Endrin Induced Alterations in Bound Carbohydrates in Rat Serum
by Ronald L. Coleman
Departments of Environmental Health and Biochemistry,
University of Oklahoma, School of Health,
Oklahoma City, Oklahoma 73104

Introduction

The varied effects of endrin, a highly toxic cyclodiene pesticide, have been recently reviewed (1). In general, endrin manifests its effects through action on the central nervous system. Evidence of additional alterations in the composition of blood serum has been shown by shifts in certain trace metal concentrations following acute (2) and sub-acute (3) oral ingestion of endrin. The purpose of the present study was to determine if endrin induces alterations in rat blood serum lipoproteins, electrophoretic distribution of serum proteins, and bound carbohydrates. Any alterations in bound carbohydrates would indicate metabolic alterations in serum glycoproteins which as a class could be involved directly or indirectly in the defense and repair metabolism of the blood systems.

Procedure

The experimental animals consisted of adult male Holtzman albino rats having an average weight of 197 g. The animals were randomized into seven groups of ten rats each and allowed to receive water and Rockland Mouse Breeder diet ad libitum. The control animals received peanut oil without endrin and with one group being sacrificed at each of the following time periods: 0, 5, 12 and 19 days. The exposed
groups were sacrificed after having received endrin for 5, 12 and 19 days, respectively. Endrin was prepared in commercial grade peanut oil, 1 mg per ml, and injected intraperitoneally once each day at a dose level of 1 mg of endrin per kg of body weight.

The animals were sacrificed by first placing each under anesthesia with diethyl ether, then opening the abdominal cavity and exsanguinating the animal by inserting a needle attached to a heparinized syringe into the abdominal aorta just above the iliac arch. The blood plasma was separated by centrifugation at 15,000 x g for 5 min.

Protein concentrations were determined by the Folin-phenol method of Lowry et al. (4). Protein bound neutral sugar was analysed by the tryptophan method (5) with mannose and galactose as standards and Winzler's method (6) was employed in the analysis of protein bound hexosamine content. Free and bound sialic acid, as N-acetylneuraminic acid, was determined before and after hydrolysis for 1 hour at 80 °C in 0.1 N sulphuric acid according to the method of Warren (7). Free sialic acid was not detected in the serum. Bound methylpentose, as fucose, analysis was performed by the method of Gibbons (8). Electrophoresis on paper was conducted in 0.075 M barbital buffer, pH 8.6, for 16 hours at 5 ma. Duplicate strips were stained for general protein and lipoprotein by the method of Shetlar et al. (9).

Results and Discussion

The paper electrophoresis results for lipoprotein, albumin, alpha_1, alpha_2, beta and gamma globulins demonstrated no statistical significant differences at the 0.05 level between control and endrin treated