

## Surgical Note

### Venous Pressure in Rats

DSI pressure devices have been successfully used to measure venous pressure in rats. It is important to note that due to the low values of venous pressure, there is a higher probability of a clot forming as well as tissue growth which can make it difficult to keep the catheter patent over time. Below are a few considerations for implanting a telemetry device to measure venous pressure:

- When implanting the device, it is important to keep the catheter tip as level as possible with the device body as any changes in head pressure will be very significant for low pressure areas.
  - For example, in high pressure areas (>100 mmHg) a change in 1-3 mmHg does not affect the data as much as it would in lower pressure areas (i.e.<10 mmHg).
  - For reference, at 37°C, every 1cm in height will have 1.4mmHg of head pressure.
  - Head pressure can either be negative or positive depending on whether the catheter is higher or lower relative to the device body.
- It is recommended that the catheter be inserted in the direction of the venous blood flow (towards the heart) as opposed to against the blood flow. Optimal placement for the catheter is within the vena cava. This is a similar procedure to the abdominal aorta cannulation using two occlusion sutures with Vetbond® and a fiber patch to secure the catheter in place. The procedure for abdominal aorta cannulation can be viewed in the HD-S Device surgical manual.
- When using a multi-channel pressure device (HD-S21), the configuration of which channel is used for venous pressure does not matter, unless channel 1 is specifically intended for LVP. A standard catheter can be used for measuring venous pressure. If systemic pressure and venous pressure are desired, the channels can be used interchangeably but it is recommended to designate each channel for venous or systemic pressure to keep the channels consistent across the study.
- Due to the low flow of the venous pressure, there is the potential for a few other complications.
  - Tough, fibrous tissue growing out of the lining of the vena cava was seen in a pilot study. Although it did not affect the pressure readings in the animal, it should be taken into consideration for your study.
  - A change to the lining of the vena cava could affect the pressure readings long term, especially if there is tissue growth around the catheter over time.