Observer agreement was determined using Kendell's Concordance (Marascuilo & McSweeney, 1977) with corrections for tied values. Acceptable agreement between the 5 observers' scores was demonstrated: concordance = 0.73 ($P < 0.005$). No obvious differences were detected between the behavioural syndromes induced by either PCA or tryptamine.

(±)-Propranolol (40 and 20 mg/kg) given 30 min before either PCA (7.5 mg/kg) or TCP (10 mg/kg) plus tryptamine (10 mg/kg) significantly reduced the behavioural scores in both situations. Behaviour was again scored using unmarked video cassette recordings.

The results demonstrate the inter-scorer reliability of the scoring technique subject to suitable observer training. The similarity of the PCA and tryptamine behavioural syndromes and the confirmation of their common blockade by propranolol (Deakin & Green, 1978) is further evidence that they both induce the syndrome via a common receptor.

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The relative contribution of iontophoresis and electro-osmosis to the electrophoretic release of noradrenaline from multibarrelled micropipettes

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The electrophoretic release of drugs from micropipettes involves two processes: (i) ejection of ionised drug molecules by iontophoresis, and (ii) ejection of small volumes of the drug solution by electro-osmosis. Of the two, iontophoresis is generally believed to make the greater contribution towards total release, at least in the case of well ionised drugs (Curtis, 1964).

We have attempted to assess the contribution of electro-osmosis to the total release of noradrenaline from multibarrelled micropipettes by measuring the rate at which a practically unionised molecule, glucose, is released concomitantly with noradrenaline during the passage of electrophoretic currents. Ten six-barrelled micropipettes were used; three barrels (nos. 1–3) of each micropipette were filled with a mixture of [^{14}C]-noradrenaline bitartrate (0.05 M; S.A.: 1 mCi/mmol) and glucose (0.0167 M), and the remaining three (nos. 4–6) with a mixture of noradrenaline bitartrate (0.05 M) and [^{14}C]-glucose (0.0167 M; S.A.: 1 mCi/mmol). In each micropipette the rate of efflux of radioactive material was measured during a series of 10 min periods. In calculating the rate of electrophoretic release of [^{14}C]-glucose or [^{14}C]-noradrenaline, the mean rate of spontaneous efflux of radioactive material was subtracted from the toal rate of release of radioactive material. (This spontaneously released radioactive material presumably consisted of both [^{14}C]-glucose and [^{14}C]-noradrenaline.) The rate of release of [^{14}C]-noradrenaline was measured during the passage of currents of +25, +50, +75 and +100 nA through barrels 1–3 (four samples at each current value), and the rate of release of [^{14}C]-glucose was measured during the passage of identical currents through barrels 4–6. The latter measurements were used to calculate the rate of ejection of the solution from the micropipette, which in turn was used to calculate the rate of release of noradrenaline by electro-osmosis. By subtracting the calculated rate of electro-osmotic release of noradrenaline from the total rate of electrophoretic release of noradrenaline, the rate of iontophoretic release of noradrenaline was estimated. 'Apparent' and 'real' transport numbers for noradrenaline were calculated from the measured rates of total electrophoretic release and the estimated rates of ionotophoretic release respectively.

The mean 'apparent' transport number for noradrenaline (±s.e.m.) was 0.286 (±0.022). Electro-osmo-

tic release accounted for 23.1% (±5.01%) of the total electrophoretic release of noradrenaline. The estimated 'real' transport number for noradrenaline was 0.220 (±0.025).

The relative contribution of electro-osmosis to total release seen in these experiments is considerably greater than the 11% estimated by Krnjević, Mitchell & Szerb (1963) for acetylcholine released from a 3.0 M solution. Apart from the different ionic species used, this could also reflect the weaker solutions used in our experiments. Electro-osmosis and iontophoresis may be thought of as the passage of current through two resistors in parallel; the use of weak solutions increases the resistance to iontophoretic current flow, thus causing more current to be carried by eclectro-osmosis.

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Homogeneity of β-adrenoceptors on rat erythrocytes

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Recent studies, using direct receptor labelling techniques, have provided evidence for the co-existence of β_1 and β_2 adrenoceptors in the same tissue, (Rugg, Barnett & Nahorski, 1978; Nahorski, 1978). We were particularly interested, therefore, to determine whether β-receptor sub-types could co-exist in the same population of cells. Rat erythrocytes represent a convenient source of single cell-types which contain β-receptors (Kaiser, Wiemer, Kremer, Dietz & Palm, 1978; Beckman & Hollenberg, 1979). The present study suggests that [^{3}H]-dihydroalprenolol ([^{3}H]-DHA) binds to rat erythrocyte membranes in a manner indicating interaction with a physiological β-receptor, and that the receptors present are a homogenous population of β_2-adrenoceptors.

Erythrocyte membranes were prepared from male Wistar rats (150–200 g) essentially as described by Charness, Bylund, Beckman, Hollenberg & Snyder, 1976.

Specific [^{3}H]-DHA binding, that binding which was displaced by 200 μM (−)-isoprenaline (Nahorski, 1978), represented almost 100% of the total [^{3}H]-DHA bound to the membranes at 1 nM [^{3}H]-DHA.

Table 1 Affinities of adrenoceptor agonists and antagonists for β-adrenoceptors present on rat erythrocytes

	Ki (nM)	
Agonists		
(−)-Isoprenaline	33 (±3)	
(−)-Noradrenaline	3,000 (±370)	
(−)-Adrenaline	240 (±19)	
(±)-Salbutamol	360 (±26)	
Antagonists		*Hill coefficient*
(±)-Atenolol (β_1 selective)	2,500 (±220)	1.08 (±0.06)
(±)-Practolol (β_1 selective)	21,000 (±580)	1.03 (±0.04)
(−)-Alprenolol (Non-selective)	0.3*	0.98
(−)-Propranolol (Non-selective)	0.36 (±0.04)	1.11 (±0.03)
(+)-Propranolol (Non-selective)	25 (±3)	1.09 (±0.09)
(±)-OPC 2009 (β_2 selective)	23 (±2)	0.97 (±0.02)

Ki was determined from the equation $Ki = IC_{50}/1 + S/Kd$, where S is the concentration of [^{3}H]-DHA in the assay and Kd is the dissociation constant for [^{3}H]-DHA. The data are the mean (± s.e. mean) of 3–5 experiments conducted in duplicate.

* 2 determinations performed.