

THE EFFECTS OF LOW PROTEIN DIET AND LIGHT DEPRIVATION ON ZINC STATUS AND GONAD FUNCTION IN ADULT MALE RATS

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Testicular development can be influenced or inhibited by a number of factors including both light and dietary protein deprivation. Since zinc has also been identified to have an influence on the reproductive process, quantitative examination of Zn status due to the combined effects of restricted dietary protein level and light deprivation might provide better understanding of the mechanism involved. Four groups of six male Fischer-344 rats at 10 weeks of age were placed on two different dietary protein levels, 20% or 6.7% casein, under two photoperiod regimes, normal lighting (LD) or continuous darkness (DD). The experimental diets were made in accordance with AIN93G. The phosphorus level of the 6.7% casein diet was adjusted to be equal to the 20% casein diet and L-cystine level was reduced in proportion to the protein level. After a four weeks feeding period there was no significant ($p < 0.05$) effect of protein level or photoperiod on growth. The groups kept on the low protein diet (6.7%LD and 6.7%DD) had the highest fecal and urinary Zn output so that by week 4 these two groups had significantly ($p < 0.05$) lower Zn retention. In addition these two groups showed compromised Zn status evidenced by significantly lower ($p < 0.05$) femur, serum and testes Zn concentration. Serum dihydrotestosterone (DHT) level was significantly reduced by continuous darkness either alone or in combination with protein restriction (20%DD and 6.7%DD ($p < 0.001$), and 6.7%LD ($p < 0.005$)). The results suggested that lower dietary protein intake significantly ($p < 0.05$) reduced Zn status but not to a deficient level, perhaps due to mitigating effects of maintaining dietary phosphorus : calcium ratio equivalency amongst diets. The reduction in serum DHT levels is not caused by low protein level *per se* but also by Zn status and that DHT is perhaps more sensitive to Zn availability than other parameters examined here.

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