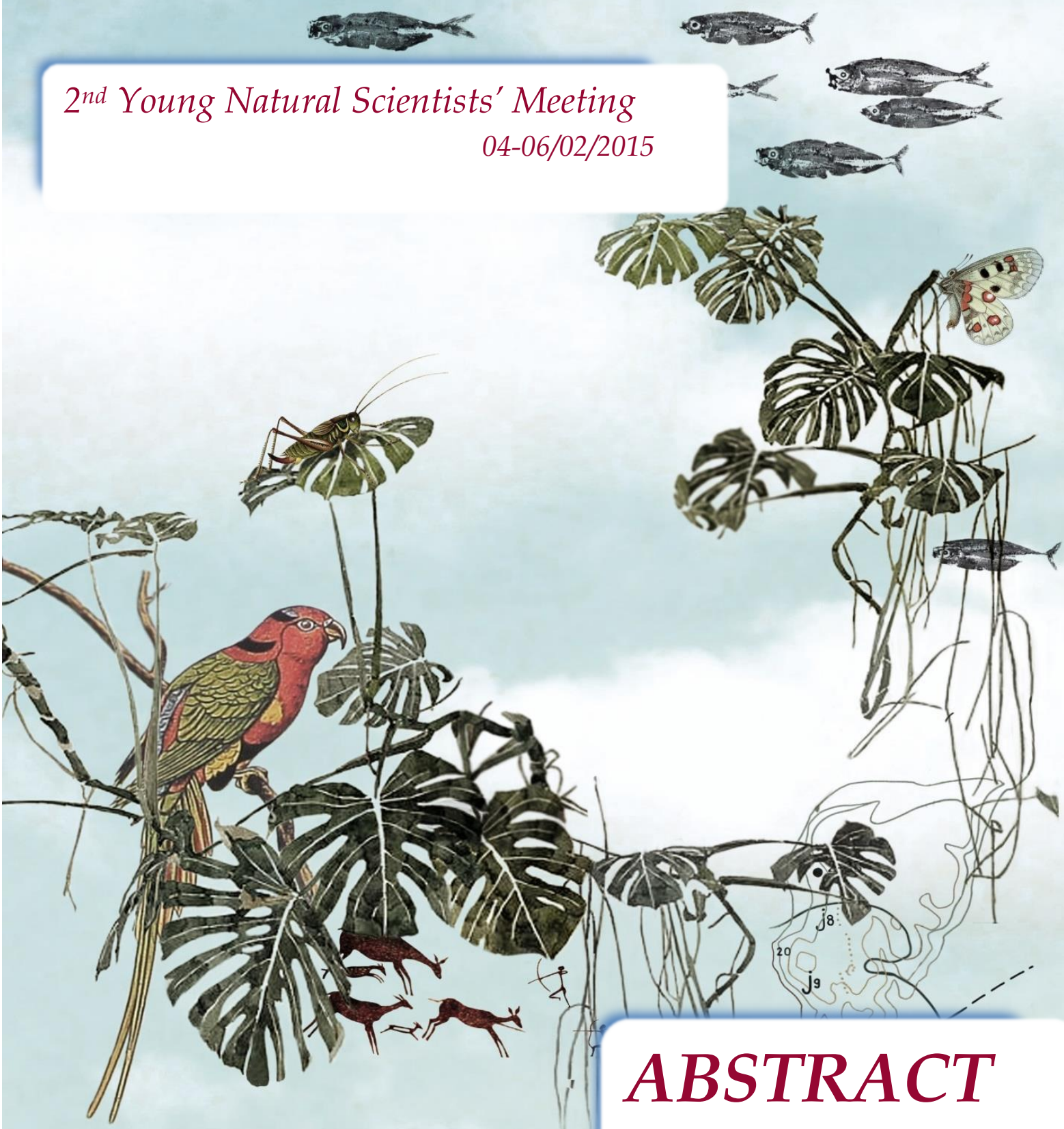
2nd Young Natural Scientists' Meeting

04-06/02/2015



ABSTRACT BOOK

GRAPHISME : SOPHIE FERNANDEZ

The BDEM (Bureau des Etudiants et Doctorants du Muséum), Doc'up and Timarcha are pleased to welcome you to the **2nd Young Natural History scientists' Meeting** at the Muséum national d'Histoire naturelle, in Paris. We hope this congress for young researchers will provide you the opportunity to present, possibly for the first time, your research in a relaxed but studious atmosphere. We believe that the YNHM is a great chance for us to have a first congress experience.

Our program is varied, covering several aspects of Natural History with a keynote speaker for each session and several oral and poster presentations by young researchers, distributed in four sessions. We thank you for coming so numerous and hope you will enjoy the conference and get opportunities for networking.

Faithfully yours,
The Organizing Committee:

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Acknowledgements

We would like to thank the **Chairpersons and Jury members** for kindly accepting our invitation to present their session as well as lead the discussion and designating the winners for the oral and poster awards.

Session	Chairperson	Jury
Biodiversity, dynamics and conservation	Laurent Palka (MNHN)	Nathalie Machon (MNHN) Cedric Hubas (MNHN) Christie Lecoeur (MNHN)
Earth and planetary sciences	Emmanuel Jacquet (MNHN)	Grégoire Egoroff (MNHN) Pierre Guerriau (IPANEMA)
Mankind, prehistory, nature and societies	Jean Denis Vigne (MNHN)	Aurélie Salavert (MNHN) Florence Revelin (MNHN)
Systematics, evolution and comparative anatomy	Mario de Pinna (MZUSP)	Romain Natier (MNHN) Damien Germain (MNHN)

We also wish to thank for their financial and logistic support:

→our **sponsors and hosting institutions**:

→the **organizing associations**:

available for paleontologists, dental wear is a key-tool to infer diets of extinct species. During my PhD, I set up a model combining dental wear pattern and food habits of European species of cervids from many populations ranging from Scandinavia to Southern Spain and from Scotland to Poland. Dental wear patterns will be quantified through an innovative tool: 3D dental microwear texture analysis coupled with an automatic Scale Sensitive Fractal Analysis. Dental microwear textures reflect what a given animal has eaten during its last few days or weeks. This powerfull proxy allows not only to identify grazing and browsing habits, but also to differentiate feeding behavior at the intra-population scale, i.e., sexual and seasonal variations. Such information can be linked to vegetal resources availabilities. When applied on fossil cervids, such ecological proxies may also provide evidence to reconstruct environment. This will be the second aim of my PhD thesis. I will integrate Early Pleistocene fossil cervids (mostly from the Balkans) into the modern model. Niche partitioning between species in a given site, variations in diet through geological time will be explored to assess tree cover dynamic in the context of hominid dispersal into Europe between 2 and 1 Ma.

Neurotransmitter localization in the airway putative oxygen-sensitive chemoreceptor cells of air breathing fishes with particular reference to nitric oxide

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The concept that non-respiratory gases such as nitric oxide (NO) and other ones (CO, H2S) function as signaling moieties is a relatively recent development. NO affects respiration by functioning as a neurotransmitter in the peripheral and central nervous system. In the periphery NO is a parasympathetic component of autonomic nervous system and a cotransmitter with acetylcholine and the neuropeptide vasoactive intestinal peptide. In the gill of teleost fishes nitrergic nerves are broadly distributed in the gill filaments in close association with vascular smooth muscle and mitochondria-rich cells, indicating that NO may be involved in the control of blood flow and in ion regulation. Nitrergic nerves expressing nNOS are distributed on the efferent side of teleost gill filament and are associated with the chemoreceptive NECs, which suggest that NO could be involved in regulating NECs by local paracrine signaling or as transmitter in sensory afferents (Zaccone et al., 2006). This paper focuses on the immunohistochemical detection of nNOS/NO in the NECs of the swimbladder epithelium of the basal actinopterygian *Lepisosteus oculatus* by confocal immunofluorescence. The NECs in the epithelium are both of the closed and the open type and are found in the mucociliated epithelium. NECs contain either nNOS and 5-HT. ChAT has been not shown to occur in these cells at any site by colocalization with nNOS. The NECs containing NO may have a complementary receptor present on the nitrergic nerves (vagal afferents) innervating these cells as well as a cotransmitter role.

Molecules, morphology, and geometric morphometrics inform the evolutionary history of the Pincer Wasps (Dryinidae: Chrysidoidea)

Carly Tribull
American Museum of Natural History - AMNH (US) (United States)

Dryinidae, parasitoids of Auchenorrhyncha, are found worldwide and are recorded as naturally attacking numerous agricultural pests. Despite their potential as biocontrol agents, these wasps are understudied and little is known of their evolutionary history. Using the novel incorporation of geometric morphometrics (as described in Catalano et al. 2010), combined with morphological and molecular data, I present a phylogeny that tests the proposed relationships within this family. Five shapes are analyzed – three configurations from the head and two from the chela- the pincer like structure that dryinids use to grapple with hosts and prey. The structures of the chela have shown significant variance throughout Dryinidae, but traditional morphological coding has failed to capture the subtle variations of curved edges and sculpturing. Additionally, I sequenced DNA from over 75 taxa of dryinids throughout the family using COI, CYTB, 18S and 28S markers and coded traditional morphological codes for these specimens. Using the generated phylogeny, I test hypothesis of host-choice and host-specificity throughout the lineages of Dryinidae.

Nuclear and chloroplast DNA phylogeography for the endangered species: *Arenaria grandiflora* L.

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The goal of conservation genetics is to understand the spatial distribution of the genetic variation of endangered species in

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NEUROTRANSMITTER LOCALIZATION IN THE AIRWAY PUTATIVE OXYGEN-SENSITIVE CHEMORECEPTOR CELLS OF AIR BREATHING FISHES WITH PARTICULAR REFERENCE TO NITRIC OXIDE

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General information:

Air breathing evolved in ancestral fishes during the Silurian period, some 400 million years ago. Today, several fish taxa (Dipnoi, Polypteridae, Holostei, ancestral teleosts) and many modern teleosts can extract oxygen from the air employing a wide range of respiratory structures collectively termed air-breathing organs (ABOs, Graham, 1997). While ABOs in modern fish are quite diverse, ancestral fishes developed specialized pharyngeal derivatives such as lungs and gas bladders (GBs). The holosteans (Amiiformes and Lepisosteiformes) are bimodal breathers which use their GB for respiration. The members of the genus Lepisosteus (garfishes) show an unpaired GB (Fig.1) located in a dorsal position in the coelomic cavity. The GB is a bilobed organ with a thin wall and numerous air spaces located laterally (Potter, 1927; Graham, 1997; Zaccone et al., 2012). The inner surface shows low ridges, and the wall contains smooth and striated muscle and a respiratory epithelium with ciliated cells, goblet cells, and a single type of pneumocyte (Zaccone et al., 2012, Icardo et al. 2015).

Fig. 1, Gas bladder, dorsal view. The aorta has been removed except in the most cranial part (arrow). The narrow, caudal end of bladder is on the left. The GB is an elongated air sac with numerous compartments.

Material and methods:

The specimens of the spotted gar, *Lepisosteus oculatus*, were obtained from a local supplier and kept in areated dechlorinated, fresh tap wather for one week to acclimatize before sacrifice. Prior to the removal of the bladder, fishes were anesthetized in a 0.01% solution of tricaine methanesulfonate (MS-222, Sandoz, Novartis AG, Basel, Switzerland) in fresh tank water. Anesthetized fish were decapitated and respiratory GBs were removed and fixed in Immunofix (Bio-Optica, Milan, Italy). Respiratory GBs were dissected, photographed with an Olympus digital 800 camera (Olympus Imaging Corp., Japan) and processed as indicated below. For confocal microscopy fragments from the glottal area, and from the cranial, middle, and caudal portions of respiratory GBs were dehydrated in graded ethanol, embedded in Paraplast (Sherwood, St. Louis, MO), and serially sectioned at 8 µm. Sections were incubated in the primary antibodies that were diluted in the permeabilizing solution according to the optimal dilutions and placed on the slides at room temperature in a moist chamber. Section were then treated with fluorescently labeled secondary antibodies diluted in PBS. Antibodies used in this study 5HT, Calbindin and nNOS, combined as follow, 5HT-Calb, and 5HT-nNOS. After washing, the sections were mounted with Vectashield (Vector Laboratories Inc., Burlingame, CA, USA) to reduce photobleaching during confocal scanning. Images were acquired using a confocal microscope (Carl Zeiss LSM 700).

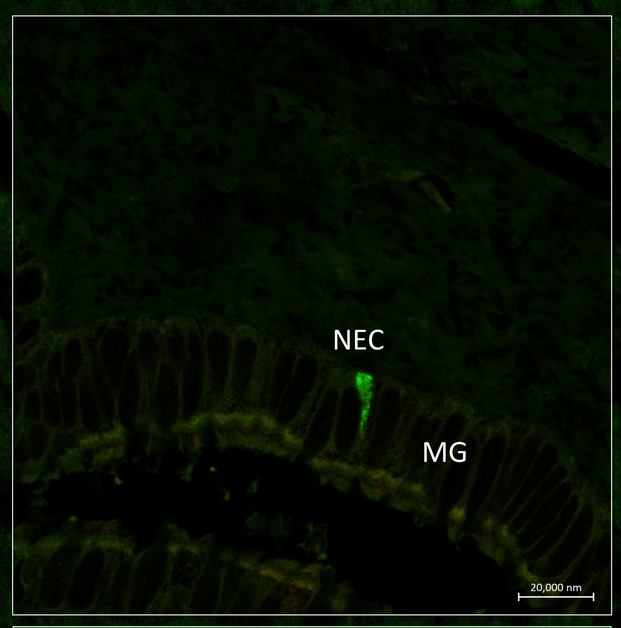

Fig 2, 5HT-IR NEC in the mucociliated epithelium of the lung showing open morphology. MG Mucous goblet cell. A slender process is seen reaching the lumen.

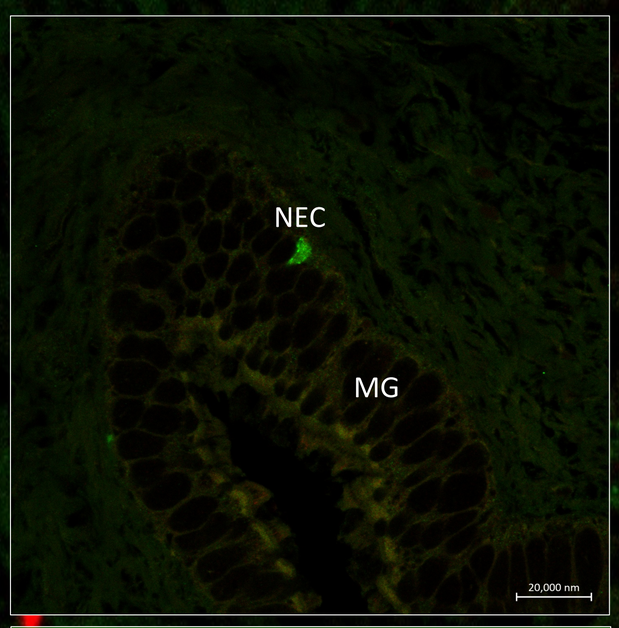

Fig. 3, 5HT-IR NEC in the mucociliated epithelium of the lung showing closed morphology. Specific granules lie in the basal cytoplasm. MG Mucous goblet cells.

Results and discussion:

Neuroepithelial cells (NECs) in the epithelium are both of the open (Fig. 2) and the closed (Fig. 3) type and are found in the mucociliated epithelium. They express various neurotransmitters as shown by the single and double immunolabeling procedures. In particular the NECs are immunopositive to serotonin (5HT, green fluorescence) and calbindin (Calb, red fluorescence) (Fig. 4). In 5HT-nNOS immunolabeling the single NEC in the epithelium is positive only to 5HT, while when in clusters, the NECs, are positive to both antibodies (5HT green - nNOS red) (Fig. 5-6). The NECs containing NO may have a complementary receptor present on the nitrergic nerves (vagal afferents) innervating these cells as well as a cotransmitter role. Nitrergic nerves expressing nNOS are also present which suggest that NO could be involved in regulating NECs by local paracrine signaling or as transmitter in sensory afferents (Zaccone et al., 2006).

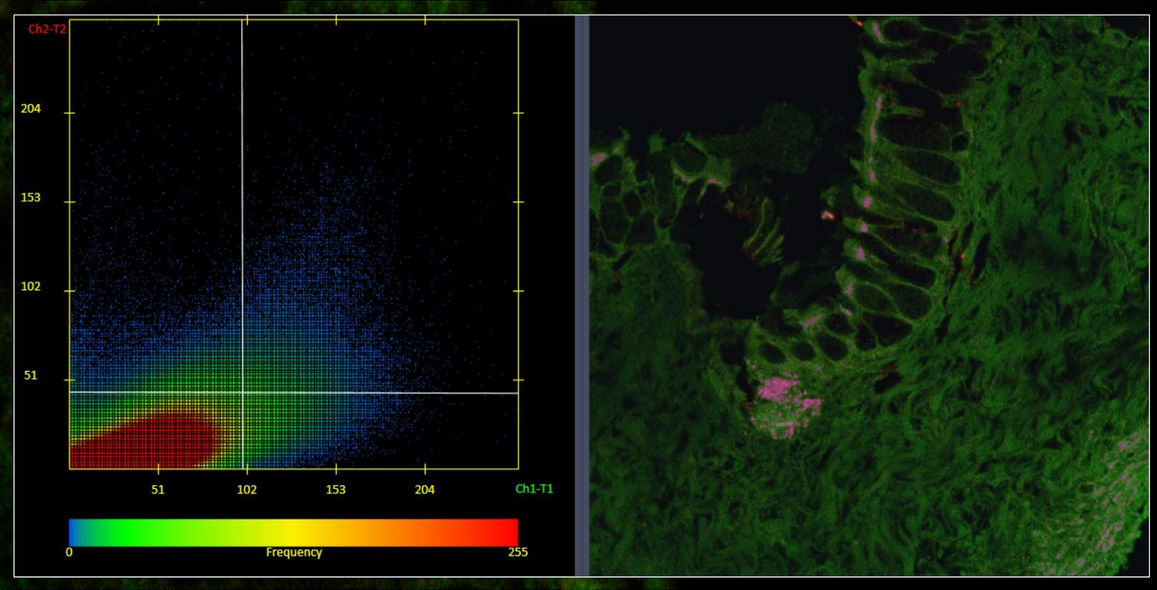

Fig. 5, Longitudinal section through the mucociliated epithelium of the lung of *L.oculatus*, immunostained with antisera to 5HT and nNOS. A cluster of 5HT-nNOS IR NECs are visible at the base of the epithelium. MG Mucous goblet cells. Colocalization is highlighted with pink.

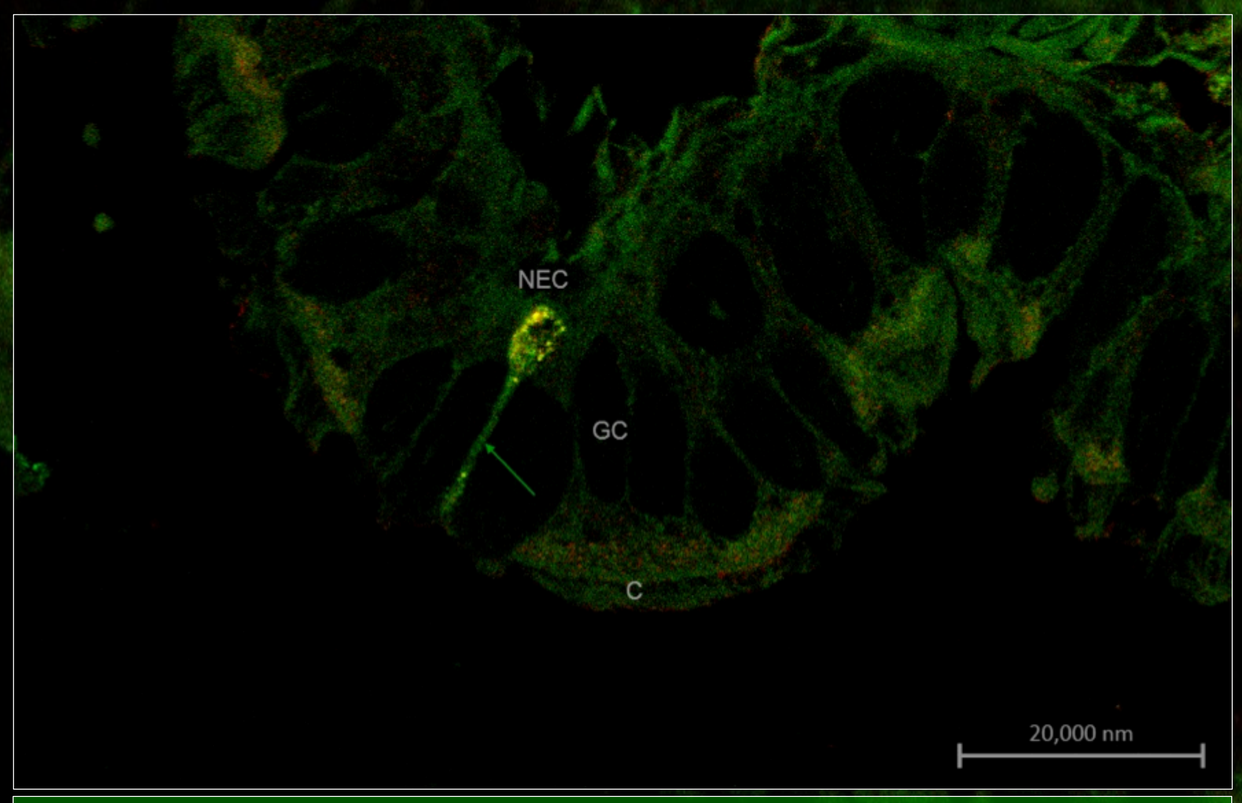

Fig. 4, Immunocytochemical double staining for calbindin D28k (CB; red fluorescence) and 5HT (green fluorescence) of a NEC in the mucociliated epithelium of *L.oculatus*. The confocal image shows a combination of the two color channels and the orientation of the cell making contact with external surface by a slender process. GC goblet cell, C ciliated cell.

Lepisosteus oculatus.

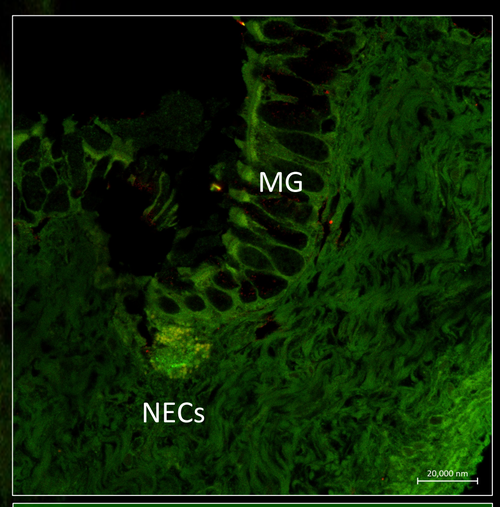

Fig. 6, Fig. 5 with original fluorescence.

Main references:

- Graham JB. 1997. Air-Breathing Fishes. Evolution, Diversity and Adaptation. San Diego, CA: Academic Press.
- Icardo JM, Colvee E, Lauriano E.R., Capillo G, Guerrera MC, and Zaccone G. 2015. The Structure of the Gas Bladder of the Spotted Gar, Lepisosteus oculatus Journal of Morphology 276:90-101
- Potter GE. 1927. Respiratory function of the swim bladder in Lepidosteus. J Exp Zool 49:45–67.
- Zaccone D, Dabrowski K, Lauriano ER, de Pasquale A, Macri D, Satora L, Lanteri G. 2012a. The simultaneous presence of neuroepithelial cells and neuroepithelial bodies in the respi- ratory gas bladder of the longnose gar, Lepisosteus osseus, and the spotted gar, L. oculatus. Acta Histochem 114:370– 378.
- Zaccone G, Mauceri A, Fasulo S. 2006. Neuropeptides and nitric oxide synthase in the gill and air-breathing organs of fishes. J Exp Zool 305A:428–439.