

Historical approach on the lateral line organs of jack mackerel (*Trachurus japonicus*)

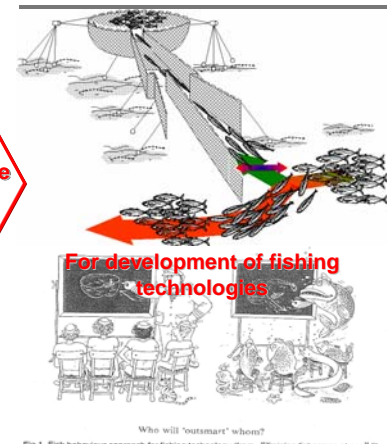
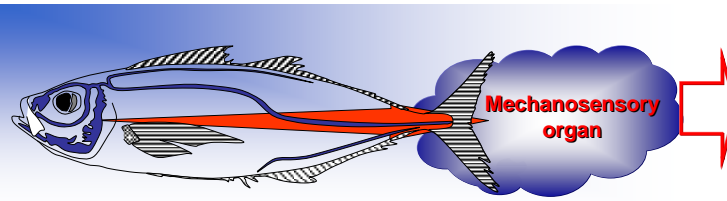
(マアジの側線器官に関する組織学的検討)

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Introduction



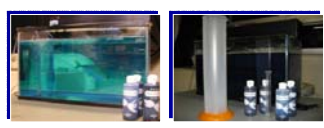
Purpose of the study; To describe the structure and function of lateral line and other organs for mechanical sensing

Materials and Methods

1. Visualization of lateral line canal and pores

Dying of the whole body with the methylene blue solution (1%)

Injection of hematoxyline solution into lateral canal at the head



2. Histological process

1. Fixation in 10% & 20% formalin (un-buffered)

2. Embedding in paraffin
 Transferred by ethanol 75%; Dehydrated by ethanol (80%, 85%, 90%, 95% & 100%); Cleared by Xylene; cut to 2-8 μ m.



Result

1. Structure of lateral line canal on the head and trunk

Notes:

- Supra temporal Canal, width 1 mm
- Postotic Canal, width 1 mm
- Otic Canal, width 1 mm
- Supraorbital Canal, width 1-1.5 mm
- Infraorbital Canal, width 1-1.5 mm
- Preoperculum Canal, width 1-1.5 mm
- Mandibular Canal, width 1-1.5 mm
- Main Trunk Line Canal
- Dorsal Trunk Line Canal } width 0.9-1 mm
- Ventral Trunk Line Canal

Injected by syringe and hematoxyline

Dyed in methylene blue solution (1%)

Distribution of lateral line canal in the head

Hematoxylin solution Methylene blue solution

Form of the lateral line in the trunk body

Deflecting caused by pectorals fin shape & position

Dorsal trunk line Main trunk line Ventral trunk line

3. Staining by hematoxylin-eosin



3. Hair cell (Transformation and translation organ)

Epidermis

Dermis

Otic canal

Hypodermis

Cupula

Neuromast canal

Cupula

Nucleus

Nerve ending efferent

Supporting cell

Basal membrane

Mitochondria

Ave. of hair cell dimensions; Height 1.43 μ m, width 0.48 μ m, nucleus 0.34 μ m ϕ .

2. Distribution of the pores (Receiver organ)

Estimation of number and density of the pores

N = 5
 TL = 19 - 22.5 cm

Density (mm²)

Number

Average of diameter of the pores

Diameter (μ m)

Density (mm²)

4A Nasal 4B Infraorbital 5 Mandibular

6 Dorsal surface of the head 7 Preoperculum 8 Trunk line

5 Pore 8A Pores of trunk line

5 Pores 7 Pores

4. Hypothesis

Sensitive area to detect the object

Higher density, Higher sensitivity...?

Different function depending on the area!

Side view Top view