Table Preparation

- Sterilizing Workstation: Clear table/cart → Hydrogen Peroxide → Alcohol Wipe
- Put blue cart perpendicular to the left end of the table
- Put chucks white side up on any surface that is expected to be used (~2 on top of the cart, ~4 on top of the table)
- Plug pump power cables in the labeled battery backup sockets on the portable power source and place on the second shelf (keep thick wire and slack on second shelf)

Pump Plug Preparation

- Black wires (power cables) Blue tape plug → Venus, Red tape plug → Arterial; plug into 6 o'clock port (bottom) on pumps by aligning white arrows
- Grey wires (information cables): Blue tape plug → Venus, Red Tape plug → Arterial; plug into 9 o'clock port (left)
- Get stand with two clamps and place behind pumps such that clamps are over/above the the two pumps

Drum Arrangement

- Place drum on right side of table (about the same distance from the pumps as it would be on the cart)
- Slide diaphragm under the foam and near the edge of the basin

Water Heating Blanket Setup

- Get a water heating blanket and cut the tubing past the white clamp pieces
- Pull out the heated water tank tubing (two big tubes that split via a y connector into four small tubes) → If one blanket is in use (cap
- Put needle driver (from Hannah's desk) into blanket tubing, then carefully stretch/expand tubing with the tool (improve fit for LUER piece)
- Obtain a 3/16 LUER piece and fit barb into blanket tubing end tightly
- Place blanket over drum with tubing coming out of the top left end
- Screw one tube from each water tank y-connector "pair" into each of the two water blanket LUER ports (doesn't matter which)

Mobile Reservoir Preparation

- Attach belmont clamp to top right leg of the cart such that the larger circle is facing outwards towards the middle of the workstation area (about ⅓ of the way up from the second platform to the third)
- Open up a new blood reservoir and place into belmont clamp → yellow end facing cart, blue ends facing drum, red end facing floor
- Adjust clamp so the reservoir isn't pressed against the cart
- Take off all the colored plastic piece (do not remove white caps)

Pump Head Preparation

- Inspect pump heads (2) for cleanliness → place in UV clave for 5 minutes to sterilize
- Pull pin on blood pumps out, then place pump head in, then twist clockwise until secured (outlet facing up and outlet facing out)
- Spray with alcohol

Oxygenators

- Orient oxygenators with the label facing towards you and barb facing right → oxygen pumped through hollow fibers (top), blood pumped through the shell (bottom); this setup is the reverse of normal but is done in order to reduce blood flow resistance

Pump-Reservoir Tubing

- Most of the system is comprised of ⅜" and ¼" tubing (ID)
- Spray tubing ends with alcohol
- Attach ⅜" tubing to the bottom of the reservoir tightly (make sure the white tag isn't clamping anything)
- Ensuring there is slack below the reservoir, bring the tubing right below the top shelf of the cart and cut it
- Fit a ⅜" y-connector to the cut end
- Measure and cut two pieces of ⅜" tubing to connect each pump inlet (facing out) to the y-connector
- Measure and cut two pieces of ⅜" tubing to connect the outlets of each pump to the bottom left barbs of their respective oxygenators (measure a little bit over the barb in order to maintain some looseness)
- Measure and cut two identical, ~2" pieces of ¼" tubing, then insert a male ¼" LUER into the ends of each tubing piece, then place a female LUER cap on each LUER end
- Fit each of the capped tubing pieces on the bottom right barbs of the oxygenators (capping flow)

Gas-Mixer Tubing

- Measure and cut two identical, ~2" pieces of ¼" tubing, then insert a male ¼" LUER into the ends of each tubing piece
- Fit each of the ¼" LUER tubing pieces on the top right barbs of the oxygenators
- Twist the blue labeled gas tubing onto the venous oxygenator, twist the red labeled gas tubing onto the arterial oxygenator

Sampling Flow Re-Drain Preparation

- Measure and cut 2" of ¼" tubing
- Attach the tubing to the back (formerly yellow-capped) of the reservoir
- Obtain a female T connector and attach a male ¼" LUER to one of the horizontal outlets, then attach male ⅛" LUERs to the other two outlets
- Insert the ¼" end onto the ¼" tubing coming out of the reservoir

Portal Vein Tubing Preparation

- Obtain two ⅜" y-connectors
- Measure and cut 30" of ⅜" tubing (oxygenator to the liver)
- Attach tubing to the outlet (right) barb of the oxygenator
- Cut tubing roughly halfway and place a ⅜" y-connector over the cut end, then reattach the other cut end to the top (outermost) y-channel
- Measure and cut a 4" piece of ¼" tubing, then stretch one end using the needle driver (sampling/CDI outlet)
- Attach the stretched of the tubing to the other outlet y-channel of the ⅜" connectors
- Obtain a cuvette sensor and remove the red covers on either side, then cut off a small bit of the tubing end

- Orient the sensor piece with the circle facing down, then connect the barbed side to the ¼” tubing
- Obtain one male and one female ¼” LUER, then twist them together (set aside)
- Measure and cut 2” of ¼” tubing
- Insert a male ¼” LUER on one side, then horizontally insert a female T connector into the ¼” LUER end (one perpendicular and one parallel outlet), then insert a male ⅛” LUER on the parallel horizontal outlet of the T connector
- Attach ⅛” tubing from the ⅛” LUER end to the ⅛” LUER on the reservoir drainage connector
- Attach the end of the original ⅜” tubing to the second ⅜” y-connector
- Measure and cut ~55” of ¼” tubing, then stretch one end using the needle driver
- Insert the stretched end of the tubing over the outer ⅜” y-connector channel
- Route the rest of the tubing through the rotor pump (from bottom to top), making sure that the plastic inlet/outlet pieces are locked
- Obtain two stopcocks, then expose parallel male/female sites of one stop cock and the male site of another stopcock, then screw the male end of the latter stopcock into the female end of the former stopcock
- Insert the exposed male end of the bottom stopcock into a female T-connector such that the two outlets are parallel to one another
- Attach a male ¼” LUER onto each of the T-connector outlets
- Measure and cut enough ¼” tubing to reach the center of the drum from the bottom y-connector channel
- Stretch one end of the ¼” tubing with the needle driver and fit it over the bottom y-connector channel
- Cut the bottom ¼” tubing ~3” from the y-connector and fit both cut ends over the assembled stopcock apparatus → ensure that the apparatus is facing up for easy drug infusion
- Fit the flow sensor holders onto the stand at an arbitrary, adjustable height (make sure the cradle can spin, then route the ¼” tubing in between the posts and under the cradle
- Clamp the blue-labeled flow sensors around the ¼” tubing, then fit the setup into the holder cradle
- Adjust as needed in order to keep the stopcock apparatus vertical and prevent any sharp tubing angles
- Test the pressure sensors: turn on the outlets near the diaphragm, plug the pressure sensor into the reader, place fingers on both exposed ends of the sensor to see if reader detects a higher pressure
- Cut the ¼” tubing at roughly the same height as the liver inflow and fit the blue pressure sensor over the cut ends

<u>Arterial Vein Tubing Preparation</u>

- Obtain a ⅜” Y-connector
- Cut the ⅜” tubing roughly halfway and fit the ⅜” Y-connector over the inlet and top outlet channels
- Measure and cut ~4” of ¼” tubing

- Use the needle driver to stretch one end of the ¼” tubing, then fit the stretched end of the bottom Y-connector channel
- Attach ⅛” tubing to the remaining ⅛” LUER end on the reservoir drainage connector
- Attach a male ¼” LUER and a ⅛” LUER to the parallel ends of a T-connector
- Measure and cut a ~3” piece of tubing, then attach the piece to the ¼” LUER on the T-connector
- Attach the ends of the T-connector ¼” tubing and Y-connector ¼” tubing to a combined, male-female ¼” LUER
- Attach a ⅜” to ¼” coupler to the end of the ⅜” tubing coming out of the top channel of the Y-connector

Experiment Specific (drug infusion ~1 ft from measuring site)

- Measure and cut ~3” of ¼” tubing, then attach it to the end of the ⅜” to ¼” coupler
- Attach the male end of a stopcock to the top of a T-connector, then attach male ¼” LUERs to the parallel outlets of the T connector, then insert the left LUER into the ¼” tubing
- Measure and cut enough ¼” tubing to reach the center of the drum funnel from the stopcock
- Fit the flow sensor holders onto the stand at an arbitrary, adjustable height (make sure the cradle can spin, then route the ¼” tubing in between the posts and under the cradle
- Clamp the red-labeled flow sensors around the ¼” tubing, then fit the setup into the holder cradle
- Adjust as needed in order to keep the stopcock apparatus vertical and prevent any sharp tubing angles
- Attach male ¼” LUERs to the parallel outlets of a T-connector
- Cut the ¼” tubing ~2” from the flow sensor (roughly at the mouth of the drum), then attach the cut ends to the T-connector setup
- Test the pressure sensors: turn on the outlets near the diaphragm, plug the pressure sensor into the reader, place fingers on both exposed ends of the sensor to see if reader detects a higher pressure
- Cut the ¼” tubing at roughly the same height as the liver inflow and fit the red pressure sensor over the cut ends

<u>IVC Tubing Preparation</u>

- Measure and cut ~30” of ¼” tubing (drum center to formerly blue-capped reservoir inflow)
- Attach male ¼” LUERs to the parallel outlets of a T-connector
- Cut the ¼” tubing at a convenient location (probably half a foot or so) from the reservoir inlet and attach the cut ends to the T-connector

<u>Warmer Drape</u>

- Obtain warmer drape (probably from the OR)
- Find the blue square and fold it twice (two triangle folds), then cut slightly off from the edge of the blue plastic
- Find the 3D printed outlet piece and put a magnet in the groove
- Place the drape over the drum such that the previously cut, blue hole faces the drainage
- Sandwich the drape between the 3D printed outlet piece and another magnet
- Raise excess drape material over the top of the drum
- Use a large rubber band to secure the drapes to the drum
- Measure and cut a ~30” piece of ¼” tubing, then attach the piece to the 3D printed outlet piece (bottom of the drum funnel) and a reservoir inlet (formerly blue capped)

<u>Dialysis</u>

- Unbox a new hemodialysis column kit
- Ensure the yellow lever on the dialysis bag is closed, then twist the female bag LEUR onto the male LEUR coming from the dialysis output tube
- Trim down the dialysis system to necessary tubes (see Hannah’s other document)
- Attach a male ¼” LEUR to the end of the previously setup ¼” dialysis tubing (coming from rotary pump), then attach the other end to the dialysis inlet tubing
- Attach a female ¼” and male ⅛”, then insert the male end into the dialysis output tubing
- Measure and cut enough ¼” tubing to go from the dialysis bottom to the reservoir inlet (route the tubing for this part underneath all the other previously set up tubing)
- Attach ⅛” dialysate tubing from the dialysate inlet pump to the bottom of the dialysis configuration (yellow tube), use ⅛” LEURs
- Attach ⅛” dialysate tubing from the dialysate outlet pump to the bottom of the dialysis configuration (green tube), use ⅛” LEURs

<u>Miscellaneous</u>

- Attach claves to the exposed T-connector ends around the circuit
- Save the clave caps for capping syringes