

Freshwater Biological Association

FBA Translation (New Series) No. 132

Title: A contribution to the knowledge of the skin albuminose cells of
Torpedo ocellata Raf.

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Reference: Riv. Istochim. norm. pat. 8, 411-416

Original language: Italian

Date of publication of original: 1962

Translator: K. Dickson

Date of publication of translation: 1979

Number of pages of translation: 5 pages

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A contribution to the knowledge of the skin albuminose cells of
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CELADA, M. & DE PAOLI A.M.

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Glandular cells, other than the mucous cells, have been described in the skin of various groups of fish (Teleosts, Ganoids, Selachii) (Beccari) and they have been called 'albuminose' by Schneider and 'serous' by Kwietniewski and others.

The problem of whether these cells correspond to the cell types in the skins of lampreys (petromizonti) and amphibial larvae, still remains, although some authors (Rauther) suggest a distinction on a morphological basis.

We propose to study the albuminose cells in the skin of Torpedo ocellata Raf. from a histochemical point of view.

Our results can be considered together with the histochemical data of Manfredi-Romanini on the epidermal cell types of Petromyzon planeri and on the Leydig cells of the neotonous Triturus alpestris Laur.

Methods:

Fragments of the skin of Torpedo ocellata were fixed in 10% formalin for 6 days then dehydrated and embedded in the normal way.

The following histochemical reactions for polysacchorides were carried out:

- The reaction to periodic acid - Schiff according to Hotchkiss - in water at room temperature and after digestion with 2% diastase (diastasi) at 37°C for 60' mins.
- The reaction with Alcian Blue 8 GS;
- Simultaneous double staining with Alcian Blue 8 GS and Hotchkiss' reaction;
- Staining with 1% Toluidine blue (toluidina) in an aqueous solution for 1', followed by observation in water;

- Hali's reaction for acidic polysaccharides;

For proteins:

- Staining with Fast Green at pH 1;
- Staining with Fast Green at pH 8 according to Pollister;
- Staining with Bromophenol blue according to Mazia, Brewer and Alfert;
- Staining with naphthol yellow S (naftolo) after methylation (Deitch);
- Millon's reaction for total protein (with trichloro-acetic acid)

For ribo nucleic acids

- Staining with Galocynine chromalum after treatment with ribonuclease;
- Staining with pyronine at 1%, after treatment with ribonuclease;

Reaction to make particular functional groups evident:

- Reaction for phenolic groups: Diazo-reaction with the diazo compound of sulphanic acid and with Gurr's two diazo compounds, Azo Black and Diazo Blue;
- Reaction for polyphenol groups: with silver ammonium according to Masson-Hamperl;
- Morley and Sisley's reaction;
- Reaction for the SS and SH groups: with performic acid and peracetic acid - Schiff and Chevremont and Frederic's reaction;

For alcohol resistant lipids:

- Staining with Sudan black B (solution saturated in alcohol at 70°C).

Histomorphological indications.

The albuminose cells in the observed skin of Torpedo ocellata Raf. were not regularly distributed but occurred in groups.

The albuminose cells were three or four times as big as the surrounding principle epithelial cells, they are also more rounded. They are found in the medial region of the epidermis. They do not appear to have an adverse affinity to either the basal membrane or the surface.

The nucleus is small, and not always visible. There appears to be a granular material in the cytoplasm, which is composed of unequal sized and irregularly distributed granules. The heamat_oxyl_{in} stains an extensive reticulate structure throughout the cytoplasm which seems to entangle in its matrix the granulous. material. This impression is confirmed by the slides of some of the histochemical reactions. Moreover Romanini has suggested this tendency in the Leydig cells of the neotenus Triturus alpestris.

Table No. 1

Stains and reagents	Intracytoplasmic locations	
	Network irregular matrix	Granules of various dimensions.
Haematoxylin	+	-
Eosin	-	+
Hotchkiss	-	+
Hotchkiss-saliva	-	-
Alcian	+	-
Alcian Hotchkiss	prev. Alcian	prev. Hotchkiss
Toluene Blue	negative	double
Hale	+	-
Fast Green at pH 1	+	-
Fast Green at pH 8	+	-
Bromophenol Blue	+	+ -
Millon	-	-
Galocrynine-chromalum after ribo nucleases	+	-
Masson-Hamperl	+ -	-
Diazo reaction	-	+
Morel & Sisley	-	+
APF-Schiff	-	-
Sudan on embedded material	-	-

Results and Conclusions.

The albuminose cells have a complex morphological structure and a correspondingly complicated histochemical make-up.

A network in which the presence of ribonucleic acid entangles granules of various dimensions and chemical reactivity.

In most of the reactions of the neutral poly and mucopolysaccharides glycogen is clearly present.

Moreover in the reactions for proteins and particularly that of Morel

and Sisley, there was a negative response in only a small number of granules.

The first task of further research is to look at the generality of this data, not only for the skin of other selachii, but also for other groups of fish.

In fact it is sensible to maintain that these cells must have a similar chemical make-up corresponding to the similarity in their morphology.

In order to find a way of enlarging the present comparative view one could consider the granose cells of cyclostomes and the Leydig cells of the Urodel amphibians.

We must wait longer for a major comparison of albuminose cells with the granose cells of cyclostomes than with the Leydig cells because the histochemical data given in the literature (which however does not constitute such a complete picture as the present study) is more often about the latter relationship.

The names 'albuminose' (Schneider) and 'serous' (Kwietnewski) given to the cell we are studying by preceding authors, creates a question of how a cell of this type fits into the framework of the serous cell. The data collected contrasts with this at least in the main.

The secreted neutral mucopolysaccharides, which are unstained by the general reactions for proteins, cannot be identified with the normal serous granules.

Conversely the presence of ribonucleic acid and the positive result of Morel and Sisley's reaction, even though they were limited to a small part of the granules, agreed with the characteristics of cells with serous secretions.

We have not been able to achieve an agreement between our results and those of Junqueira and Bignardi who demonstrated the existence of granules responding positively to Hotchkiss's reaction or to the other characteristics of serous granules.

Therefore one must treat them as an example of cell with secretions of a particular type, which must and will be better incorporated when more is known of characteristics existent in other species.

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