

TOPIC

ELECTRORECEPTORS IN FISHES AND
THEIR FUNCTIONS

BY

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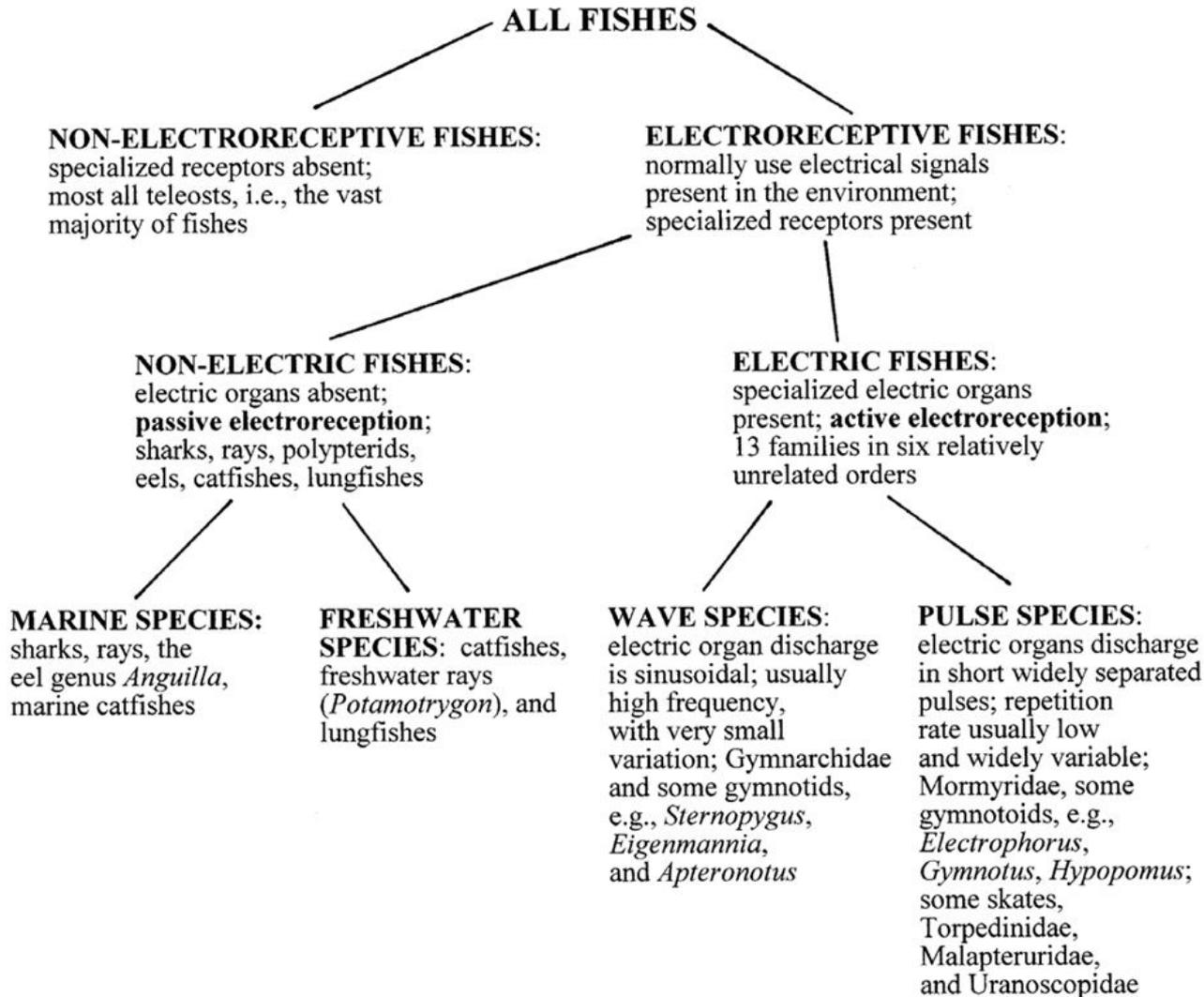
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INTRODUCTION

- **Electroreception is a biological ability to perceive electrical impulse.**
- **The primary functions of electroreceptors are OBJECT LOCATION which is important for feeding and navigation in turbid or dark environment, ORIENTATION and NAVIGATION which is often species specific.**

1. DISTRIBUTION OF ELECTRORECEPTION AMONG LIVING FISHES



Organ (structure) of Electroreceptor

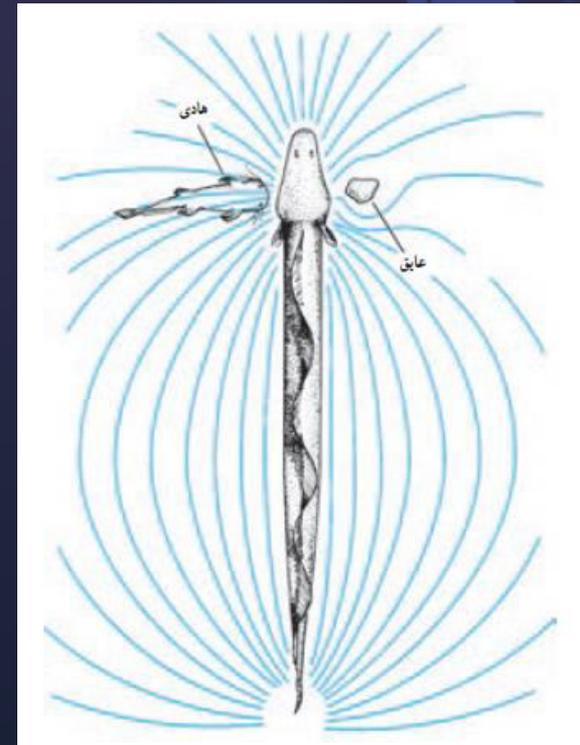
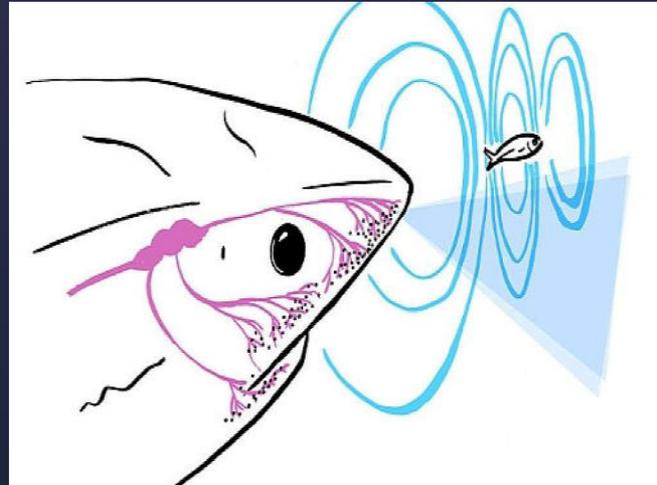
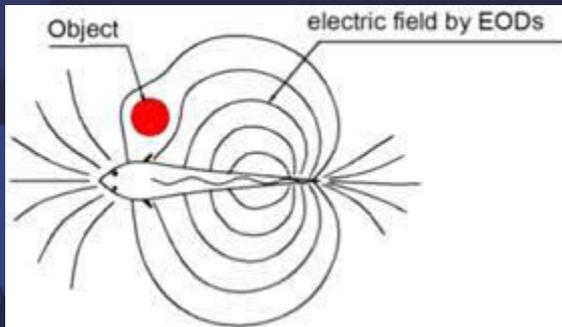
The electroreceptor organ is made up of a large number of disc like cells called electroplaxae or electroplates, it is embedded in a jelly-like extra-cellular material and bound together by connective tissue into an elongated tube or compartment. One face of each electroplate is supplied by nerve fiber and jelly receive blood capillary. Each electroplate is multinucleated cell with nearby transparent cytoplasm.

ELECTRO LOCATION

It is the ability of electric fishes to detect and localize objects around them. It allows electric fishes to hunt and navigate in the absence of visual cues at night or in turbid water. There are two main type of electro location found in fishes –

- 1. Active electro location**
- 2. Passive electro location**

ACTIVE ELECTROLOCATION



PASSIVE ELECTRO LOCATION

ELECTROGENESIS

- **Electroreceptor organs are modified muscle cells. These organs originate from various muscles in different part of the body-**
- **In torpedo, the entire electric organ has been derived from some of the bronchial muscles.**
- **In electric eel, the skates and the Mormyridae, lateral muscles of the tail are modified into electric organ.**
- **In the catfish, malapterurus, the electric organs develop from some body muscles.**
- **In the star-gazer, some of the eye muscles give rise to the electric organs.**

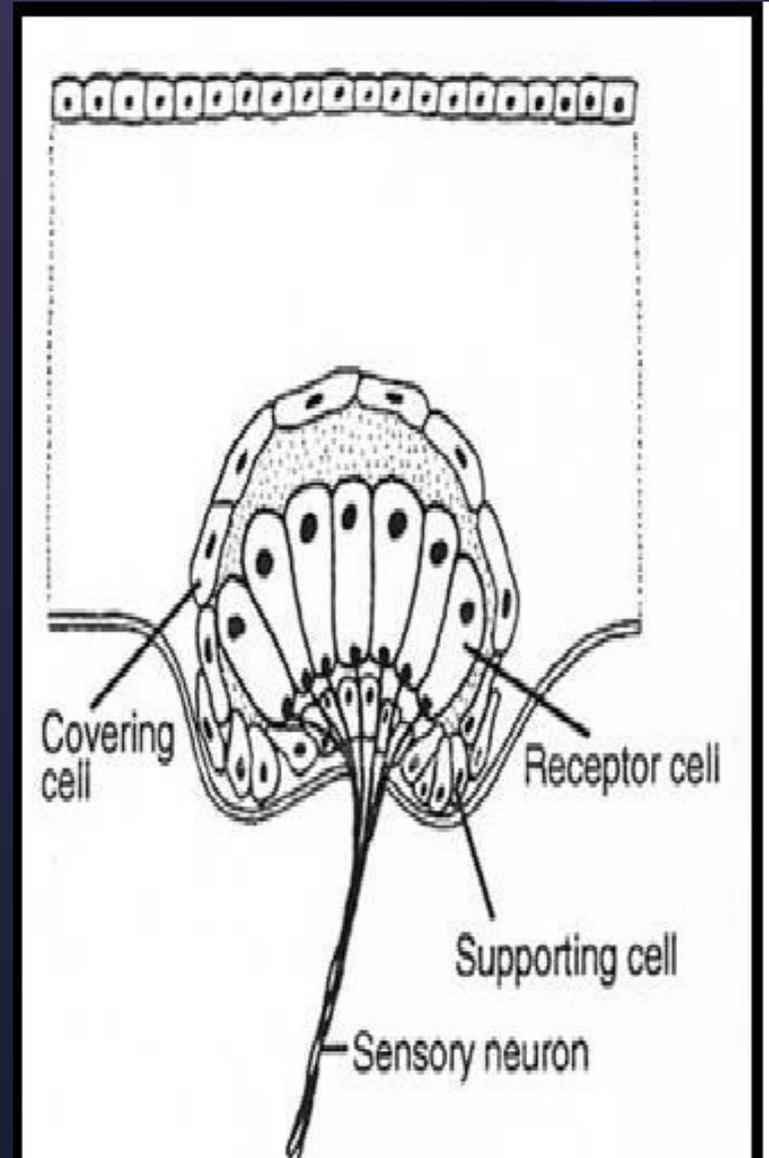
TYPES OF ELECTRORECEPTOR

The receptive cells can be organized into 2 types of receptor organs:

- 1. Tuberous receptor organ**
- 2. Ampullary receptor organ**

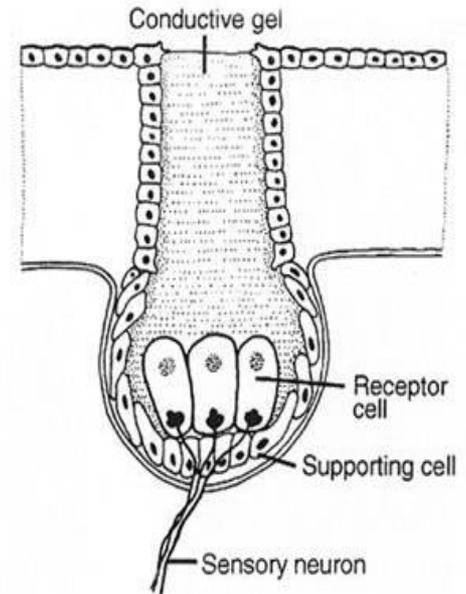
TUBEROUS RECEPTOR ORGAN

Tubular receptors are located in an epidermal invagination into the corium. These receptors are covered with skin, usually without a canal opening to the skin surface. The space above receptor is, however, filled by loose plug cells. So essence, there is a channel for the electric current flow across the skin.



AMPULLARY ELECTRORECEPTOR ORGAN

The ampullary organ consists of a single or several ampullae opening to exterior by a long or short canal. The canal and ampulla is full of jelly like material.

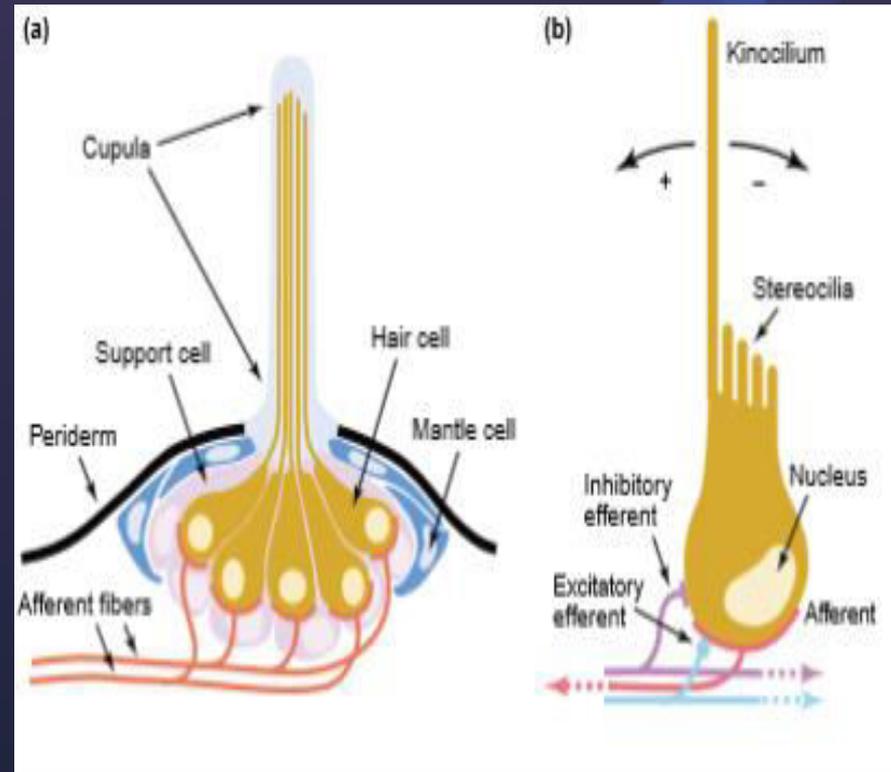


Ampullary Organ

~ SW signals
prey detection
communication

low frequency

The sensory epithelium composed of hair cells and supporting cells, lies at the base of ampulla. The sensory cells bear tuft cilia, which consists of a Kinocilium surrounded by stereo cilia. These cells are innervated by an afferent nerve only, and are tonic receptors being stimulated by low frequency electric field.



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HOW TO ELECTRICITY GENERATE?

REFERENCES

- S .S . Khanna : An introduction to fishes.
- <https://faculty.washington.edu>.

THANK YOU