

Results. Typical small axon terminals² from unmyelinated nerves were seen to be apposed to the plasma membrane of slow-type muscle fibres (Figure 1) in the unoperated animals.

The fine structure of the multiple endings in the operated group was identical with that of the controls

after both uni- and bilateral (Figure 2) cervical ganglionectomy, even 17 days after the operation.

The possibility that the multiple endings from unmyelinated nerves were derived from the superior cervical ganglion is thus excluded. The possibilities that the neurones of origin are located in the ciliary ganglion or arrive with the third or fifth cervical nerves are now under investigation.



Fig. 2. Myoneural junction from unmyelinated nerves 17 days after bilateral removal of superior cervical ganglion. No degenerative changes. $\times 30,000$.

Zusammenfassung. Die Ultrastruktur der aus nicht-myelinhaltigen Nervenfasern stammenden kleinen motorischen Endplatten in den Augenmuskeln der Ratte wurde untersucht. Strukturelle Veränderungen waren nach Entfernen des Ganglion cervicale superior nicht festzustellen.

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¹ M. v. DÜRING, Z. Zellforsch. mikrosk. Anat. 81, 74 (1967).

² H. TERÄVÄINEN, Z. Zellforsch. mikrosk. Anat. 90, 372 (1968).

³ H. DAVSON, in *The Eye* (Academic Press, New York 1962), vol. 3.

⁴ G. A. BRECHER and W. G. MITCHELL, Am. J. Ophthalm. 4, 144 (1957).

⁵ J. R. WOLTER, in *Proc. 7th Int. Congr. Ophthalm.* (Univ. Press, Toronto 1954), vol. 3, p. 1865.

⁶ J. R. WOLTER, Acta neuroveg. 5, 257 (1953).

⁷ D. D. SABATINI, K. BENSCH and R. J. BARNETT, J. Cell Biol. 17, 19 (1963).

⁸ J. H. LUFT, J. biophys. biochem. Cytol. 9, 409 (1961).

⁹ E. S. REYNOLDS, J. Cell Biol. 17, 208 (1963).

Identification of a Catecholamine in the Skin of the Toad, *Xenopus laevis*, and the Relation to the Physiological Melanophore Reaction

In 1960 DAVEY¹ published a hypothesis about the activity of MSH – in vitro – in relation to the physiological melanophore reaction. He postulated an indolalkylamine stored in the skin of *Xenopus laevis*, which caused dispersion of the melanophores initiated by MSH.

In order to investigate the storage of a biogenic amine in the skin of *X. laevis*, which is released during the dispersion reaction of the melanophores, an analysis was made of skin of light and dark adapted animals by the method developed by FALCK et al.²

Therefore toads were adapted during various periods to a white or black background. The toads were killed by plunging them into liquid nitrogen and pieces of skin were cut off in the frozen state and immediately lyophilized. Dried pieces of skin were treated with gaseous formaldehyde, embedded and sectioned for fluorescence microscopy.

The tissue sections were examined with activation filter UGI, maximum of transmission at 365 nm, and barrier filter 41, transmission from 410 nm (filter notations according to Schott). Just below the epidermis a strip of green fluorescing material was found. Compared with animals which were adapted for 3–6 days to a white background (Figure A), a decrease in the green fluorescence and a narrowing of the strip was observed

in animals which were adapted for the same period to a black background (Figure B).

Using the sodium borohydride reduction method of CORRODI et al.³, the fluorescence could definitely be ascribed to biogenic amines. The colour of the fluorescent material indicated a catecholamine rather than an indolalkylamine.

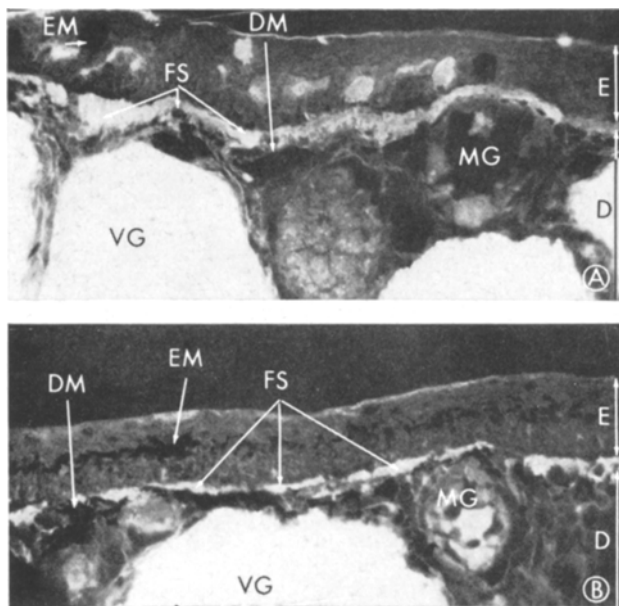
In order to investigate the nature of this catecholamine, a chemical analysis of a skin extract was made. Using the fluorimetric method of BERTLER et al.⁴, a distinction can be made between DOPA, noradrenaline, adrenaline and dopamine. An extract was made of about 800 mg dorsal skin of a light adapted toad. The catecholamines were separated on a column with negatively charged groups (Dowex 50W X-8 200–400 mesh) by elution with different solvents. With this method each

¹ K. G. DAVEY, Can. J. Zool. 38, 715 (1960).

² B. FALCK, N.-Å. HILLARP, G. THIEME and A. TORP, J. Histochem. Cytochem. 10, 348 (1962).

³ H. CORRODI, N.-Å. HILLARP and G. JOHNSON, J. Histochem. Cytochem. 12, 382 (1964).

⁴ A. BERTLER, A. CARLSSON and E. ROSENGREN, Acta physiol. scand. 44, 273 (1958).



Sections of the skin of *Xenopus laevis*. (A) Adaptation for 6 days to a white background. (B) Adaptation 6 days to a black background. D, dermis; DM, dermal melanophore; E, epidermis; EM, epidermal melanophore; MG, mucous gland; FS, fluorescent strip; VG, venom gland.

catecholamine has its characteristic elution volume. These various volumes were put together and analysed fluorimetrically. Only dopamine was clearly identified.

It can be concluded that in the skin of *X. laevis* a reservoir must be present filled with dopamine. Instead of the originally postulated indolalkylamine, the substance related to the physiological melanophore reaction seemed to be identical with dopamine. The relation between MSH, release of dopamine and dispersion of melanophores is being investigated further using pharmacological, histochemical and chemical techniques⁵.

Zusammenfassung. Mit Hilfe chemischer und histochemischer Technik gelingt in der Haut von *Xenopus laevis* der Nachweis eines dopamingefüllten Reservoirs. Das Catecholamin ist mit der physiologischen Melanophorenreaktion verbunden.

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Utrecht (Netherlands), 15 November 1968.

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Métamorphose expérimentale de la peau de queue du têtard d'*Alytes obstetricans* Laur. normalement destinée à dégénérer

D'anciennes expériences ayant montré que – chez les Batraciens Anoures – des greffons de queue transportés sur le corps dépérissent au moment de la métamorphose du porte-greffe, les auteurs avaient suggéré que les tissus de la queue du têtard possédaient des facteurs intrinsèques de dégénérescence. La seule exception à ces phénomènes connue jusqu'à ces dernières années était relative à des greffes de peau sur la columelle.

Dans des publications antérieures¹⁻³ nous avons écrit que, chez *Alytes obstetricans*, la corde de queue greffée sur le dos ne dégénère pas toujours mais peut devenir cartilagineuse au moment de la métamorphose de l'animal porteur.

Nous apportons ici les résultats de plus de 150 greffes de peau de queue sur le dos, réalisées au cours des trois dernières années sur des sujets issus de plusieurs élevages naturels (Tableau). Précisons que nous avons procédé pour ces greffes comme pour celles de corde ou de muscle¹⁻³, c'est à dire que nous avons pratiqué une petite fente sur le dos du porte-greffe et fait pénétrer par là un greffon de peau de queue que nous avons étalé le mieux possible sous sa propre peau; nous n'avons donc pas utilisé la technique classique qui consiste à remplacer un morceau de peau du porte-greffe par un autre. Il n'y a aucun doute à avoir sur l'origine des vésicules de peau

Résultats des homogreffes et des autogreffes de peau de queue effectuées sur le dos chez *Alytes obstetricans* Laur.

	Homogreffes			Auto-greffes
	1964	1965	1966	1966
greffes effectuées ^a	19	20	95	33
animaux morts	2	1	41	26
animaux tués	17	19	50	7
greffons retrouvés à la dissection	16	17	64	16
greffons analysables histologiquement	13	17	49	15
Animaux tués ou morts				
Avant l'apparition des pattes antérieures				
greffons nécrosés		1	7	4
greffons peau de têtard typique		15	12	8
Pendant la regression de la queue				
greffons nécrosés				3
greffons peau de têtard typique				3
greffons en évolution métamorphique				7
greffons métamorphosés				1
Au stade «petite grenouille»				
greffons nécrosés	4	1		
greffons peau de têtard typique	2			3
greffons en évolution métamorphique	3			4
greffons métamorphosés	4		9	3

^a Certains animaux ont reçu 2 greffons d'où la discordance entre le nombre d'animaux et celui des greffes effectuées.

¹ M. DELSOL et J. FLATIN, Bull. Ass. Anat., Marseille 290 (1966).

² M. DELSOL et J. FLATIN, Bull. Ass. Anat., Paris 398 (1967).

³ M. DELSOL et J. FLATIN, Association française pour l'avancement des Sciences, congrès de Bordeaux, juillet 1967; en cours d'édition.