## Suppression by Actidione of Development of Rat Liver L-Tyrosine : 2-Oxoglutarate Aminotransferase Activity

Abstract. *The development of* L-*tyrosine : 2-oxoglutarate aminotransferase in newborn rats is suppressed by actidione (cycloheximide), an inhibitor of protein biosynthesis, administered immediately after birth.*

Actidione (cycloheximide) inhibits protein biosynthesis in cultured mammalian cells (*1*) and human lymphocytes (*2*). It also inhibits the inducible enzymes bacterial β-galactosidase (*3*) and rat liver tryptophan pyrrolase (*4*), but there is conflicting evidence on its effect on the inducible enzyme rat liver L-tyrosine : 2-oxoglutarate aminotransferase (EC 2.6.1.5) (TT). Induction (*4*), lack of induction, and partial inhibition of hydrocortisone induction (*5*) have been reported. We now report the effect of actidione on the developmental increase in rat liver TT which occurs during the first few hours after birth (*6, 7*).

Albino Wistar full-term rats were delivered by cesarean section under ether anesthesia. Immediately after delivery, newborn rats in the test group received 1 mg of actidione per kilogram of body weight in 0.05 ml of normal saline intraperitoneally, whereas controls received the same volume of normal saline alone. The animals were killed at timed intervals after birth. For each measurement, two livers were pooled and quickly cooled to 0°C. Assays for TT activity were carried out by the method of Lin and Knox (*8*).

Actidione consistently produced partial inhibition of developmental increase of TT activity (Table 1) from 2 to 12 hours after birth. Observations at 18 and 24 hours were precluded by heavy mortality in the animals injected with actidione.

The development of TT may be induced prematurely by glucagon (*9*) and inhibited by adrenalectomy (*7*), but the mechanism of this inhibition is unclear. Inhibition by actinomycin of TT development (*10*) suggests dependence on RNA synthesis and introduces the possibility that development results from *de novo* synthesis of enzyme protein. Indeed, in adult rats the hydrocortisone-induced increase in TT activity has been shown to be due to synthesis of new enzyme molecules (*11*), and its inhibition by actinomycin (*10*) suggests that, like the developmental increase, it is RNA-dependent.

Actidione appears to have a variety of effects on RNA synthesis. Thus it inhibits synthesis of ribosomal RNA in yeast (*12, 13*) and neurospora (*14*), but apparently not in cultured mammalian cells (*1, 15*). It suppresses RNA synthesis in cultured human lymphocytes after phytohemagglutinin stimulation, but it enhances RNA synthesis in unstimulated lymphocytes (*2*). However, in these systems protein synthesis is inhibited. The inhibitory effect by actidione on TT development is consistent with the concept that the latter results from an increase in the *de novo* synthesis of enzyme molecules.

Table 1. Effect of actidione on developmental increase of rat liver L-tyrosine : 2-oxoglutarate aminotransferase. Enzymatic activity is expressed as micromoles of *p*-hydroxyphenylpyruvate formed per gram of liver per hour at 25°C. Each value represents a measurement on two pooled livers.

| Controls | | Actidione injected |
|---|---|---|
| | *Hour 0* | |
| 0.9, 1.5, 0.5, 0.9 | | |
| | *Hour 2* | |
| 3.8, 4.1, 3.8, 4.9 | | 1.9, 2.4, 1.1, 1.7 |
| | *Hour 4* | |
| 21, 16, 15, 36 | | 2.4, 8.2, 1.5, 3.5 |
| | *Hour 6* | |
| 17, 18, 35, 62 | | 7.5, 7.5, 3.0, 5.1 |
| | *Hour 12* | |
| 110, 150, 55, 171 | | 3.8, 23, 18, 4.5 |

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**References and Notes**

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## Origin of Iridescent Colors on the Indigo Snake

Abstract. *In the indigo snake, a pattern of undulating lines on the surface of the skin, formed by the junction of rows of cells, acts as a two-dimensional optical diffraction grating to produce the play of colors. The distance between repetitive units of the pattern measured from observations made with an electron microscope are in agreement with those found by spectrometric analysis.*

The indigo or gopher snake, *Drymarchon corais*, variety *couperi* (Holbrook) is the largest North American snake, attaining a length of about 2.5 m (8 feet). The variety we studied inhabits the Gulf states. The specimen is jet black except for a white-to-coral strip located under the chin and extending posteriorly several centimeters. The entire scalation is highly polished and, in bright light, displays iridescent colors. Iridescence is enhanced by black pigmentation of the chromatophores located in the dermis and in the nonventral portions of the stratum corneum layer. However, rainbow colors may also be observed in the region of white or coral pigmentation.

These iridescent colors were recognized as structural colors, in which colors are produced by interference effects of the light, in contrast to color due to pigmentation. Other occurrences of structural colors in natural materials have been reported in the literature, for example, precious opal (*1*), certain feldspar minerals (*2*), crystals of potassium chlorate (*3*), fossil brachiopod shells (*4*), mollusk shells (*5*), viruses (*6*), and insects (*7*). Structural elements giving rise to interference effects are in every case arranged in a periodic array. The focus of our study was on the exact nature of the interference phenomenon and structure of the skin which cause this effect.

A skin from an indigo snake that had recently undergone ecdysis was obtained for study. The outside surface of the scales was highly polished, whereas the inside surface had a dull luster. Examination by light microscopy was made on ventral and lateral-dorsal scales. Transmitted light showed poorly resolved cellular units; reflected light revealed a pattern of uniformly spaced undulating lines extending perpendicularly to the medial axis of the specimen. This pattern was observed on both external and internal surfaces.