Short Description on
Organ Bath Assemblies

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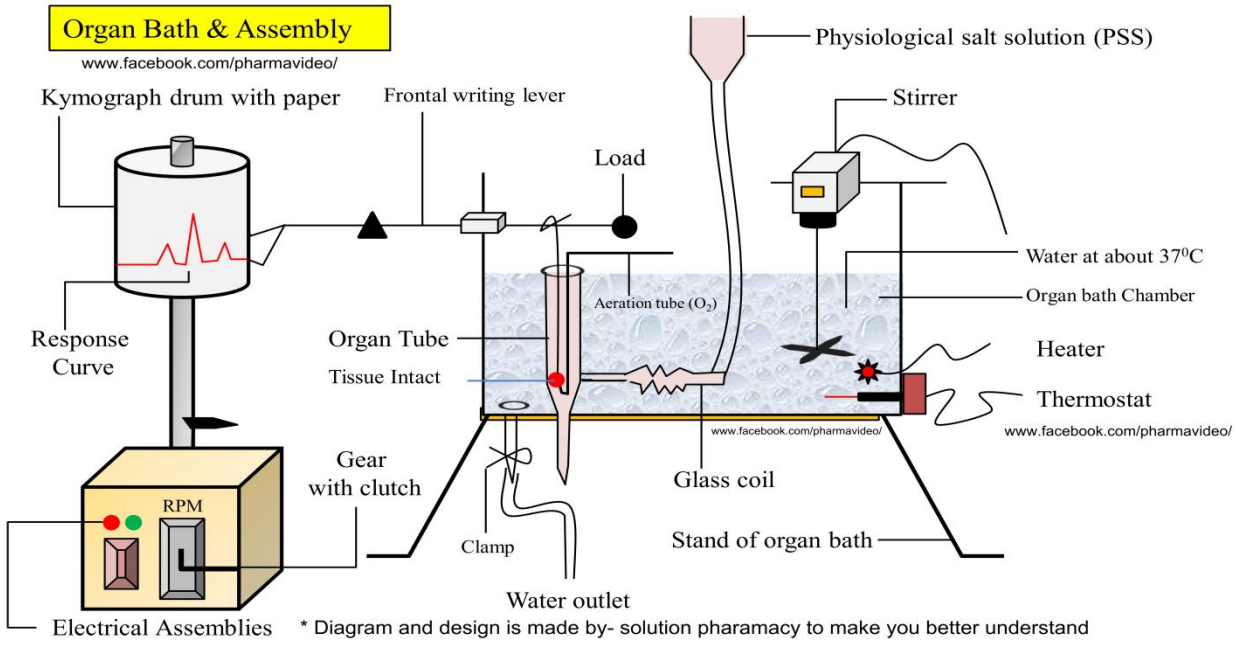


Figure- solution/SOB*- Labelled diagram of student organ bath

Introduction- Student organ bath or simply organ bath is an apparatus widely used in pharmacology laboratory and various educational Institutes, research and development sector. Organ bath is not a single apparatus but it is a combination of many small units which include-

1. Bath chamber
2. Organ tube
3. Glass coil
4. PSS reservoir
5. Heater
6. Thermostat
7. Stirrer or mixer
8. Oxygen tube
9. Aerator
10. Leaver
11. Load
12. Sherrington rotating drum (Kymograph Drum)
13. Kymograph Paper

Use- When we have to perform the *invitro* studies of any given drug, we need to isolate the organ from suitable experimental animal. Once organ is isolated it should be immediately transferred into physiological salt solution (PSS). Organ bath is having several important component and assembly as mentioned above; all are equally important and have individualized functions. Once organ is placed into PSS other arrangement are made. These include-

1. Cleaning the organ bath assembly
2. Attaching or arranging all small hooks, clamp and water pipes.
3. Fixing the lever and stick the kymograph paper on rotating drum.
4. Kymograph paper should be either smoked or have to use colour ink at the end of lever.
5. Fill the water into 2/3 portion of organ bath or up to suitable length depending upon the unit of organ bath.
6. Switch on the mains and heater
7. Wash the organ tube with PSS once
8. Fill the PSS into organ bath and hold it.
9. Start providing oxygen by aerator machine
10. Attach the aeration tube into the organ bath
11. Now tie the tissue of isolated organ which you have to study (This process may be modified)
12. Tie the other end of thread into writing lever
13. Attach the lever with rotating drum and wait till resting or constant line appears
14. Inject the drug into organ bath and carefully examine the changes in muscle strength by observing kymograph paper.
15. Release the clamp of organ bath to let the PSS flow outside the organ tube if you want to reduce the strength of dose, if you want to increase the dose, no need to change the PSS. (It is for same drug)
16. For every new drug injection the old PSS must be change.
17. Ensure the temperature of water bath; it should not increase than optimum temperature.

Description of various parts

1. **Bath chamber**- Bath chamber is made of good quality plastic (PVC) it is of two types- Single unit and double unit. In single unit there is only one place for organ tube, thus you can perform one study at one time, or you need to wash the tissue with PSS before changing drug. Double unit organ bath is having two holding place for organ tube, that's why we can perform two studies at same time. It depend on you weather you want to check the effect of various dose of same drug or you can check two separate drug's effect on muscle. At the bottom of bath chamber there is two outlets, one is for drainage of water and second is for the PSS.

2. **Organ Tube**- Organ tube is the soul of organ bath because the king of experiment lies or rest in this chamber. Organ tube is a glass tube having two sides opening. Out of which one is for expelling used PSS and second is for inlet of PSS. PSS is not filled directly from the top of organ tube, but it is filled from this side inlet unit.

3. **Glass coil**- Glass coil is coil like structure (As name indicate) its function is very simple. If we supply PSS directly to the organ tube from straight pipe, its temperature may not be equal to outer temperature that is about 37^0C, so the PSS is supplied through this pipe, by doing so the PSS take a longer time to reach organ tube and contact time of PSS increase with water available in the bath chamber and this the temperature of PSS slightly increase and matched with outer temperature.

4. **PSS reservoir**- PSS reservoir is a simple vessel which holds PSS to be supplied to organ in organ tube. PSS is essential solution containing all electrolytes which are necessary for the intact tissue. These include maintenance of is tonicity, conductivity and contractility etc. Example of PSS includes- (1) Frog ringer solution (2) Ringer or Ringer Locke solution (3) De Jalon solution (4) Tyroid solution (5) Kerbs-Henslet solution.

5. **Heater**- Heater is heating devices which maintain the desired (37^0C) temperature of water inside the organ bath. Optimum temperature is important for the tissue attached in a organ bath, because this help to maintain its live condition. And the contraction or relaxation of muscle may affected by variation in temperature.

6. **Thermostat**- Thermostat is very basic devise available in every home. The objective of Thermostat is to maintain the temperature we have set. Thermostat is based on auto cut principle. When the temperature exceed from set temperature, it automatically stop the heater, and once when temperature start falling it again start the heater so that water start heating.

7. **Stirrer or Mixer**- Stirrer is a device or part of devise which is used to homogenize the temperature of water inside the organ bath. If we don't use stirrer the temperature of water may vary part to part and this is not suitable for tissue. So the basic work of mixer is to mix the heat throughout the water bath.

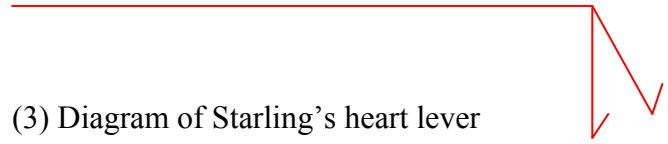
8. **Oxygen Tube**- Oxygen tube is one of the most important parts of student organ bath. Oxygen tube carries oxygen directly to the tissue tied. Tissue is tied at the end of oxygen tube and it gets oxygen form this tube which is fitted to aerator at the other end. One end of aerator tube is consisting of thin metal wire and in this metal wire we tied the tissue and the other end of tissue will be tied with the lever. Any changes in the tissue will be recorded in the kymograph paper by the lever.

9. **Aerator**- This is a common device used to supply the vital air that is oxygen. It generates oxygen and pump to the aeration tube where our tissue is located. Aerator is also used in the aquarium and the purpose is same, to generate and supply oxygen to the tissue.

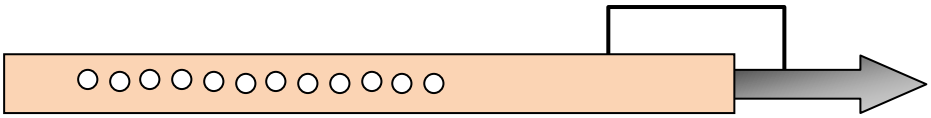
10. **Lever-** This is the main part of any organ bath. Lever is a simple writing device which records every movement or changes in the strength of muscle by drug we applied. One end of the lever is attached to the tissue and when we inject the drug into the organ tube, its effect can be easily seen in muscle, either in form of contraction or relaxation. When muscle get contracted it pull the thread and thread pulls the lever and it may seen by upward graph and the opposite is applicable for muscle relaxation. There are various types of lever available- (1) Simple lever (2) Frontal lever (3) Starling's heart lever (4) Brodie's Universal lever

(1) Diagram of Frontal Lever

(2) Frontal Lever



(3) Diagram of Starling's heart lever



11. **Load-** Load is nothing but an object which provide optimum load and tension to the lever so that proper recording will be achieved.

12. **Sherrington rotating drum (Kymograph Drum)** - It is another main parts or assembly of student organ bath. It is a rotating devise, which keep rotating and recording the changes in tension of lever. It has several basic units' like- gear and clutch which allow us to set the desired RPM (rotation per minutes) at the back of this there is a lock which lock and unlock the machine. In front of the devise there is counter which count the RPM by touching the other hand. Kymograph is attached with kymograph paper, this is used either by coating with smoke or by using colour pen.

References- All materials and notes are made by solution pharmacy