

SUCCINATE DEHYDROGENASE ACTIVITY IN ORGANS OF ALBINO RATS POISONED WITH VIPER VENOM

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Injection of a toxic and lethal dose of venom of *Vipera lebetina* into rats caused considerable changes in succinate dehydrogenase activity (determined histochemically) in the liver, kidneys, myocardium, lungs, and brain. The character of the change in enzyme activity was dependent on the dose and duration of action of the venom.

EXPERIMENTAL METHOD

Viper (*Vipera lebetina*) venom in physiological saline was injected intramuscularly into albino rats. The animals were sacrificed 30-40 min, 3 h, and 24 h after injection of a toxic dose (4 mg/kg) and also 10-15 min and 2-3 h after injection of a lethal dose (10 mg/kg) and at the time of respiratory arrest. Succinate dehydrogenase (SDH) activity was determined by Nachlas's method [1] in tissue sections cut from various organs on a cryostat.

EXPERIMENTAL RESULTS

During the action of a toxic dose of the venom the most marked degenerative changes are observed in the liver and, in particular, in the kidneys, while the myocardium and brain were affected to a rather lesser degree. It is in these organs that the greatest decrease in SDH activity took place. In the myocardium a considerable decrease in SDH activity against the background of progressive degenerative changes was observed only after 24 h. In the brain, in addition to pericellular and perivascular edema, a very slight decrease in SDH activity was observed initially, progressing to a moderate decrease after the prolonged action of a toxic dose of the venom. In the lung tissue, where the changes are on the whole characteristic of a disturbance of lymph formation, there was actually a slight increase in SDH activity, to be replaced by a very slight decrease only after 24 h.

A different picture developed after administration of a lethal dose of venom. After 10 min the degenerative changes in the organs corresponded approximately to the level observed 24 h after administration of a toxic dose. Later the degenerative changes in all organs increased in intensity. To begin with the greatest decrease in SDH activity was observed in the myocardium and kidneys, closely followed by the level of decrease in SDH activity in the liver. A moderate decrease in SDH activity was observed in the lungs. At the time of respiratory arrest, a sharp fall in SDH activity was observed in the liver and a considerable fall in the lungs, together with progressive degenerative changes. In the kidneys, however, at this time there was a slight increase in activity of this enzyme. There was a particularly marked increase in SDH activity in the myocardium, almost to the level in the control animals. At all times after administration of a lethal dose of venom the level of SDH activity in the brain tissue was a little higher than in the control.

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The increase in SDH activity in the myocardium and kidneys at the time of respiratory arrest can to some extent be associated with the considerable increase in permeability of the vessels and cell membranes taking place through the action of V. lebetina venom, and also, perhaps, with binding of inhibitors of oxidative enzymes.

The results of these experiments thus showed that the character of the changes in SDH activity depends on the duration of action and dose of venom. As a rule, the level to which the enzyme activity falls corresponds to the severity of the degenerative changes in parenchymatous organs.

LITERATURE CITED

1. M. Nachlas et al. J. Histochem., 5 420 (1957).