

DOPA in Ocular Pigment Cells in Mammalian Albinotic Embryos

DOPA (3,4-dihydroxyphenylalanine) is one of the intermediate metabolites in the biosynthesis of melanin. Recent studies have shown DOPA to occur in melanocytes and naevi cells in humans, in human malignant melanomas¹⁻³ and in certain experimental tumours⁴.

There are indications that the cellular DOPA content in skin structures is correlated with the tyrosinase activity⁵. This activity is also high in the ocular embryonic pigment cells⁶, but no previous records concerning DOPA in albinotic pigment cells are available. However, studies with the histochemical fluorescence technique of FALCK and HILLARP (cf. FALCK and OWMAN⁷) revealed a strong greenish fluorescence in the ciliary epithelium and retinal pigment cells in the eyes of albinotic embryos (rabbits, rats, mice, guinea-pigs) during the latter half of the pregnancy. The characteristics of the fluorescence⁷ suggested that it derived from a catecholamine or another catechol derivative (such as DOPA). Fluorimetric assays⁸ revealed peaks with the characteristics typical for DOPA, whereas no dopamine could be detected. The amount of DOPA was in the order of 0.01–0.03 µg per eye in albinotic rabbit embryos near full term. The fluorescence was seen in the cytoplasm in both layers of the ciliary epithelium and, weaker, in the retinal pigment

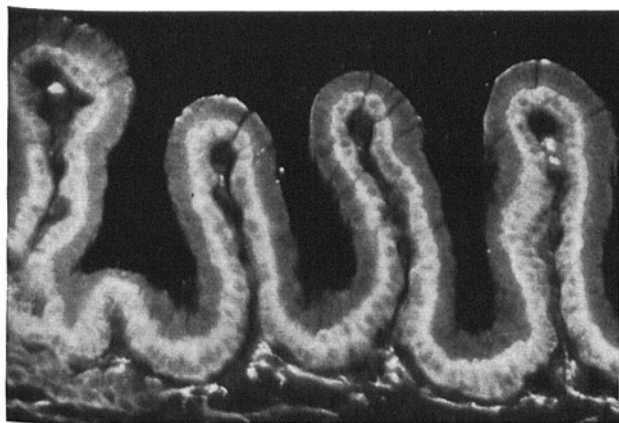
epithelium. The nuclei were non-fluorescent. The basal cell row was usually the most intensely fluorescent in the ciliary epithelium (Figure), the fluorescence often being accumulated at the apical part of these cells. In some guinea-pig embryos, where the albinism was incomplete, cells were observed both to fluoresce and to contain small numbers of melanin granules. In fully pigmented embryos, no specific fluorescence was observed. Neither was in any case any specific fluorescence seen in the ciliary epithelium or retinal pigment cells in a wide variety of adult pigmented or albinotic mammals. On the other hand, BERNHEIMER⁹ claimed that DOPA was present in cattle eyes; it should thus not be excluded that in certain adult strains or species DOPA may occur in ocular pigment cells.

The accumulation of DOPA in uveal albinotic cells during a restricted period of development is to be compared with the similarly restricted appearance of tyrosinase activity during the development^{6,10}.

Résumé. L'épithélium ciliaire des yeux d'animaux albinos (rat, souris, cobaye, lapin) contient du DOPA (0,01–0,03 µg par œil de lapin) au dernier stade du développement des embryons.

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Ciliary epithelium, guinea-pig embryo, 60 days gestation. Specific fluorescence in the basal cell row and, weaker, in the top row. Below the epithelium fluorescent adrenergic nerve fibres. ×175.

¹ B. FALCK, S. JACOBSON, H. OLIVECRONA and H. RORSMAN, *Science* 149, 439 (1965).

² B. FALCK, S. JACOBSON, H. OLIVECRONA and H. RORSMAN, *Archs Derm.* 94, 363 (1966).

³ B. FALCK, S. JACOBSON, H. OLIVECRONA, G. OLSEN, H. RORSMAN and E. ROSENGREN, *Acta dermat.-vener. Stockh.* 46, 65 (1966).

⁴ H. TAKAHASHI and T. B. FITZPATRICK, *Nature* 209, 888 (1966).

⁵ H. S. POMERANTZ and C. M. WARNER, *Biochem. biophys. Res. Commun.* 24, 25 (1966).

⁶ M. MIYAMOTO and T. B. FITZPATRICK, *Science* 126, 449 (1957).

⁷ B. FALCK and CH. OWMAN, *Acta Univ. lund. Sectio II, no. 7*, 1 (1965).

⁸ A. H. ANTON and D. F. SAYRE, *J. Pharmac. exp. Ther.* 145, 326 (1964).

⁹ H. BERNHEIMER, *Naunyn-Schmiedebergs Arch. exp. Path. Pharmacol.* 247, 202 (1964).

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5-Bromouracil and Induced Production of Fusaric Acid by *Fusarium oxysporum* f. *lycopersici* in Culture

The pioneering endeavours of GÄUMANN, KERN and their associates¹⁻³ blazed a luminous trail in the domain of phytopathology by elucidating the focal role of fusaric acid in tomato wilt syndrome induced by *Fusarium oxysporum* f. *lycopersici* (Sacc.) Snyder and Hansen. Although considerable interest has been aroused in the role of this vivotoxin ever since its discovery, only a couple of experiments⁴ to date have convincingly demonstrated the induced synthesis of fusaric acid in response to the distinct signal of the culture medium.

The fact that the substituted pyrimidines exert their mutagenic impact by replacing the bases of either DNA^{5,6} or altering the base composition of messenger or adapter RNA^{7,8}, and the knowledge that such reactions can be environmentally programmed, led the author to investigate whether such compounds, either activated by UV-irradiations or non-irradiated, could trigger the production of fusaric acid in defined nutrient milieu.

This communication reports the novel finding that fusaric acid is produced by *F. lycopersici* in response to the programmed environmental signal furnished by 5-bromouracil (both non-irradiated and UV-irradiated) on modified Asthana and Hawker's medium 'A'.

The medium with the following composition (Maltose 10 g, potassium nitrate 3.5 g; Potassium dihydrogen