**  IMPC_EYE_017_001 | v1.0

**simpleParameter**

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

**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**

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

**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,
**Synechia** IMPC_EYE_019_001  | v1.0  

*simpleParameter*

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

**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,

**Optic Disc** IMPC_EYE_023_001  | v1.0  

*simpleParameter*

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

**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*

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

**Description:** retinal_blood_vessels
Retinal Blood Vessels Structure IMPC_EYE_025_001 | v1.0

**simpleParameter**

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

**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**

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

**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

procedureMetadata

**Description:**

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

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**Slit Lamp Equipment Manufacturer** IMPC_EYE_031_001 | v1.2

*procedureMetadata*

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

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

*procedureMetadata*

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

Description: slit_lamp_equipment_model


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

*procedureMetadata*

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

Description: ophthalmoscope_equipment_id
Ophthalmoscope Equipment Manufacturer IMPC_EYE_034_0

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

**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

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

**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, Micron IV,

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Experimenter ID IMPC_EYE_036_001 | v1.1

**Req. Analysis:** false  **Req. Upload:** true  **Is Annotated:** false
**Optical Coherence Tomography Equipment ID** IMPC_EYE_038_001 | v1.2

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

**Optical Coherence Tomography Equipment Model** IMPC_EYE_039_001 | v1.2
**Scheimpflug Equipment ID** IMPC_EYE_040_001 | v1.1

*procedureMetadata*

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

**Description**: scheimpflug_equipment_id

**Scheimpflug Equipment Manufacturer** IMPC_EYE_041_001 | v1.4

*procedureMetadata*

- **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

*procedureMetadata*

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

**Description**: scheimpflug_equipment_model

**Options**: Pentacam,
**Dilation Method**  IMPC_EYE_043_001 | v1.0

**procedureMetadata**

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

**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

**procedureMetadata**

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

**Description:** topical_anesthetic

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

**General Anesthetic**  IMPC_EYE_045_001 | v1.1

**procedureMetadata**

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

**Description:** general_anesthetic

**Options:** Ketamine+Xylazine, No anesthesia, Isoflurane, Euthatal, Avertin, Ketamine+Medetomidine, Zoletil,
Date Slit Lamp equipment last calibrated IMPC_EYE_046_001 | v1.1

Date Ophthalmoscope equipment last calibrated IMPC_EYE_047_001 | v1.1

Date Scheimpflug equipment last calibrated IMPC_EYE_048_001 | v1.1

Date OCT equipment last calibrated IMPC_EYE_049_001 | v1.1
Images Ophthalmoscopy IMPC_EYE_050_001 | v1.1
seriesMediaParameter


Images Slit Lamp IMPC_EYE_051_001 | v1.1
seriesMediaParameter


Sheimpflug Lens description IMPC_EYE_052_001 | v1.1
simpleParameter


Scheimpflug description IMPC_EYE_053_001 | v1.0
simpleParameter


Min left eye lens density IMPC_EYE_054_001 | v1.2
simpleParameter
Max left eye lens density IMPC_EYE_055_001 | v1.1
simpleParameter

Mean left eye lens density IMPC_EYE_056_001 | v1.1
simpleParameter

Min right eye lens density IMPC_EYE_057_001 | v1.1
simpleParameter
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: %

Right corneal thickness IMPC_EYE_060_001 | v1.2
simpleParameter


Unit Measured: um

Right anterior chamber depth IMPC_EYE_061_001 | v1.2
simpleParameter

**Right total retinal thickness** IMPC_EYE_062_001 | v1.2

*simpleParameter*

**Right inner nuclear layer** IMPC_EYE_063_001 | v1.2

*simpleParameter*

**Right outer nuclear layer** IMPC_EYE_064_001 | v1.2

*simpleParameter*
Right posterior chamber depth IMPC_EYE_065_001 | v1.2

simpleParameter


Unit Measured: um

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Left corneal thickness IMPC_EYE_066_001 | v1.2

simpleParameter


Unit Measured: um

-----------------------------------------------

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
Left inner nuclear layer  IMPC_EYE_069_001 | v1.2

simpleParameter


Unit Measured: um

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Left outer nuclear layer  IMPC_EYE_070_001 | v1.2

simpleParameter


Unit Measured: um

---------------------------------------------------------------

Left posterior chamber depth  IMPC_EYE_071_001 | v1.2

simpleParameter


Unit Measured: um

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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

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**VIP of right eye** IMPC_EYE_078_001 | v1.1

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**VIP of left eye** IMPC_EYE_079_001 | v1.1

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**Corneal Sclerization** IMPC_EYE_080_001 | v1.1

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**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
Corneal ulcer IMPC_EYE_085_001 | v1.0

Lacrimation IMPC_EYE_086_001 | v1.0

Right vitreous humor thickness IMPC_EYE_087_001 | v1.0
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<tr>
<th>Requirement Information</th>
<th>Measurements</th>
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<tbody>
<tr>
<td><strong>Left vitreous humour thickness</strong></td>
<td>IMPC_EYE_088_001</td>
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<td><em>Simple Parameter</em></td>
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<td>Unit Measured: um</td>
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<td><strong>Ophthalmoscope Lens Model</strong></td>
<td>IMPC_EYE_089_001</td>
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<td><em>Procedure Metadata</em></td>
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<td><strong>Right eye diameter</strong></td>
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<td><em>Simple Parameter</em></td>
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<tr>
<td><strong>Left eye diameter</strong></td>
<td>IMPC_EYE_091_001</td>
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**Retina (combined)**  IMPC_EYE_092_002 | v2.0

**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,