rotenone or carbonyl cyanide *m*-chlorophenylhydrazone. In the latter case a temporary alkalinization occurred, owing to NADH oxidation, with a $\Delta\text{pH}/2e$ value of -1.0 . Correction of the $\rightarrow\text{H}^+/2e$ values for the non-proton-translocating rotenone-insensitive pathway of quinone reduction by NADH gave calculated values for the proton-translocating rotenone-sensitive pathway of 1.7 – 2.0 . It is concluded that, if the respiratory chain is organized into three proton-translocating loops, then only one of these loops exists between NADH and ubiquinone. The identity of the postulated hydrogen carrier preceding cytochrome *c* remains unknown, unless it be one of the multiple forms of cytochrome *b*.

The authors thank the Medical Research Council of Canada (Fellowship for H. G. L.) and the Medical Research Council for support.

Mitchell, P. (1966) *Biol. Rev.* **41**, 445–502

Mitchell, P. & Moyle, J. (1967) *Biochem. J.* **105**, 1147–1162

Ornithine Decarboxylase Activity during Kidney Growth

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It has been suggested that increased rates of polyamine biosynthesis are associated with rapid tissue growth (Jänne, 1967; Russell & Snyder, 1968; Raina & Jänne, 1970; Snyder & Russell, 1970). The rise in ornithine decarboxylase activity occurring during liver regeneration is in fact one of the earliest and most dramatic responses to partial hepatectomy (Schrock *et al.*, 1970). We have therefore examined ornithine decarboxylase activity (measured by a modification of the $^{14}\text{CO}_2$ absorption method of Russell & Snyder, 1968) in rat kidney and tried to relate it to the hypertrophy that takes place in the remaining kidney after unilateral nephrectomy. Normal rat kidney has a variable content of ornithine decarboxylase about 10–100-fold higher than that of rat liver, spleen, pancreas, heart, brain or uterus. Prostate is the only other tissue with comparable activity. The enzyme activity in the kidney is equally high in male and female rats and is not significantly affected by orchidectomy, ovariectomy or adrenalectomy, or (in the male) by injection of testosterone (25 mg/kg) or oestradiol (2.5 mg/kg). Unilateral nephrectomy produces a sixfold increase in enzyme activity in the remaining kidney 4 h after the operation, but a comparable though slightly smaller increase can be produced by sham operation or by partial hepatectomy. Thereafter the activity decreases, until 12 h after the operation it is at the normal pre-operative value (in unilaterally nephrect-

omized rats) or below it (in sham-operated rats). This increase can be prevented if the animal is maintained under continual Nembutal anaesthesia throughout the 4 h post-operative period or is treated with metyrapone (125 mg/kg) (a drug that inhibits 11β -hydroxylation of steroids). If normal rats are injected with dexamethasone phosphate (0.25 mg/kg) (a synthetic glucocorticoid) their kidneys 4 h later show an increase in the enzyme comparable with that produced by unilateral nephrectomy. Deoxycorticosterone acetate, a mineralocorticoid, has no effect at doses up to 2.5 mg/kg body wt. It seems likely therefore that the increased enzyme activity in the remaining kidney after unilateral nephrectomy is partially a non-specific response to the stress of the operation.

W. T. M. is grateful to the Science Research Council for a studentship.

Jänne, J. (1967) *Acta Physiol. Scand. Suppl.* **300**, 1–71

Raina, A. & Jänne, J. (1970) *Fed. Proc. Fed. Amer. Soc. Exp. Biol.* **29**, 1568–1574

Russell, D. & Snyder, S. H. (1968) *Proc. Nat. Acad. Sci. U.S.* **60**, 1420–1427

Schrock, T. R., Oakman, N. J. & Bucher, N. L. R. (1970) *Biochim. Biophys. Acta* **204**, 564–577

Snyder, S. H. & Russell, D. H. (1970) *Fed. Proc. Fed. Amer. Soc. Exp. Biol.* **29**, 1575–1582

Changes in the Pyrimidine Deoxynucleoside Triphosphate Pools of L5178Y Cells after their Exposure to Methotrexate and 5-Fluorouracil

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The pools of deoxynucleoside triphosphate in mouse L5178Y lymphoma cells in culture have been measured with a highly sensitive assay utilizing DNA polymerase (Solter & Handschumacher, 1969; Lindberg & Skoog, 1970). Contrary to the finding by Baumunk & Friedman (1971) in HeLa cells, we have observed a fall in the dTTP content of L5178Y cells after treatment with either methotrexate or 5-fluorouracil (at concentrations that inhibit the uptake of $[\text{H}]$ dUMP into DNA). This finding supports the hypothesis that methotrexate and 5-fluorouracil inhibit dTMP syntheses. An elevation in the concentration of the other pyrimidine deoxynucleoside triphosphate, dCTP, occurs subsequent to the fall in that of dTTP. No changes were seen in the concentrations of the purine deoxyribonucleoside triphosphates, dATP and dGTP. The extent of these changes in a heterogeneous population of cells was