

NUCLEIC ACID CONTENT IN EMBRYONIC LIVER  
AND EFFECT OF HUMORAL GROWTH STIMULATORS  
ON  $P^{32}$  INCORPORATION INTO LIVER RNA

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Cock and human plasma albumin, if injected into chick embryos, accelerates liver growth. The nucleic acid content in the liver is not thereby increased but incorporation of  $P^{32}$  into RNA is increased. Lauric and bilirubin complexes of egg albumin have a tendency to increase  $P^{32}$  incorporation into RNA.

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Although not validated experimentally, the view that plasma albumin inhibits liver growth is widely held among investigators studying the processes of embryonic growth and regeneration [5, 6]. Contrary to this hypothesis, the author has shown that cock or human plasma albumin, if injected into chick embryos, increases the weight of the liver irrespective of the increase in its water content. A complex of egg albumin with bilirubin, an insoluble substance transported in the blood by albumin, acted in a similar manner. Egg albumin itself did not increase the weight of the liver [2]. To study the participation of blood albumin or its complexes with transportable substances in the system stimulating growth of the liver, biochemical and cytological investigations also are necessary.

The object of this investigation was to study the effect of cock and human plasma albumin and of egg albumin and its bilirubin and lauric complexes on the nucleic acid content in the liver and incorporation of  $P^{32}$  into liver RNA.

EXPERIMENTAL METHOD

Experiments were carried out on 534 chick embryos of the Russian White breed. Cock plasma albumin was isolated by Cohn's method with reprecipitation by ammonium sulfate and acetone [2]. The product was homogeneous on electrophoresis and its sedimentation constant was 4.5 S. The remaining substances used in the investigation were commercial products. The content of nucleic acids in the liver and incorporation of  $P^{32}$  into them were determined by the usual methods [1, 3, 4, 7, 8, 10].

EXPERIMENTAL RESULTS

Injection of blood plasma and egg albumin into 8- and 12-day embryos caused no changes in the liver nucleic acid content during the subsequent 24 h. The values of the nucleic acid content agreed with those obtained by Leslie and Davidson [8, 9]. Nevertheless, cock plasma albumin, when injected into 8-day embryos, produced an increase in the mitotic index of the liver parenchyma after 24 h from  $0.52 \pm 0.04$  to  $0.95 \pm 0.08\%$  ( $P < 0.01$ ), and also an increase in the nuclear volume of the hepatocytes, i.e., it stimulated growth of the liver. It can be concluded that stimulation of liver growth by plasma albumin is not accompanied by accumulation of nucleic acids in the liver. This distinguishes this process from regenerative hypertrophy of the liver, characterized by an increase in nucleic acid content [6]. The nucleic acid content in the liver of 8-day embryos 3-6 h after injection of the bilirubin complex of egg albumin was lowered by 20-25% ( $P = 0.01-0.05$ ), possibly indicating acceleration of liver differentiation or hypertrophy of the liver cells through its action.

The relative specific activity (RSA) of RNA 4 h after injection of cock albumin into 12-day embryos was increased by 2.9 times ( $P = 0.02$ ), and by 2.4 times ( $P = 0.02$ ) after injection of human albumin. This

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effect disappeared after 7 h, and after 13 h it was replaced by a decrease in the RSA of RNA. Egg albumin had no effect on the RSA of RNA, but its complex with bilirubin and lauric acid had a tendency to increase the RSA. The increase in liver RNA synthesis produced by plasma albumin is thus species-nonspecific.

It can be concluded from these results that plasma albumin or its complexes with transportable substances act as stimulation in the system regulating growth of the liver.

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