

Blood Pressure (Mouse) 血壓測量(小鼠)

1. Purpose

- 1.1 Measure the systolic, diastolic, mean blood pressure and pulse rate using the tail-cuff system.

2. Safety Requirements

- 2.1 General laboratory procedures should be followed, which include: no eating, no chewing gum, no drinking, and no applying of cosmetics in the work area. Laboratory coats and gloves must be worn at all times in the work area, unless the protocol specifically describes the appropriate attire for the procedure.

3. Associated Documents

- 3.1 BP-2000 Series II Blood Pressure Analysis System

4. Notes

- 4.1 The validity of results obtained from cardiovascular phenotyping is largely dependent on methods of animal husbandry. It is important that individuals following this procedure are experienced and aware of the animal's welfare, and be familiar with the animal being tested, in order to reduce the anxiety levels of the animal prior to testing.
- 4.2 The majority of mouse cardiovascular studies are age/sex/strain dependent. It is important to keep these parameters comparable throughout a single experiment.
- 4.3 Environmental factors may contribute to the levels of stress of mouse. Noise levels in the experimental room must be kept to a minimum and several parameters such as temperature, moisture and ventilation must be controlled according to regulations of animal welfare. These conditions should be maintained throughout the procedure (We will let the animals to adapt environment in the first day, and then collect data for three days).
- 4.4 Due to circadian variations of hemodynamic parameters, it is recommended that all cardiovascular tests must be carried out at approximately the same time of day. It is recommended that all cardiovascular investigations be undertaken in the morning.
- 4.5 It is recommended that the same operator complete experimentation during these three days.

5. Quality Control

- 5.1 In order to obtain reproducible results, the Visitech BP-2000 series II pressure system should be inspected every day for leakages, following the procedure described in user's guide.
- 5.2 To obtain accurate systolic blood pressure measurements with the BP-2000 series II, calibration should be performed on a regular basis.

6. Equipment

- 6.1 The BP-2000 Series II Blood Pressure Analysis System Visitech Systems.
- 6.2 The BP-2000 Blood Pressure Analysis System consists of four main pieces of hardware: specimen platform, control unit, computer (an IBM notebook), and a security key.

7. Supplies

- 7.1 Ethanol 70%
- 7.2 Tissues
- 7.3 Cuff elastic
- 7.4 Tape
- 7.5 Mask
- 7.6 Gloves

8. Procedures

- 8.1 To improve the efficiency of the measurements, an automated six-stage sphygmomanometer for mice (Visitech Systems, BP2000) is used. This device uses the tail-cuff method, in which pressure is applied while waveforms associated with blood vessel expansion and contraction in the tail are optically recorded with simultaneous measurements of maximum blood pressure (systolic blood pressure), minimum blood pressure (diastolic blood pressure), and pulse rate in unanesthetized mice. To restrain mice without anesthesia, mice are fixed to warmed stages with magnetic holders. To account for variance in the measurements and mouse stability, measurements are taken using the same method on three consecutive days to obtain average values. A set of 20 measurements is taken once a day; the first 10 measurements are preliminary whereas the following 10 are used as real data.
- 8.2 Turn on the control unit and computer, and start the "Blood Pressure Analysis" program.
- 8.3 Calibrate the system every week
 - 8.3.1 Pump air into the cuff; stop at a pressure level between 200 and 250 mmHg to confirm that the pressure does not go down.
 - 8.3.2 Connect the air tube to the sphygmomanometer equipped with a mercury column and begin to pump air. Set the BP-2000 values when the pressure of the mercury column reaches approximately 250, 200, 150, 100, and 50 mmHg (input the values from the mercury column by setting them in the dialogue box and complete the process by pressing Finish).
 - 8.3.3 Pump air into the cuff, stopping at appropriate pressures. Check if the pressures from the mercury column agree with those shown on the computer.
- 8.4 Check that the temperature of the platform is stable at 38 degrees Celsius.
- 8.5 Place one or more animals in the specimen holders on the specimen platform, move the metal covers into place, pass the tail through the cuffs and optical hemodrometers , and fix the mouse tail into place with packaging tape.
- 8.6 Leave the mouse in this position for 4-5 minutes to allow the temperature to stabilize.
- 8.7 Register the experiment, group, and specimen names.
- 8.9 Initiate the measurement process via the program.
- 8.10 Remove the animals from the specimen platform.