with chemical mutagens, resulting in viable organisms with significantly altered physiology. Theoretically, the redundancy of controls in, for example, carbohydrate metabolism should make mutations that affect regulatory properties of enzymes more permissible. To illustrate, citric acid, a component of the Kreb's cycle and also the initial substrate for fatty acid biosynthesis, acts as an allosteric effector for three different enzymatic reactions. The summed effects of citric acting as an allosteric agent is to diminish oxidation of carbohydrates and enhance the biosynthesis of fatty acids (storage) under conditions of high ATP concentration.

The consequences of altering the regulatory properties of acetyl-CoA carboxylase, one site affected by citrate, have been evaluated in a computer simulation study. A very small (5-fold) decrease in the K_m of acetyl-CoA carboxylase for citrate would result in marked increase in the biosynthesis of fatty acids relative to oxidative metabolism. Experiments will be conducted with defined strains of mice to evaluate the predictions of the simulation model.

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Analysis of the color changes induced by serotonin (5-hydroxytryptamine) and lysergic acid diethylamide (LSD) in the fiddler crab, Uca pugilator. MILTON FINGERMAN AND K. RANGA RAO.

Serotonin in dosages of 0.1 μg and above per crab evoked pigment dispersion in the erythrophores of eyestalkless and intact *Uca*. Similar dosages of LSD evoked pigment concentration in the erythrophores of intact but not eyestalkless *Uca* (light patch variant from Panacea, Florida). LSD and serotonin were ineffective *in vitro* when assayed on legs isolated from *Uca* showing that they do not directly stimulate the erythrophores. In contrast, red pigment-dispersing and pigment-concentrating polypeptide hormones from the eyestalks were effective both *in vitro* and *in vivo*. Assay of extracts of supraesophageal ganglia with the attached circumesophageal connectives from serotonin-injected crabs revealed a marked decrease in the red pigment-dispersing potency of such extracts compared with controls, indicating that serotonin may have stimulated release of a red pigment-dispersing substance from the neuroendocrine system. In an effort to determine the mode of action of LSD, blood from LSD-treated crabs was assayed for erythrophorotropic activity on eyestalkless crabs. It was found that blood from LSD-treated crabs on a black background evoked more red pigment concentration than did that of the controls. Control crabs on a black background normally contain more red pigment-dispersing hormone than pigment-concentrating hormone. It appears that LSD shifted the hormone balance in the blood in favor of the red pigment-concentrating hormone by either inhibiting the release of red pigment-dispersing hormone or by stimulating the release of red pigment-concentrating hormone. The fact that LSD antagonized the action of serotonin but not that of the red pigment-dispersing polypeptide lends strong support to the view that LSD most likely acts by inhibiting the release of red pigment-dispersing hormone from the neuroendocrine system of the crab. The present studies and the finding of serotonin in the nervous system of *Uca* (Spirtes and Fingerman, unpublished data) indicate that this indolealkylamine may be normally involved in the control of color changes in this crab.

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Enzymatic hydrolysis of the nerve gases DFP and Tabun in relation to nerve function. FRANCIS C. G. HOSKIN.

The organophosphorus cholinesterase inhibitor, diisopropylphosphorofluoridate (DFP), is hydrolyzed by an enzyme in squid axons and especially in squid head ganglia called "DFPase" with a $K_m = 6.25 \times 10^{-3}$ *M*. Another organophosphorus cholinesterase inhibitor, ethyl N,N-dimethylphosphoramidocyanidate (Tabun), is hydrolyzed only slowly by squid nerve. At 10^{-2} *M* the rates are 750 ± 9 μmoles DFP and 83 ± 18 μmoles Tabun hydrolyzed per gram head ganglion per hour. The situation is reversed in rat serum, the rates being 11 ± 1 μmoles DFP and 77 ± 10 μmoles Tabun per milliliter serum per hour. The relative rates of hydrolysis of DFP, of Tabun, and of mixtures of the two by squid nerve indicate that the two substrates compete for a common site on a single enzyme. When a squid axon is bathed in 10^{-3} *M* Tabun, this compound penetrates in its active form, attaining about 50% of the outside concentration