2. Title: LDH Isozymes in P. coatneyi Simian Malaria.

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OBJECTIVE

Previous studies of P. coatneyi in the rhesus monkey have shown that deep vascular schizogony takes place principally in the myocardial capillaries and to a lesser extent in the capillaries of the liver and lung. The objective of this study is to determine whether the aggregation of schizonts in the capillaries produces cellular damage in the host tissue to the extent that it would be reflected in the myocardial and liver fractions of the serum L.D.H. Since the heart and liver fractions of the total LDH are organ specific and serum LDH is a highly sensitive indicator of acute cellular damage, the isozyme pattern (isogram) in deep vascular schizogony should show whether there is accompanying cellular injury.

PROGRESS

Six rhesus monkeys (four splenectomized and two intact) were infected with P. coatneyi. Total serum LDH, isozymes, parasite counts, hematocrit, and serum hemoglobin were followed at 8–12 hr. intervals. The animals were sacrificed when they became moribund or when the parasitemia subsided to a mild chronic phase. Crush preparations of major organs and tissues were made in order to determine the extent of schizont sequestration within the deep vasculature. Histologic sections of major organs and tissues were made, and specimens of liver and kidney were processed for electron microscopy.

The total serum LDH was elevated to some extent in all six animals after infection, and the level of activity correlated with the severity of the infection. The isozyme distribution was the same as in normal serum ("isomorphous".).

DISCUSSION

Elevation of the total serum LDH with an isomorphous isozyme pattern is seen in conditions as diverse as multiple myeloma, metastatic carcinoma, tuberculosis, collagen disease, polycythemia rubra vera, and erythrocytosis secondary to hypoxia. It has recently been reported that, in a small series, the isomorphous pattern corresponds to thrombocytosis.[1] Platelets were not counted in our experiments; however, thrombocytopenia has been reported in malaria.[2] The normal serum LDH is in some way related to a platelet factor[3].

At the present time, there is not a unifying concept to explain all these observations, but they do fit into a general framework. The isomorphous pattern is probably produced by a platelet factor. The thrombocytopenia of malaria could well be due to increased destruction of platelets. Another feature of malaria—increased capillary permeability—suggests a platelet factor.

From the above data and speculations we can derive the hypothesis that platelets are destroyed at an increased rate in malaria releasing factors which increase vascular permeability and which activate the serum LDH.

SUMMARY

Six rhesus monkeys infected with P. coatneyi had elevated total serum LDH with an isomorphous isozyme pattern. It is postulated that the source of the increased serum LDH activity is not injured tissue but a platelet factor.

REFERENCES

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