the multiple forms of choline acetyltransferase: choline uptake and acetylation of choline in rat brain. *Br. J. Pharmac.*, **61**, 111–112P.

ATTERWILL, C.K. & PRINCE, A.K. (1978a). Choline uptake, choline acetyltransferase and the acetylation of choline in chick and rat brain. *Br. J. Pharmac.*, **62**, 398P.

ATTERWILL, C.K. & PRINCE, A.K. (1978b). Multiple forms of choline acetyltransferase and the high affinity uptake of choline in brain of developing and adult rats. *J. Neurochem.*, **31**, 719–725.

BARKER, L.A., DOWDALL, M.J. & MITTAG, T.W. (1975). Comparative studies on synaptosomes. High affinity uptake and acetylation of N-[Me-^{3}H]-choline and N-[Me-^{3}H]N-hydroxyethyl-pyrrolidium by squid optic lobe synaptosomes. *Brain Res.*, **86**, 343–348.

COLQUHOUN, D. (1971). *Lectures on biostatistics*, pp. 28–41, Clarendon Press, Oxford.

MALTHE-SØRENSSEN, D. (1976). Molecular properties of choline acetyltransferase from different species investigated by isoelectric focusing and ion exchange adsorption. *J. Neurochem.*, **26**, 861–865.

MALTHE-SØRENSSEN, D., LEA, T., FONNUM, F. & ESKELAND, T. (1978). Molecular characterization of choline acetyltransferase from bovine brain caudate nucleus and some immunological properties of the highly purified enzyme. *J. Neurochem.*, **30** 35–46.

POLSKY, R. & SHUSTER, L. (1976). Preparation and characterization of two isoenzymes of choline acetyltransferase from squid head ganglia. *Biochim. Biophys. Acta*, **445**, 25–42.

ROSSIER, J. (1977). Acetyl-coenzyme A and coenzyme A analogues. Their effects on rat brain choline acetyltransferase. *Biochem. J.*, **165**, 321–326.

TUČEK, S. (1966). On subcellular localization and binding of choline acetyltransferase in the cholinergic nerve endings of the brain. *J. Neurochem.*, **13**, 1317–1327.

The 'Electronic platelet aggregometer'

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We have invented a device which can be used to study platelet behaviour in whole blood as well as platelet rich plasma. An evaluation of this 'electronic aggregometer' will be the subject of a communication presented by us at this meeting. In this demonstration we will deal with the principle of its operation and method of use.

Citrated (or heparinized) blood or plasma samples (1 ml) are pipetted into siliconized glass cuvettes (of the type used in standard aggregometers) and placed into heated holders (37°C) and stirred at 600 rpm with a 'flea' magent. A perspex cap that fits on top of the cuvette holder holds two electrodes – 0.25 mm diameter platinum wires 1.5 cm long, separated by approximately 1 mm. The electrode assembly projects into the sample to a depth of 1 cm and is energised by an oscillator generating a 15 kHz sine wave with an amplitude of 100 mv, which is passed through the blood between the electrodes. Electron microscopy showed that during the initial contact with the sample, the electrode becomes coated with a platelet monolayer. In the presence of aggregating agents, however, platelets stick to the monolayer and progressively cover the electrode. Resultant changes in conductance cause a change in the excitation voltage across the cell and this is amplified, rectified and filtered before being fed via an outlet socket to any suitable chart recorder. The trace thus obtained is in many respects identical to that obtained with an optical aggregometer.

After aggregation has occurred the electrode assembly is removed and cleaned with a piece of tissue. The cuvette is rinsed with saline and the apparatus is then ready for another sample.

The operation of the machine depends upon efficient control of temperature and stirring rate, but it is extremely simple to use and is suitable for measuring the aggregation of platelets within 1–2 min of obtaining the blood sample. It is, therefore, well adapted for assay of labile endogenous hormones such as prostacyclin. The device is novel, although a similar principle has been used to measure clot formation (Amiram, 1970) in blood.

Reference

AMIRAM, V.R. (1970). Determination of blood coagulation using impedence measurements. *Biomed. Eng.*, **5**, 324–345.

Influence of mode of blood sampling on the immunoreactive insulin concentration in serum of *Bordetella pertussis*-treated mice

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Pertussis vaccine induces hyperinsulinaemia in mice and rats (Gulbenkian, Schobert, Nixon & Tabachnick, 1968) and augments the hyperinsulinaemia induced by various stimuli (Sumi & Ui, 1975). Hyperinsulinaemia was observed also in *B. pertussis* infection in mice (Pittman, Furman & Wardlaw, unpublished). A