A superfusion chamber suitable for maintaining mammalian brain tissue slices for electrical recording

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Recent work has shown that mammalian brain tissue slices can be kept alive and electrically excitable *in vitro* (see Richards, Smaje & White, 1976). This technique is useful for the study of the mode of action of centrally-acting drugs because of the control one has over the environment of the nerve cells. However, earlier incubation chambers have generally placed the tissue slice at the interface between an oxygen-enriched atmosphere and the saline solution itself as this facilitates the recording of field potentials (Doré & Richards, 1974). The present apparatus was designed for the superfusion of both surfaces of the tissue slice thus permitting rapid changes in the bathing medium.

The apparatus consists of a small recessed chamber mounted on top of a thermostatically-controlled water bath which is kept at $38 \pm 0.2°C$ (Figure 1). The tissue slice rests on a grid of platinum gauze just above the bottom of the recess and is prevented from floating by a nylon mesh. Solutions are prewarmed in tubes made of silicone rubber or nylon which are fixed to connectors on the top plate of the incubation assembly. To reach the tissue, the solutions pass through non-return valves made from 3.18 mm ceramic balls which seat on the top of the inner connectors. Only one solution is permitted to flow at any one time, its rate of flow being governed by the head of pressure applied. The solution is selected by a rotary switch which clamps five of the six tubes connecting the reservoirs of saline to the incubation chamber. The level of fluid above the slice is maintained by a suction pipette. A gas mixture of 95% O_2 : 5% CO_2 is bubbled through the water bath before passing over the solution in the incubation chamber.

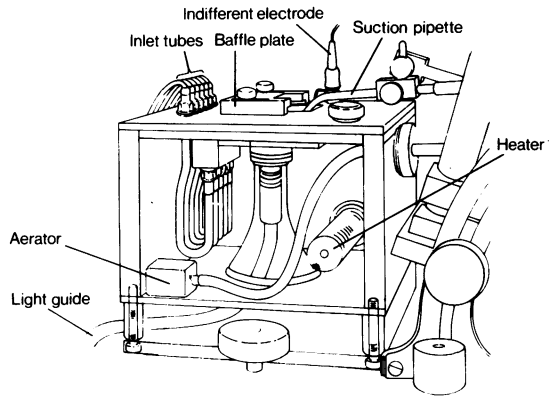

Figure 1 A simplified three dimensional view of the apparatus.

This apparatus can also be adapted for other mammalian tissues and has the advantage of a very small dead space.

References

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