AMEIURUS NEBULOSUS (LESUEUR, 1819), BRAIN SECTIONS

Meek-J*, Peters-RC 2013

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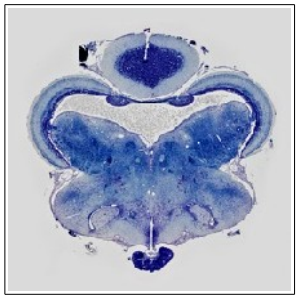

This work is part of a pilot study, prior to a joined effort to re-investigate neural processing of information by the electrosensory system of the common brown bullhead *Ameiurus* sp. The authors herewith offer the preliminary results of the histological study for further use to those who are interested.

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*Corresponding author at http://www.deTraditie.nl

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Materials and Methods & Results, References, Acknowledgements & Appendix

Abstract

Histological transverse sections of the brain of the common brown or black bullhead, *Ameiurus* sp were photographed for reference purposes.

Keywords

Brown bullhead, black bullhead, *Ameiurus nebulosus, Ameiurus melas, Ictalurus*, histology, brain sections, Klüver-Barrera staining.

Introduction

Today, electroreception is a well established sensory faculty of various families of aquatic vertebrates. The properties of the electrosensory perphery have been investigated quite thoroughly, and central processing of electrosensory information has been elucidated to a large extent, at least in electric fish (Bullock *et al*. 2005). In passive electrosensitive fish like sharks and catfish, i.e. electrosensitive fish not producing electric organ discharges, there are still many white spots in the central information processing picture. It is unknown for example, how common mode rejection is achieved, if lateral inhibition occurs, and how the central nervous system deals with ex-afferent and re-afferent stimuli.
In 1988, Hans Meek from the Radboud University at Nijmegen and Rob Peters from Utrecht University decided to start a pilot study as a bootstrap for fund raising. The funds never came off, but a nice series of histological sections of a catfish brain sedimented on the archive shelves. These sections were photographed by Ronald Leito of Utrecht University and are made available today to the interested student.

Materials and Methods

A single specimen of the brown bullhead[1] *Ameiurus* sp. was anesthetized with a solution of MS222, pre-perfused wit h 0.9% NaCl, and fixated with Bouin Hollande, after-fixated 2 hours, transferred to paraffin, stained with Klüver-Barrera, and embedded (c.f. Meek *et al.,*1989). Perfusion took place on 22 April 1988.
The sections were 15 µm thick. Every tenth section was selected and mounted for photography. The overall length of the sectioned brain amounted to 9 mm. At its broadest part, the brain was 4.5 mm thick (cf. Atema 1969, figs II-10, II-11, II-15). For visual inspection and photography a Zeiss Axioskop was used, provided with a Nikon DXN 1200 camera and Nikon ACT-1 software. The objective lenses were Zeiss Ph1 Plan Neofluar 10x/0,30 and 20x/0,50, (most likely) the same as used in earlier work (Peters et al., 2008). The photographs were made by Ronald Leito of the Photography section of the Department of Biology at Utrecht University.

Results

Photographs – thumbnails - of every tenth section of the catfish brain are presented in fig 1. The scale marker is 4.5 mm. The series of sections begins with the most rostral section (Fig. 1-1) and ends with the most caudal one (Fig. 1-61).

1 The fish kept in stock were bought from fish farmers as *Ameiurus nebulosus*. There might have been also some specimens of *Ameiuirus melas*, which are very much alike, and with which they interbreed. In this stage of the project no strict species determination was performed.

References

Atema-J 1969. The chemical senses in feeding and social behavior of the catfish, *Ictalurus natalis*. Dissertation, University of Michigan.

Bullock-TH, Hopkins-CD, Popper-AN, Fay-RR (Eds) 2005. Electroreception. Springer handbook of auditory research 21. pp. 472. Berlin, Heidelberg, New York: Springer-Verlag

Meek-J, Joosten-HWJ, Steinbusch-HWM 1989. Distribution of dopamine immunoreactivity in the brain of the mormyrid teleost *Gnathonemus petersii*. J. Comp. Neurol. 281(3), 362-383.

Peters-RC, Bretschneider-F, Eeuwes-LBM 2008. Open lumina of microampullary electroreceptor organs in the transparent catfish, *Kryptopterus bicirrhis* s (Valenciennes 1840), contain 50 mM potassium: why? Animal Biol. 58(3), 313-319.

Acknowledgements

The authors gratefully ackowledge the help of Ronald Leito. The fish was provided by Utrecht University, Department of Neuro-ethology. Histology was performed at the laboratory of the Radboud University at Nijmegen.

Appendix

Three sets of photographs are available on CD-ROM in formats JPG 256 x 256 px, JPG 2008 x 2008 px, and TIFF 2008 x 2008 px for further analysis. Please contact Dr J. Meek through *Stichting De Traditie* for more information about copyright and co-authorship.

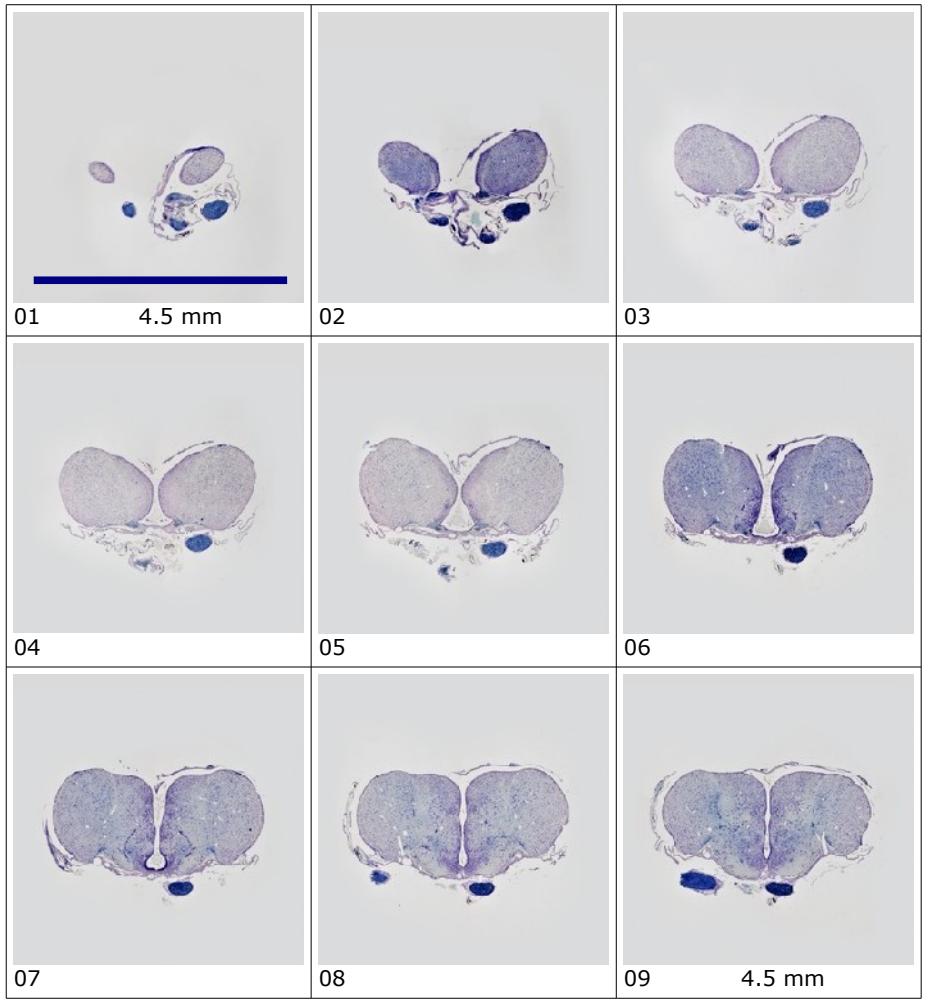

Fig 1 (1-9).

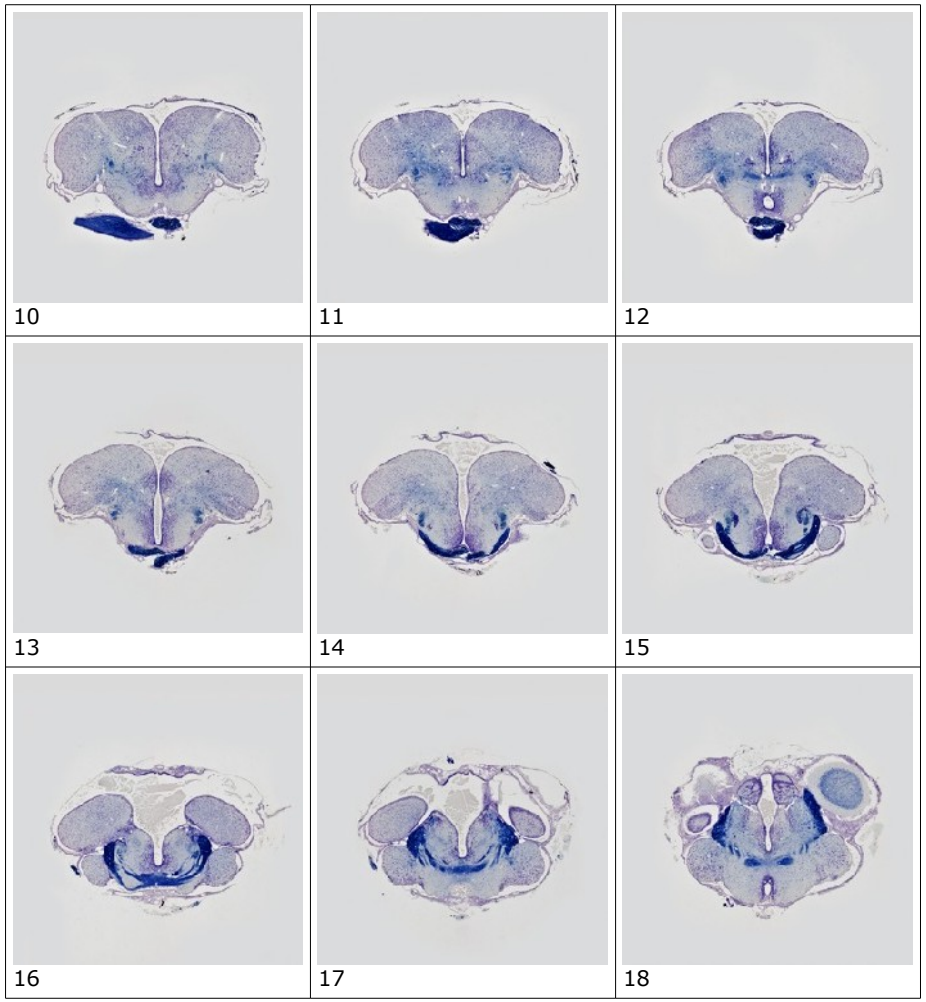

Fig 1 (10-18).

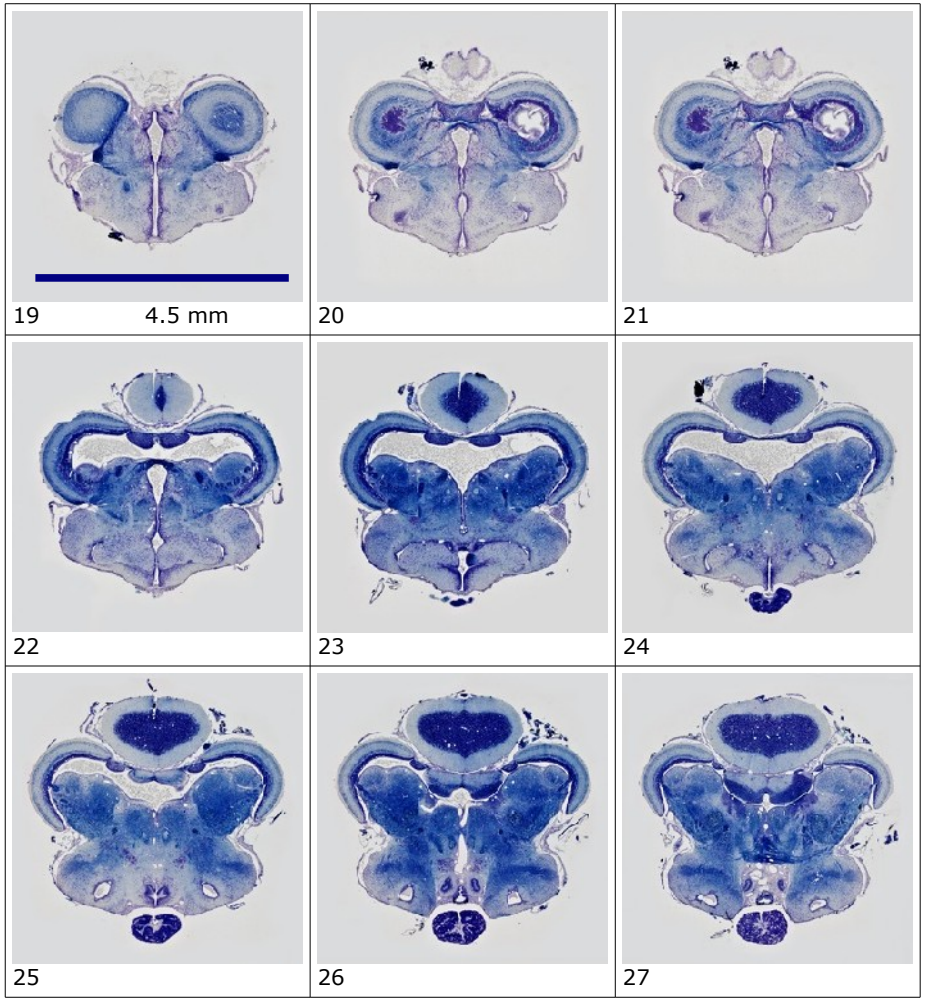

Fig. 1 (19-27)

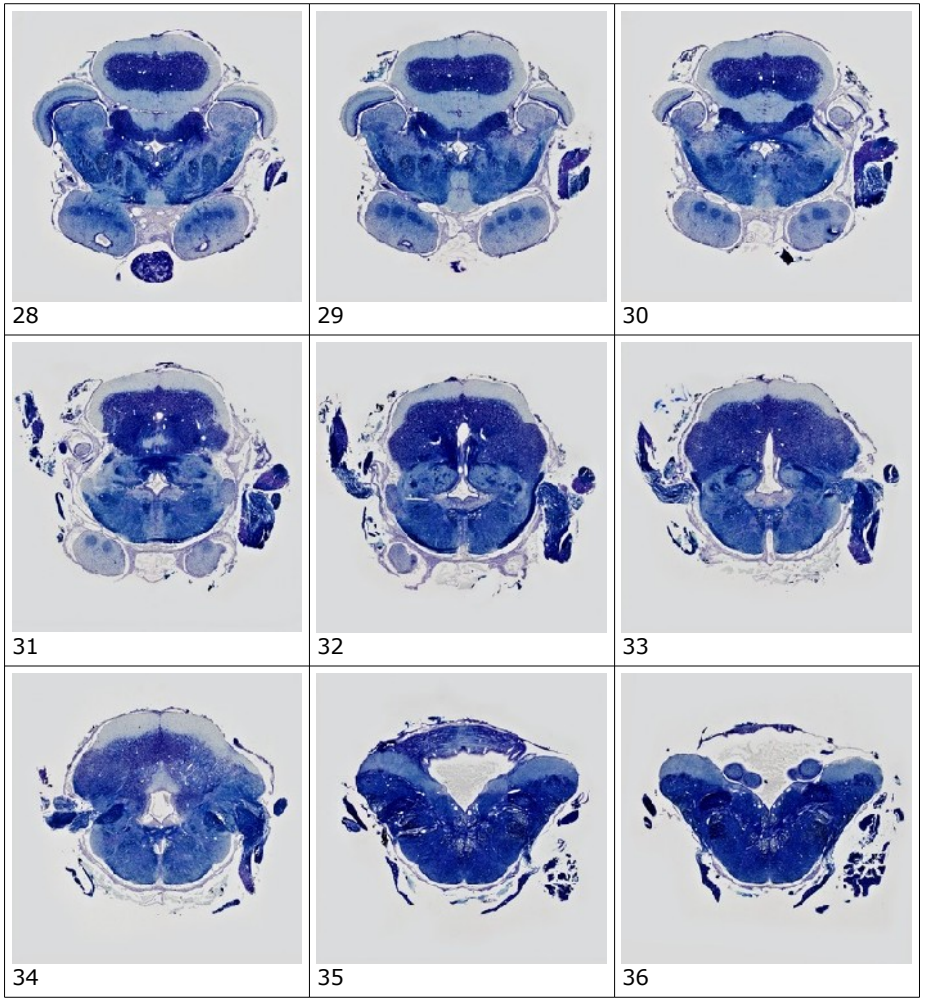

Fig. 1 (28-36)

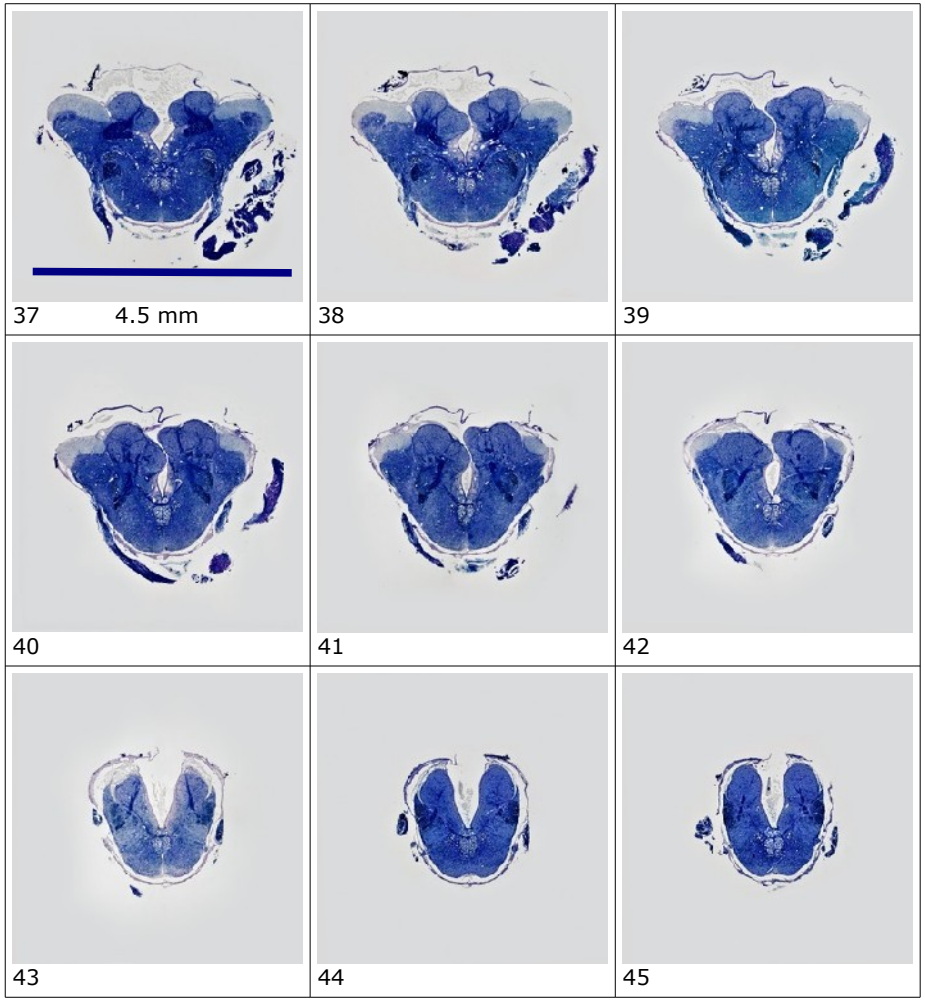

Fig. 1 (37-45)

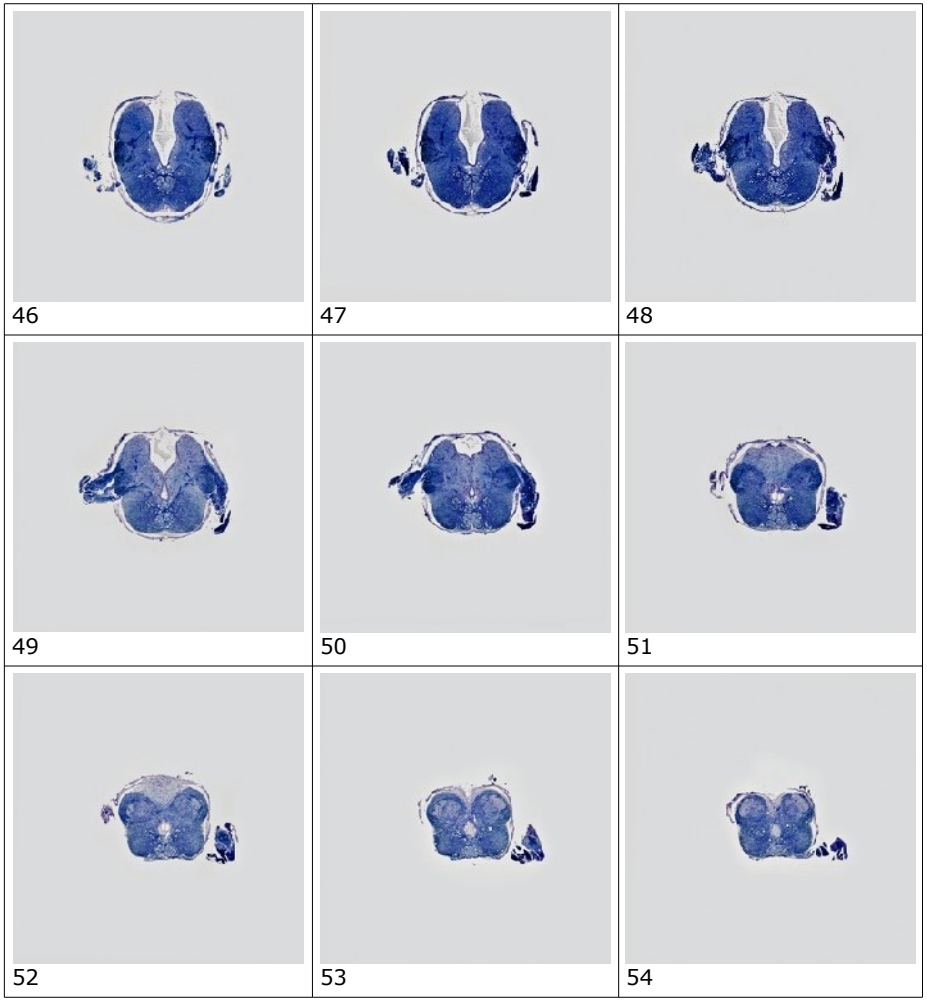

Fig.1 (46-54)

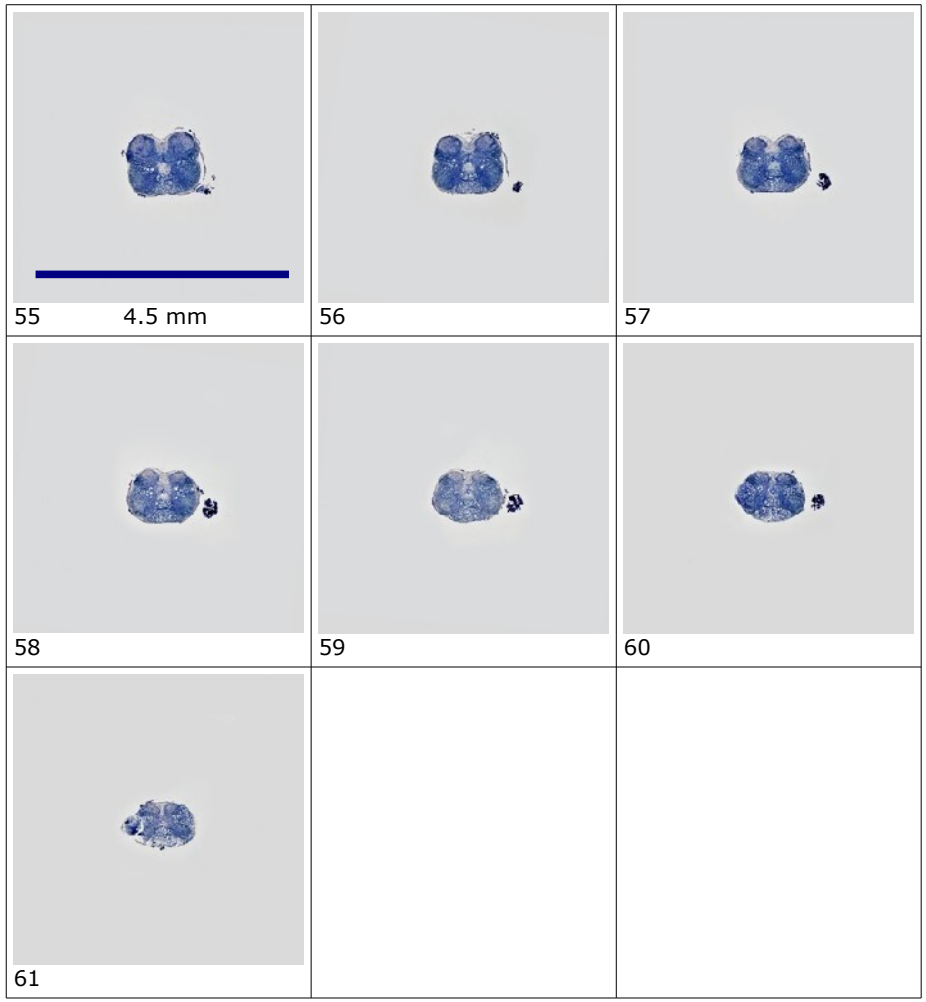

Fig. 1 (55 -61)