SANGER INSTITUTE
STANDARD OPERATING PROCEDURE

SUBJECT: Grip Strength – V1

SOP Number: SOP0062	To be reviewed:	
Author(s):	Signed:	Date:
Editor:	Signed:	Date:
Risk Assessor:	Signed:	Date:
Date of Implementation:		

INTRODUCTION:

The purpose of this procedure is to measure the strength of the forelimbs, and a combination of the fore- and hindlimbs in mice.

ABBREVIATIONS:

DCF = Data Capture Form
IVC = Individually Ventilated Cage
LAA = Laboratory Animal Allergens
NaMPA = Neurological and Morphological Phenotypic Assessment
NACWO = Named Animal Care and Welfare Officer
PAF = Project Authorisation Form
PIL = Procedure Individual Licence
PPE = Personal Protective Equipment
PPL = Procedure Project Licence
QC = Quality Control
RA = Risk Assessment
RSF = Research Support Facility
SMP = Sick Mouse Procedure
SOP = Standard Operating Procedure
SLT = Senior Leadership Team

QUALITY CONTROL (QC) DURING PROCEDURE:

Refer to the table below for approved QC fail comments steps to be used during procedures.
If a value has been collected leave on the Data Capture Form (DCF) and then apply the fail reason from below;

In-Life Procedures:

Problem / Issue	QC fail reason
At any point during the procedure the mouse is deemed sick and processed through Sick Mouse Procedure (SMP)	Fail whole DCF as 'Sick mouse' – for all tests that day

Mouse incorrectly scheduled at wrong week	Fail whole DCF as 'Scheduling Issue'
Insufficient anaesthesia level affects the whole test DCF	Fail whole DCF as 'Anaesthesia Issue'
Insufficient anaesthesia level affects specific parameter(s)	Fail parameter(s) as 'Anaesthesia issue'
A welfare issue makes it impossible to collect specific parameters	Fail parameter(s) as 'Welfare issue'
Parameters affected by delays or noise due to fire alarms	Fail parameter(s) as 'Fire alarm'
An equipment failure affecting specific parameters	Fail parameter(s) as 'Equipment failure'
A software issue affecting specific parameters	Fail parameter(s) as 'Software failure'
A procedural error which affects data collection	Fail parameter(s) as 'Manual error'
Parameter cannot be assessed	Fail parameter(s) as 'Readout not possible'
Wrong value has been entered which cannot be re-measured or accounted for	Fail parameter(s) as 'Erroneous data'
Glucose meter unable to record high blood values	Fail parameter(s) as 'Meter reading HI'
Fighting occurs prior to or during data collection	Fail parameter(s) as 'Fighting during procedure'
Parameter on the current DCF is not required for that specific test/pipeline	Fail parameter(s) as 'Not required'

HEALTH & SAFETY:

This procedure is covered by the following Risk Assessment (RA):
Name: WTSI-1200
Assessment Title: Basic Mouse Procedures
Assessor:
Approver:

- Appropriate Personal Protective Equipment (PPE) is to be worn at all times when handling animals. This includes:
  - Overshoes
  - Gown
  - Gloves
- In addition to the above, when sources for Laboratory Animal Allergens (LAA) i.e. animals or soiled cages, are not contained within Local Exhaust Ventilation Systems (change stations, fume hoods or downflow tables), a respiratory mask, for which you have passed a face fit test, must be worn.
- Lone worker alarms should be used when working alone.
- This procedure can only be performed during Research Support Facility (RSF) core hours (7:30am-7:30pm).
- All electrical equipment is to be inspected for damage before use.

RESPONSIBILITIES:

All staff performing this procedure are responsible for ensuring that this Standard Operating Procedure (SOP) and accompanying RA have been read, understood and where applicable is followed in accordance with the relevant Procedure Project

Licence (PPL). All staff should be trained and competent to perform the procedure, where applicable they should also be licensed to perform the procedure with a valid Procedure Individual Licence (PIL).

For secondary phenotyping, seek confirmation with project manager for deviations from this SOP. Any deviation will be detailed in the Project Authorisation Form (PAF).

RESOURCES:

Equipment:
1. Balance
2. Tecniplast interactive cage change station
3. 70% Ethanol **Hazardous substance: highly flammable**
4. Hydrex Pink **Hazardous substance: highly flammable**
5. Hydrex Hard Surface Spray **Hazardous substance: highly flammable**
6. Paper towels
7. Tecniplast mobile Individually Ventilated Cage (IVC) rack
8. Transport Rack
9. 1x Clean cage for each cage to be tested (as defined by pipeline)
10. Nestlets
11. Diet (as defined by pipeline)
12. Grip strength meter *(Bioseb, model BIO-GT3+MR)*
13. Custom built coated 'shiny' grid with horizontal bars only
14. Triangular bar
15. 40g and 100g hooked weights

Associated SOPs/Documentation:
- **EQ18** - Use of Interactive Change Station
- **SOP0045** - Weigh Mice
- **SOP0044** – Hair Analysis
- **SOP0063** – Modified SHIRPA
- **SOP0088** - Neurological and Morphological Phenotypic Assessment (NaMPA)
- **SOP0101** - Taking and returning cages for procedure
- 1) Equipment QC tool.xls

Staff: This procedure requires one phenotyper.

NOTE:

This procedure was performed on various pipelines and could have been performed in conjunction with the Neurological and Morphological Phenotypic Assessment (NaMPA) procedure, Mod-SHIRPA or Mod-SHIRPA & Hair Analysis depending on which primary phenotyping pipeline it was a part of.

Whether or not cages were cleaned during this assay was pipeline dependant with there being no cleans on Pipeline 2, but a clean with all other pipelines. The diet the mice were on was also pipeline dependant.

Do not pull on the grid in an attempt to move or tighten the grid while the grip strength meter is turned on. Doing so could cause damage. If the grid becomes loose, turn the meter off before tightening.

If at any point during the procedure blood is noticed or a nail becomes dislodged, terminate the procedure immediately, add an appropriate health observation and place a welfare card on the cage. QC fail the remaining measurements.

PROCEDURE:

Before performing any tests verify this is the correct set of procedures at this time point in the pipeline or project, by consulting the cage card(s).

1. Collect scheduled mice from the animal room, transport them to the procedure room and register them onto the correct rack (refer to SOP0101 - Taking and returning cages for procedure).

2. Place 'Phenotyping in progress' sign on the outside of the door.

3. Prepare change station for use (refer to EQ18 - Use of Interactive Change Station).

4. Prepare the balance for use in the change station; ensure the balance is connected to the computer (refer to SOP0045 - Weigh Mice).

5. Prepare the Grip Strength meter for use in the change station:
   5.1. Turn on the meter
   5.2. Follow the on screen instructions from the AUTOTEST screen (if applicable)
   5.3. Set the correct unit of measurement; grams by pressing UNIT until '2548g' is displayed.
   5.4. Ensure the grid is securely attached before cleaning it with 70% Ethanol or Hydrex Hard Surface Spray.

6. Open the Equipment QC tool document to see if the grip strength meter QC is required. If required:
   6.1. Turn off the meter and attach the triangular bar.
   6.2. Place the meter vertically on a flat surface making sure that there is nothing in contact with the bar or the spigot.
   6.3. Zero the meter and, without adding additional force, hang the 40g hooked weight from the bar, record the maximum value (not the live reading (VLI)), repeat 2 more times.
   6.4. Zero the meter and repeat with the 100g weight.
   6.5. When all weights have been entered into the spreadsheet, check that the QC has been passed. If so, turn off the meter to re-attach the grid, then turn on (see steps 5.1-5.4) and continue with the test.
   6.6. If the QC is failed, do not proceed and contact the phenotyper responsible for the test or Senior Leadership Team (SLT).

7. Whilst wearing the correct PPE and <mark>in the change station</mark>, identify the mouse to be tested by earmark and briefly check all four paws to ensure all nails are intact.

8. Hold the mouse at the base of the tail and support on the back of your hand.

9. **Forepaw Measurement:**
   9.1. Lower the mouse towards the grid unsupported and allow it to grip the grid with its front paws only. This is achieved when tension is felt. If this is not felt

immediately lift the mouse slightly and lower back towards the grid again until tension is felt.

9.2. Keeping the mouse torso **horizontal** (this will prevent the mouse from being able to grab the grid with its hind paws), pull back gently and slowly until the grip is released.

9.3. As the mouse releases its grip, lift the mouse up and away, so it is not dragged down the grid.

9.4. Press the TDX button on the meter to send the result to the DCF.

9.5. Zero the meter and repeat steps 9.1-9.4 as required according to the DCF. As little time as possible should be left between readings.

9.6. If at any point the mouse is unable to grip the grid, record the value the meter displays for that parameter and write an appropriate comment (i.e. *Mouse unable to grip grid*) in the DCF.

10. **All Paw Measurement:**

   10.1. Lower the mouse towards the grid unsupported and allow it to grip the grid with both its front and hind paws. This is achieved when tension is felt. If this is not felt immediately lift the mouse slightly and lower towards the grid again until tension is felt.

   10.2. Keeping the mouse torso **parallel to the grid**, (this will ensure equal pressure is exerted on each paw), pull back gently and slowly until the grip is released.

   10.3. As the mouse releases its grip, lift the mouse up and away, so it is not dragged down the grid.

   10.4. Press the TDX button on the meter to send the result to the DCF.

   10.5. Zero the meter and repeat steps 10.1-10.4 as required according to the DCF. As little time as possible should be left between readings.

   10.6. If at any point the mouse is unable to grip the grid, record the value the meter displays for that parameter and write an appropriate comment (i.e. *Mouse unable to grip grid*) in the DCF.

11. When finished check all four paws to ensure nails are intact, if any are dislodged record accordingly.

12. Weigh the mouse (refer to SOP0045 - Weigh Mice*)* and record according to current DCF.

13. Carefully wipe the grid and weigh container with 70% ethanol or Hydrex Hard Surface Spray and then zero the meter.

14. Repeat steps 7-13 for all mice to be tested and perform a cage clean as defined by pipeline.

15. Clean all equipment, surfaces and the floor. **Transfer all waste to a yellow offensive waste bag or clearly labelled waste container.**

16. **All cages must display the updated cage card. Place a 'POST PROCEDURE CHECK REQUIRED' label on all cages and register them to the correct rack whilst returning them to their destination/home rack in the animal room. (Refer to SOP0101 – Taking and Returning Cages for Procedures).**