

diverses voies d'adaptation exploitent au mieux les possibilités offertes par l'environnement.

Enfin, l'analyse des relations entre la vitesse de nage et la forme du corps nous a amené à conclure que les poissons rapides étaient les moins spécialisés au point de vue mécanique, tandis que les poissons lents révèlent, selon leur type, des complications diverses, probable-

ment en lien avec leur milieu, mais certainement pas avec la vitesse considérée isolément.

Nous suggérons, en manière de conclusion, que les poissons se fixent dans certaines conditions de milieu qu'ils cherchent à exploiter par leur développement même, sans toutefois que celui-ci puisse mener à la sur-adaptation.

## Brèves communications – Kurze Mitteilungen – Brevi comunicazioni – Brief Reports

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### Mast Cells, Tryptophan and 5-Hydroxytryptamine in Precancerous Mouse Skin

It has previously been shown that the golden-brown fluorescence of the numerous mast cells in precancerous mouse skin, fixed in formaldehyde, is due to their high content of 5-hydroxytryptamine (5-HT)<sup>1-3</sup>. It was thus of interest to look for precursors of 5-HT in such material.

40 young female white mice were divided into 2 groups. Half were painted twice, nape to tail, 7 days apart with a carcinogen, 0.5% 9,10-dimethyl-1,2-benzanthracene (DMBA) in acetone. The remainder were painted with 5% ethylphenylpropionate (EPP) in acetone, which causes epilation and epidermal hyperplasia, but is neither carcinogenic nor co-carcinogenic for mouse skin<sup>4,5</sup>. EPP was applied twice a week for the first month, three times a week for the second month and on alternate days for the third month, by which time the EPP mice had acquired a patch of epilation and epidermal hyperplasia grossly resembling that of the DMBA series. Papillomas in the DMBA mice were excised, and the remaining treated areas of both groups were subjected to histological and chromatographic examination.

Paraffin sections from skin fixed in 10% formaldehyde, or fresh frozen sections cut on a cryostat and fixed overnight in formaldehyde vapour, were first examined for fluorescence in UVL (Leitz Panphot) and then stained with toluidine blue at pH 3 for mast cells. This showed that initial painting with DMBA, or continuous treatment with EPP, both produce epidermal hyperplasia and a mast cell reaction. Following fixation in formaldehyde, the mast cells in both groups fluoresced golden-brown (maximal under a papilloma) and the hyperplastic epidermis showed a deep blue, alkali-resistant fluorescence. The small new mast cells in precancerous skin develop immediately under the hyperplastic epidermis: in EPP skin they lie at a deeper level.

The substances responsible for the two types of fluorescence were identified by paper chromatography. Epidermis and dermis were separated either by stretching and scraping or by immersion in alkaline trypsin at 4°C<sup>6</sup>. Pooled epidermis, dermis and the excised papillomas, were extracted twice with acetone and the residues re-extracted with 0.01N HCl. Ascending chromatograms were run in isopropanol, ammonia, water (20:1:2 by

volume), with tryptamine (T), tryptophan (TP), 5-hydroxytryptophan (5-HTP) and 5-HT as reference markers. Spraying with formaldehyde and heating the papers revealed that 5-HT was present only in the acetone extract of papillomas (Rf = 0.63, blue colour with *p*-dimethylaminocinnamaldehyde, golden brown fluorescence with formaldehyde). The separated epidermis of both groups contained TP (Rf = 0.16, violet colour with *p*-dimethylaminocinnamaldehyde, blue fluorescence resistant to spraying with alkali). Only a trace of TP was present in any specimen of dermis.

It has recently been shown that neoplastic mast cells in the mouse can convert TP into 5-HT via the intermediate, 5-HTP<sup>7,8</sup>. It would thus appear that the high content of 5-HT in the mast cells of both groups is derived from TP in the overlying, hyperplastic epidermis<sup>9</sup>.

*Zusammenfassung.* Nach Formaldehydfixation und Vorbehandlung mit dem Carcinogen DMBA oder Äthylphenylpropionat (das nicht cancerogen oder co-cancerogen wirkt) wird in der Epidermis der Maus eine Tryptophanbedingte blaue Fluoreszenz gefunden. Die gelbe Fluoreszenz in den Mastzellen beruht auf 5-HT.

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<sup>5</sup> Our thanks are due to Dr. F. L. ROSE for the sample of EPP.

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