In addition it is not unusual to observe disacchariduria in children with non-specific mental retardation and no clinical symptoms suggestive of malabsorption, though the connection between these findings is obscure.

As part of a more extensive study on the actions of circulating lactose, the effects of this carbohydrate on the concentrations of pyruvate, glucose 6-phosphate and metabolites of the citric acid cycle were measured in the brains of rats that had received regular injections of intraperitoneal lactose from the fifth to the twentieth days of life. According to the methods described by Goldberg, Passonneau & Lowry (1966) the mean concentration of isocitrate was significantly raised whereas those of the other metabolites showed no significant change compared with controls. Studies *in vitro* with a commercial preparation of isocitrate dehydrogenase showed 16 and 23% inhibition by 1mM- and 5mM-lactose respectively. Sucrose gave 10% inhibition, whereas glucose, galactose and maltose were without effect.

These five sugars caused no inhibition of preparations of fumarase, malate dehydrogenase and citrate lyase.

As yet there is no indication of the way in which raised concentrations of isocitrate might affect the brain. Possibly it might exert a direct physiological effect analogous to that of sucrose on lysosomes (Wattiaux, Wattiaux-de Coninck, Rutgeerts & Tulkens, 1964) or cause inhibition of a key enzyme.

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DEMONSTRATION

A Flow System for the Superfusion and Stimulation of Isolated Mammalian Tissues

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The system is based on the quick-transfer apparatus of McIlwain & Rodnight (1962), an analytical multi-channel peristaltic pump and an incubating bath. Each tissue sample (30–100mg) is held in a defined position in relation to stimulating electrodes in beakers containing 2.5–6ml of incubating fluid. The electrodes, tubes bringing gas mixtures and tubes supplying and removing incubating fluid are mounted on an easily removable plastic frame, which fits the beaker. After flowing over the tissue, the incubating fluid is collected in a series of sample tubes, which are changed at 1 or 2min intervals.

The apparatus is demonstrated with four to six samples from the brain separately superfused with glucose-bicarbonate saline media. Chosen flow rates are maintained, e.g. 3ml/min, which implies a fluid exchange similar to that *in vivo*. Though superfused cerebral tissues have been examined in

pharmacological studies (see below) little is known about their metabolic status. Results for tissues from the piriform cortex and the neocortex of the guinea pig in the present apparatus showed the tissue content of K^+ and of creatine phosphate to be well maintained and to be responsive to electrical stimulation, as also was their formation of lactic acid. This was the case after passage of fluid up to 2000 times the volume of the tissue sample.

Uptake and release of [3H]noradrenaline, [3H]serotonin and [3H]glycine were examined in tissues from guinea-pig piriform cortex (McIlwain & Snyder, 1970). Release of the noradrenaline and serotonin was greatly increased on electrical stimulation of the samples [cf. results of Baldessarini & Kopin (1967) and Srinivasan, Neal & Mitchell, (1969) for other parts of the brain], and charts showing these results will be exhibited.

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