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Mouse Liver Dihydrodiol Dehydrogenases. Identity of the Predominant and a Minor Form with 17 β -Hydroxysteroid Dehydrogenase and Aldehyde Reductase

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A major and a minor form of dihydrodiol dehydrogenase were co-purified with 17 β -hydroxysteroid dehydrogenase and aldehyde reductase, respectively, from mouse liver cytosol. The major form of the enzyme showed higher affinity for 17 β -hydroxysteroids and 17-ketosteroids than for xenobiotic alcohols. The dehydrogenase activities for hydroxysteroids and dihydrodiols exhibited identical heat stability and sensitivity to several inhibitors. The minor form of the enzyme reduced various aldehydes and was specifically inhibited by barbiturates and sorbinil.

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Purification and Characterization of NADP-dependent 3 α -Hydroxysteroid Dehydrogenase from Mouse Liver Cytosol.

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A monomeric 3 α -hydroxysteroid dehydrogenase with a molecular weight of 34,000 was purified to apparent homogeneity from mouse liver cytosol. The enzyme catalyzed the reversible oxidation of the 3 α -hydroxysteroids, reduced various carbonyl compounds, and was inhibited by SH-reagents, synthetic estrogens, anti-inflammatory drugs, prostaglandins, and 4⁴-3-ketosteroids. Uncompetitive substrate inhibition with respect to NADPH was observed in the reverse reaction. Steady-state kinetic measurements in both directions indicated that the reaction proceeds through an ordered bi bi mechanism with NADP(H) binding to the free enzyme.

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Purification of Cytosolic Estradiol 17 β -Dehydrogenases from Male and Female Mouse Liver.

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Three forms of 17 β -hydroxysteroid dehydrogenase were purified from liver cytosol of male ddy mice. All forms of the enzyme were monomeric proteins with the same Mr of 36,000 but differing charges. The enzymes oxidized estradiol-17 β , 17 β -hydroxyandrostanes, and nosteroidal alicyclic alcohols with NADP or NAD as a cofactor, and reduced estrone-3-sulfate, 17-ketoandrostanes and xenobiotic carbonyl compounds in the presence of NADPH. The three enzymes were not immunologically distinguished from one another. Female mouse liver cytosol exhibited the same level of 17 β -hydroxysteroid dehydrogenase as that in male liver cytosol, and also contained the three enzyme forms.