DIGITAL MICROPHOTOGRAPHIC ATLAS OF THE ADULT ZEBRAFISH CEREBELLUM

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INTRODUCTION

Zebrafish (*Danio rerio*, Figure 1), a vertebrate species, is known to have high physiological and genetic homology to humans and have a similar central nervous system morphology to humans. They are also used as a model organism to study various human brain disorders. In recent years, the cerebellum has been a popular topic for research. The cerebellum is known for having major implication in both sensory and motor control, coordinating smooth movements and motor learning. The zebrafish cerebellum contains a similar histology as the human cerebellum: the molecular, the Purkinje and the granular cell layers.

Brain atlases are considered a part of industrialized neuroscience. They are best known for their characteristic of being an anatomical template. They extend the abilities of researchers to tackle problems, answer questions, and build understanding by allowing data to be searched and compared in a comprehensive manner.

Figure 1 ♂

MATERIALS & METHODS

- Pre-prepared adult *Danio rerio* brain slides, cut in the three anatomical planes (sagittal, horizontal & coronal; Figure 3 inlet) were used to make photographic frames with an Olympus BX40F4 light microscope equipped with a video camera. The images were displayed on to a Dell desktop computer and captured and saved with ToupView software.
- A thumbnail library was then created of every slice in the 4X magnification.
- Roughly 10 images were selected to be further analyzed in the 40X magnification.
- Adjacent images were taken of the cerebellum in 40X so they over lapped.
- These images were managed in Adobe Photoshop CS5 Extended Version 12.0 as follows:
  - Aligned to create a "mosaic" (Figure 2) version of the selected image
  - The mosaic was then montaged to create a large scale, high definition, complete images (Figs. 3, 4 & 5).
  - The edges of the image and the background were then edited in order to make a smooth and clean appearance.
  - The picture was finally rotated into the correct orientation.

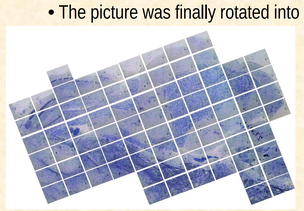

Figure 2

RESULTS: SAGITTAL SECTION

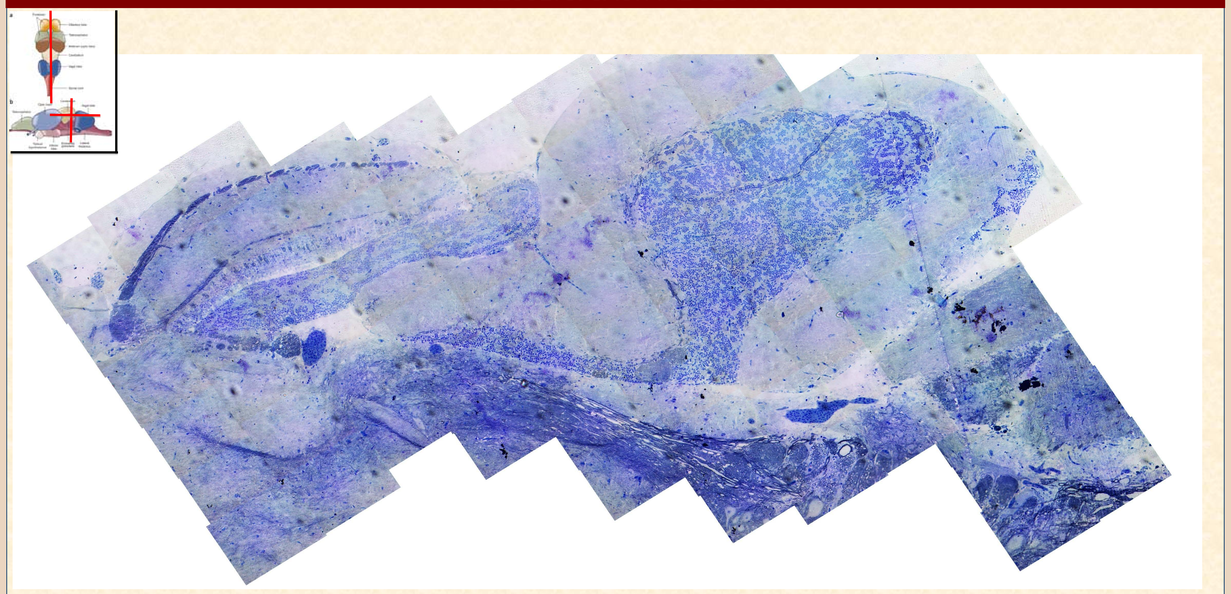

Figure 3

RESULTS:HORIZONTAL & CORONAL SECTIONS

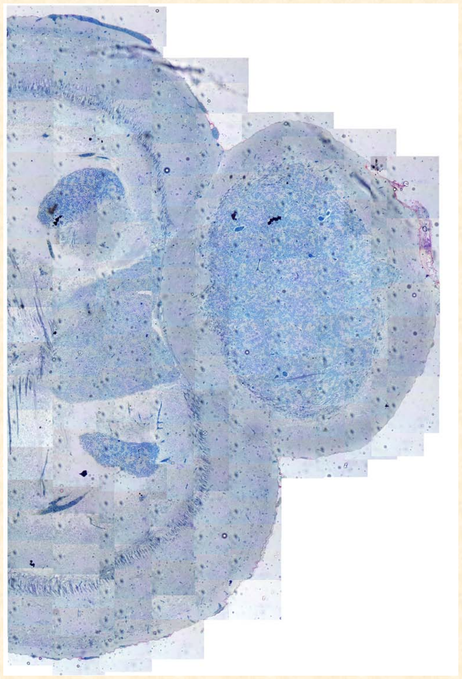

Figure 4

Figure 5

CONCLUSION

Sagittal, horizontal and coronal cerebellar regions of the brain sections (Figs 3, 4 & 5, respectively) are presented, so the three dimensional anatomical relationships of the zebrafish cerebellum can be visualized. Serial pictures resulted in a digital microphotographic atlas of the adult zebrafish cerebellum, which is presented in the senior theses of the first three authors of this poster. This current atlas is a great start to creating a fuller and more complete atlas of the zebrafish cerebellum.

This atlas could aim in future phenotypic comparisons between normal and abnormal zebrafish cerebella. In the future it would be valuable to combine all of the final images together in order to create one large three-dimensional microphotographic image of the adult zebrafish cerebellum.

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