

Relationship Between Onset of Egg Production and Plasma Cholesterol Levels in the Chicken.* (22953)

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With the current interest in plasma cholesterol level and its relationship to atherogenesis, it seemed of interest to report the pattern of plasma cholesterol during maturation in the chicken. Lorenz *et al.*(1) observed a rise in the level of blood cholesterol and total lipids during puberty. The present study extends these observations and demonstrates the biphasic nature of this rise as related to the onset of egg production.

Method. Plasma cholesterol was determined in a group of 20 Leghorn pullets at 3-4 week intervals beginning at 12 weeks of age. All birds were maintained in individual cages in a temperature regulated room. Cholesterol was determined by the method of Zlatkis *et al.*(2).

Results. The pattern of plasma cholesterol with increasing age is shown in Table I. Plasma cholesterol was observed to rise significantly ($P < 0.01$) from an initial value of 116 mg % to a value of 285 mg% at 168 days of age, which represents an increase of 146% over the initial value. Following this peak, there occurred a statistically significant ($P = 0.01$) decrease to 208 mg% which, however,

still represents a significant 79% increase over the initial value. The occurrence of the peak cholesterol level corresponds in time very closely to the onset of egg production; the average number of days to deposition of the initial egg was 155 days.

Discussion. The observed increase in the level of plasma cholesterol which confirms a previous report(1) may be due to the increase in estrogen activity at the time the bird begins laying. It must also be borne in mind that fat biosynthesis from the all-carbohydrate caloric intake of the bird plays only a minor role in the intermediary metabolism of the pullet prior to the commencement of egg production. The significant decrease from the peak value undoubtedly represents a physiological adjustment by the bird to the new stress of egg production and the concomitant deposition of large amounts of fat in the yolk. Unpublished data from this laboratory suggest that a similar initial rise and subsequent decline in plasma cholesterol may occur with continued administration of estrogen or cholesterol to mature hens.

Since the chicken has become a widely used experimental animal in the study of sclerosis and cholesterol metabolism, the present study points up the importance of ascertaining the stage of development of experimental birds. If females are to be used, it would seem desirable to select for experimental purposes either non-laying immature birds or females in active production for several months.

Summary. Plasma cholesterol levels have been studied as a function of age and onset of egg production in Leghorn pullets. Following a highly significant increase of 146% with peak value corresponding closely to time of first egg, plasma cholesterol decreases significantly from peak value to 79% above initial value. It is suggested that this relationship be considered when choosing birds for

TABLE I. Relationship of Plasma Cholesterol Level to Onset of Egg Production.

Age of birds (days)	% of birds in egg production	Plasma cholesterol (mg %)
84	0	116 $\pm$ 2*
105	0	152 $\pm$ 2
133	5	223 $\pm$ 31
168	90	285 $\pm$ 24
172	100	
198	100	208 $\pm$ 15
232	100	238 $\pm$ 16

* Stand. error of mean.

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experimental studies on cholesterol metabolism.

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Phenaglycodol:* A New Antiepileptic Agent. (22954)

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Phenaglycodol (2-p-chlorophenyl-3-methyl-2, 3-butanediol) has, by rat screening methods, anticonvulsant and sedative properties.‡ These authors report the following oral doses for rats: electroshock $ED_{50} \pm SE = 63.0 \pm 6.6$ mg/kg; metrazol $ED_{50} \pm SE = 45.1 \pm 7.7$ mg/kg, ataxia $ED_{50} \pm SE = 86.5 \pm 6.1$; hypnotic $ED_{50} \pm SE = 165.7 \pm 16.6$ mg/kg; and the $LD_{50} \pm SE = 832.4 \pm 37.5$. Evaluation in humans with difficult to control grand mal, petit mal or mixed epilepsy also indicates anticonvulsant activity.§ An attempt was, therefore, made to demonstrate anticonvulsant activity in patients with focal brain damage and epilepsy.

Method. Twelve patients with focal brain damage and epilepsy received identically appearing experimental medications orally every 8 hours. Each medication was given for 3 days of one week. The medications were randomized among the patients. Focal and generalized seizures were reported by attendants who had no knowledge of the medications given. Each focal seizure was scored

1 point and each generalized seizure was scored 2 points to give a daily seizure score for each patient. The score on the fourth day when their regular medications were again given was also included. Patients with no seizures during the study periods were excluded as non-epileptics; patients with more than 6 seizure points during any 8-hour period were given sodium phenobarbital intravenously and excluded from the study. A detailed description of this method has been reported previously(1).

Results. The results with the various medications are presented in Table I. As variance analysis (Table II) indicates, significant ($p > 0.05$) effects were produced by both phenaglycodol and phenobarbital. The two together apparently have an additive effect.

Discussion. Phenaglycodol lacks the structural characteristics which have been associated with anticonvulsant activity. In comparison with phenobarbital, larger doses are required; however larger doses are also tol-

TABLE I. Sums of Daily Seizure Scores from 12 Patients. Totals are given in parentheses.

	Phenobarbital in mg												Total			
	0				25				100							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Phenaglycodol, 400 mg	8	6	17	5	6	11	13	9	0	4	2	4	14	21	32	18
			(36)				(39)				(10)			(85)		
Blank	8	18	51	12	2	14	26	8	2	6	6	4	12	38	83	24
			(89)				(50)				(18)			(157)		
Total	16	24	68	17	8	25	39	17	2	10	8	8	26	59	115	42
			(125)				(89)				(28)			(242)		

* 'Ultran' (Phenaglycodol, Lilly).

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‡ To be published.

§ Personal communication.