DEMONSTRATIONS

Stereotaxic implantation of cannulae for subsequent drug administration into the third ventricles of conscious mice

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Intracerebral drug administration to conscious mice is usually made immediately after piercing the skull with a hypodermic needle (Haley & McCormick, 1957). In the method described here a cannula guide is implanted under anaesthesia several days before drug administration.

Adult male albino mice (MF1 strain) weighing 19–21 g are anaesthetized with sodium pentobarbitone (80 mg/kg i.p.) and attached to a stereotaxic apparatus (Baltimore Instrument Co.). A skin incision is made along the midline of the skull and a 1.5 mm square section of bone removed using a dental drill (burr size 0.5 or 1.0) such that the centre of the exposed area of brain lies on the midline, 3 mm anterior to the lambda. Two self tapping stainless steel screws (10 BA, $\frac{1}{8}$"; Walker Spencer Co. Ltd.) are secured to the skull through holes drilled one on each side of the midline. Using the stereotaxic apparatus a cannula guide is now lowered at right angles to the surface of the skull through an incision in the meninges made with a sterile needle (26 G) 3 mm anterior to the lambda and 0.5 mm lateral to the midline. Cannula guides are constructed from 21 G × $1\frac{1}{2}$" disposable hypodermic needles (Sherwood Medical Industries). The plastic hub is removed to reveal an aluminium collar surrounding one end of the needle. A 3.5 mm length of the collar is retained and the other end of the needle is shortened (no bevel) so that it projects 4.5 mm beyond the collar. When the tip of the cannula guide is 1 mm below the skull surface it is racked across to the midline pushing the intact saggital venous sinus to one side and then lowered a further 3.5 mm (collar upwards). It is now fixed to the skull with acrylic dental cement sufficient being used to cover the whole of the incised area plus the two screwheads which provide anchorage. A removable stilette (26 G) is kept in the cannula guide. Five to six days later drugs may be injected by the technique of Swanson, Perez & Sharpe (1972) into the third ventricle through an injection cannula (26 G) placed in the cannula guide its tip extending 1 mm beyond that of the guide. Experiments are concluded by determining the position of the injection site. Methylene blue is administered through the injection cannula and the mouse killed. Its brain is removed and kept in 4% formaldehyde for 2–3 days. Frozen sections are cut (40–60 μ intervals) with a sledge microtome and the position of the dye determined (Zeiss Dokumator).

Intraventricular administration of prostaglandin E_2 (1 μg in 1 μl) to 5 restrained mice produced a maximum rise in rectal temperature of 2.7 ± 0.3°C (mean ± s.e.) in 15 min (environmental temperature 27°C). Prior injection with 0.9% aqueous NaCl had no effect. Effects of intraventricular dibutyryl cyclic AMP on rectal temperature have also been studied (Dascombe, Milton, Nyemitei-Addo & Pertwee, unpublished).

We thank the Medical Research Council for support (R.T.). I.N-A. is the recipient of a Ghana Government Scholarship.

References

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