A5

EFFECTS OF FRUCTOSE AND ETHANOL ON LIVER PROTEIN SYNTHESIS. A. Sessa and A. Perin, Institute of General Pathology, and C.N.R. Center for Research in Cell Pathology, Univeristy of Milan, Milan, Italy.

Fructose (FR) produced increase in the rate of ethanol (ET) metabolism, probably by means of its metabolites, by promoting the reoxidation of NADH arising from oxidation of ET. Since the shifting of the redox level may influence protein synthesis in liver cells that metabolize ET the effects of FR & ET alone and combined on protein synthesis of rat liver slices were studied. FR depressed leucine incorporation into cell proteins of rat liver and increased the ET-induced inhibition of protein synthesis. Glucose did not modify the effect of ET on protein synthesis. Kinetic experiments showed that protein synthesis inhibition by ET plus FR was reversible. The inhibition of protein synthesis by FR was correlated with a depletion of liver ATP. Moreover, D-glyceraldehyde, a metabolite of FR, was a strong inhibitor of liver protein synthesis, and like FR it enhanced the inhibitory effect of ET. These results suggest that FR largely increases the toxic effect of ET on liver protein synthesis.

A6

DISTRIBUTION OF ALCOHOL (ADH) AND ALDEHYDE DEHYDROGENASE (ALDH) IN THE RAT TESTIS. F. S. Messiha, J. Hutson, J. Webb and T. Wilkinson, Texas Tech University, School of Medicine, Lubbock, Texas 79430.

NAD-dependent ADH and ALDH have been reported in the rat testis. However, little is known on the localization of both these enzymes which are involved in the immediate metabolism of ethanol (ET) and acetaldehyde. Adult male rat Sprague Dawley testes were dissected into interstitial (IS) and semineferous tubule (ST) components by microdissection. Purity and homogenity of the separated testicular tissue were verified by morphological technique. The cytoplasmic fraction served as the source of the enzymes. Testicular ADH was confined to the IS tissue. This accounted for 4.3 $\pm$ 0.8, nMol/min/mg protein, compared to 1.0 $\pm$ 0.1 units measured for ADH in the whole testis. Testicular ALDH was greater in the IS, 12.6 $\pm$ 4.5 units than in the ST, 4.0 $\pm$ 0.7 units, portion of the testis. Utilization of line-weaver Burk plots for kinetic studies showed that ALDH in the ST portion of the testis possesses approximately 18 fold greater affinity towards the substrate compared with ALDH in the IS. This finding suggest that the ST portion of the testis is responsible for the metabolism of ET and acetaldehyde and that ST-ALDH is probably more sensitive to the toxicity of ET-derived acetaldehyde in the testis.

A7

VOLUNTARY ETHANOL CONSUMPTION, AS A FUNCTION OF ESTRUS, IN ADULT, SINCLAIR(S-1) MINIATURE SOWS. P. Van Cleve*, M.E. Tumbleson, J.D. Dexter, J.L. Tinsley and C.C. Middleton, Sinclair Comparative Medicine Research Farm, College of Veterinary Medicine and School of Medicine, University of Missouri, Columbia, MO 65201.

Voluntary ethanol consumption was determined, for a 1 year period, for 6 Sinclair(S-1) miniature sows. Each sow was fed a daily ration and daily ethanol consumption was quantitated at 0800 hours. Water was supplied ad libitum. Ethanol was supplied ad libitum as a 20% (w/v) aqueous solution. Mean body weight was 43 kg at the initiation of the study and 59 kg at the end of the 12-month period. Each of the 2-year-old sows had access to ethanol for approximately 6 months, during which time each had farrowed and nursed a litter of piglets. Each sow was at least 4 weeks postlactation prior to initiation of the study. The mean estrus period was 20.2 days. For the 364-day study, mean ethanol consumptions were 3.34, 3.53, 3.87, 4.00, 4.48 and 5.17 g/kg body weight/day. Mean ethanol consumption, during the 3-day estrus period, was 1.68 g/kg body weight/day. For the 3-day midestrus periods, mean ethanol consumption was 5.20 g/kg body weight/day. For one sow, mean ethanol consumptions, during the 3-day estrus and 3-day midestrus periods, were 0.48 and 5.75 g/kg body weight/day, respectively. For the 364-day study, the 6 sows had 17, 56, 14, 26, 16 and 26 days when less than 0.25 g ethanol/kg body weight was consumed and 30, 66, 60, 56, 86 and 138 days when more than 6 g ethanol/kg body weight was consumed. Supported in part by a grant from the USBA.

A8

Plasma Ethanol Disappearance Rates in Protein Malnourished, Adult Sinclair(S-1) Miniature Swine. M.E. Tumbleson, J.D. Dexter, and C.C. Middleton, School of Medicine and Sinclair Research Farm, Univ. of MO, Columbia, MO 65212.

For a period of 6 months, adult Sinclair(S-1) miniature swine were fed a control ration (Gp 1), a control ration and aqueous ethanol (Gp II), a low protein ration (Gp III), a low protein ration and aqueous ethanol (Gp IV) or a low protein ration and ethanol in beer (Gp V). Fresh drinking water was supplied ad libitum. Dietary ethanol solutions were supplied ad libitum. Diets were formulated to provide similar daily intakes of calories, protein, vitamins and minerals. Prior to intragastric intubation of a 50% (w/v) solution of aqueous ethanol, each pig was feed fasted for 24 hours and water and ethanol fasted for 16 hours. Each of the 48 pigs was given a dose of 2 g ethanol/kg body weight. Rates of plasma ethanol disappearance (mg/dl/hr) were 12, 18, 13, 19 and 19 for pigs in Gps I, II, III, IV and V, respectively. Postintubation hours to plasma ethanol levels of 100 mg/dl were 19, 12, 21, 13 and 11 for pigs in Gps I, II, III, IV and V. Regardless of dietary protein intake, alcohol naive pigs cleared ethanol from the plasma only two-thirds as rapidly as did chronic ethanol consuming pigs. Also, naive pigs required 55% more time to clear plasma ethanol to 100 mg/dl, than did chronic ethanol consuming pigs. Supported in part by a grant from the USBA.