

ABSTRACT

Studies on the *in vivo* effect of gossypol on nuclear basic proteins and other proteins were performed on rats orally dosed with 20-25 mg gossypol/kg/day for 75-100 days. Nuclear basic protein patterns showed variation between different animals. About 85 % of animals failed to show any changes in the non-H1 histones (H2A, H2B, TH2B, H3, H4), the H1-like histones (H1, TH1) or in the testis-specific protein (TP) after gossypol treatment. About 15 % of gossypol-treated animals showed decreased levels of the testis-specific histones TH1 and TH2B in the testis, but no other changes in testis or liver. No changes were detected in the SDS-PAGE patterns of mitochondrial, membrane and cytosolic fractions of liver or testis after gossypol treatment.

The lactate dehydrogenase isozymes LDH-X, LDH-1 and LDH-5 were purified from rat testis, rat heart and rat liver respectively. Kinetic studies indicate that LDH-X has a greater ability than other isozymes to utilize other substrates besides L-lactate and pyruvate. All three isozymes were inhibited by the presence of gossypol: there appeared to be no major differences in the inhibition constants of the different isozymes. Gossypol appeared to show some irreversible inhibition: LDH-X was more sensitive to this inhibition than other isozymes when lactate was used as substrate. Coenzyme and substrate provided some protection from gossypol inhibition. Oral administration of gossypol (25 mg/kg/day for 75 days) caused a decrease in the specific activity of LDH in heart but not in other tissues. Some changes were observed in the relative distribution of LDH isozymes in some animals but these changes were not consistent.

The presence of gossypol significantly decreased the rate of lysis of fresh human semen coagulum and also inhibited the ability of dialysed human seminal plasma enzymes to digest heated semen at pH 8.0 and pH 2.5. The proenzyme form of the acidic proteinase responsible for digestion at pH 2.5 was purified. Gossypol was shown to inhibit the acid-induced activation of the proenzyme of seminal plasma acidic proteinase, reacting with 8 out of the 11 lysine residues in the proenzyme. The tissue origin of the seminal plasma acidic proteinase was studied by kinetic comparisons and by immunoperoxidase staining, and it was shown that seminal plasma acidic proteinase was a gastricsin-like enzyme, produced in the prostate in an inactive precursor form.