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Innovative Engineering for Science

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Brain Slice Chamber System

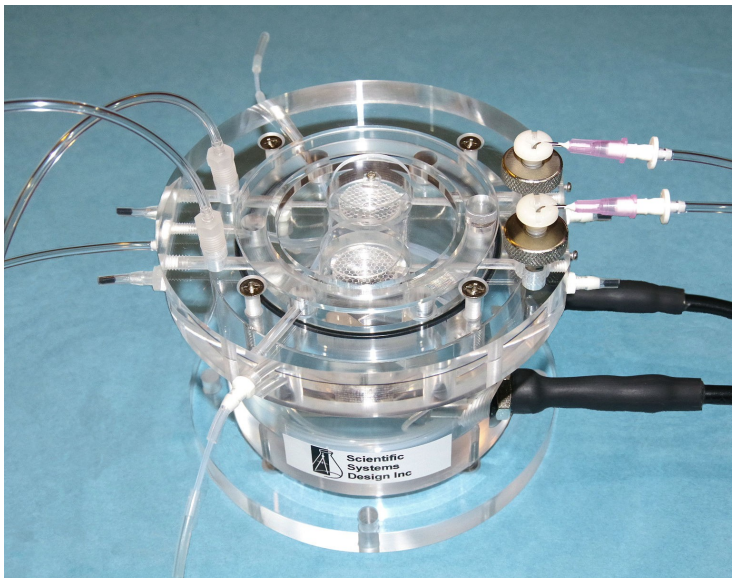
BSC1-2

Submerged and Interface Preparations

The The BSC1-2 chamber is a dual version of the BSC1 chamber, with two completely separate channels for solution in / out. Both channels share the same 95% O2 / 5% CO2, humidity and temperature control from the base. As with the BSC1, this chamber allows for both interface and submerged methods of slice maintenance.

* *'Submerged' and 'Interface' methods of slice maintenance with same chamber*
* *Slices supported on removable insert adaptable to your requirements*
* *Proportional Temperature Controller (PTC03) with low noise performance*

This chamber allows adaptation to either method of slice maintenance simply by altering the fluid level by means of a screw adjustment device on the chamber. Since it is a dual version, one side can be kept in submerged mode and the other side interface mode. A standard insert having a nylon net is supplied with the chamber for submerged and interface methods. This insert can be modified or custom made to accommodate other preparations eg. adult spinal cord (Dhanjal & Sears 1980, Alger *et al,* 1984) and Cerebellar slices (Crepel *et al* 1981). The temperature is controlled by a proportional control heating unit, the PTC03 which provides smooth DC controlled power to the heater element incorporated into the chamber.



The chamber is constructed from clear acrylic having a diameter of 130mm, height is 85mm and the base plate is 130mm in diameter. The slices rest on a nylon net fixed on to a removable insert. Pre-oxygenated medium enters the main body of the chamber through a fine bore tube which spirals in the heated distilled water in the lower part of the chamber and enters the upper part of the chamber via a bubble trap. Depending on whether submerged or interface type preparations are required, the height of the perfusion fluid is adjusted at the exit well by means of a needle on a screw mechanism. In the case of interface preparations, the high oxygen tension is maintained by bubbling a 95% oxygen, 5% carbon dioxide gas mixture through a ceramic bubbler located in the lower

References:

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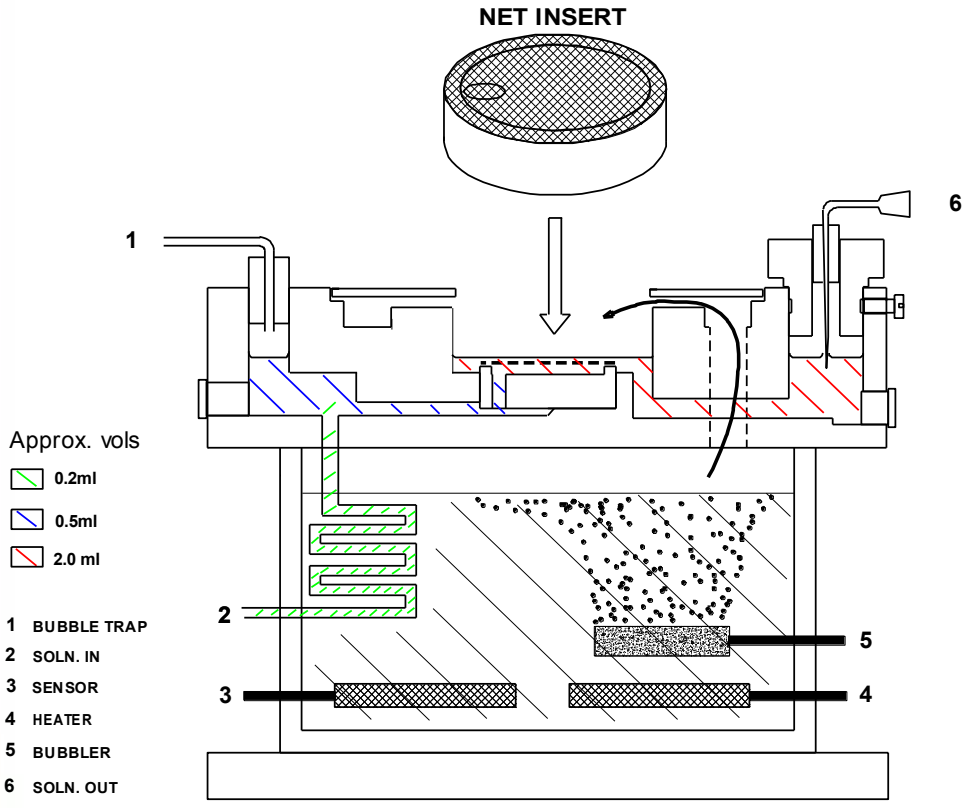
heated part of the chamber. This moistened and warmed gas mixture enters the upper part of the chamber via 'port holes' and is then deflected by a lid across and downwards towards the centrally located slice preparation. The temperature in the upper chamber is maintained by ensuring that the medium and moistened gas mixture enter at the required temperature. This is dependent on the temperature of the lower chamber body which is warmed by a heating element controlled by the Proportional Temperature Controller, PTC03. An optional monitor sensor allows the upper chamber temperature to be checked when required.

Schematic diagram



The design of the chamber is modular to allow easy cleaning and replacement of parts. The heater and control sensor elements are screwed into the base of the chamber. The three main components: base, trough and upper chamber are screwed together. The trough which forms the heated water bath is over 10mm thick for durability, heat insulation and stability. Solution lines are HPLC type PTFE tubing which resists formation and adhesion of fungal growths.

ABOVE: Schematic arrangement of ONE of TWO channels in BSC1-2 shown in cross-section view.

1. BUBBLE TRAP - Most small bubbles that may gas out of solution are captured here. Vent may be kept open or in closed loop with a syringe depending on flow rates
2. HEAT EXCHANGER FOR PERFUSION FLUID SUBMERGED/INTERFACE - Fine bore PTFE tube carries aCSF that is indirectly heated by the temperature controlled dH2O within the base trough.
3. CONTROL TEMPERATURE SENSOR - Connected to temperature controller PTC03 / PTC04
4. HEATING ELEMENT - Cartridge heater 35Watts encased in stainless steel tube
5. OXYGEN/CARBON DIOXIDE GAS BUBBLER - Provides humidified O2/CO2 fed from pre-moistened gas mixture. Bubbles also provide stirring of dH2O in the base to maintain stable feedback temperature control
6. EXIT FOR PERFUSION FLUID VIA SUCTION LINE - An 18G hypodermic needle fitted into a screw mechanism that allows for the adjustment of fluid level around the slice preparation, to adjust for submerged or interface mode.