

Mouse Cranioskeletal Atlas

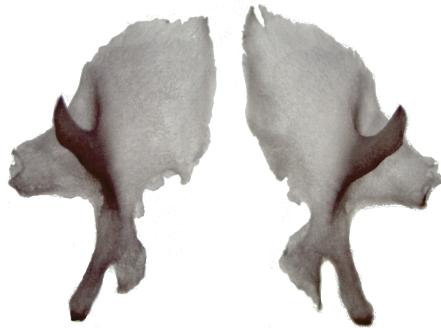
A collection of reference images and drawings of anatomical structures in the crania of C57BL/6J mice.

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The bulk of these figures were generated from μ CT scan renderings and images of tissue stained with a range of histological techniques.

This document was first published as an appendix to my Ph.D. thesis, completed in 2016 under the supervision of Tim Cox at the University of Washington and Seattle Children's Research Institute in Seattle, WA.

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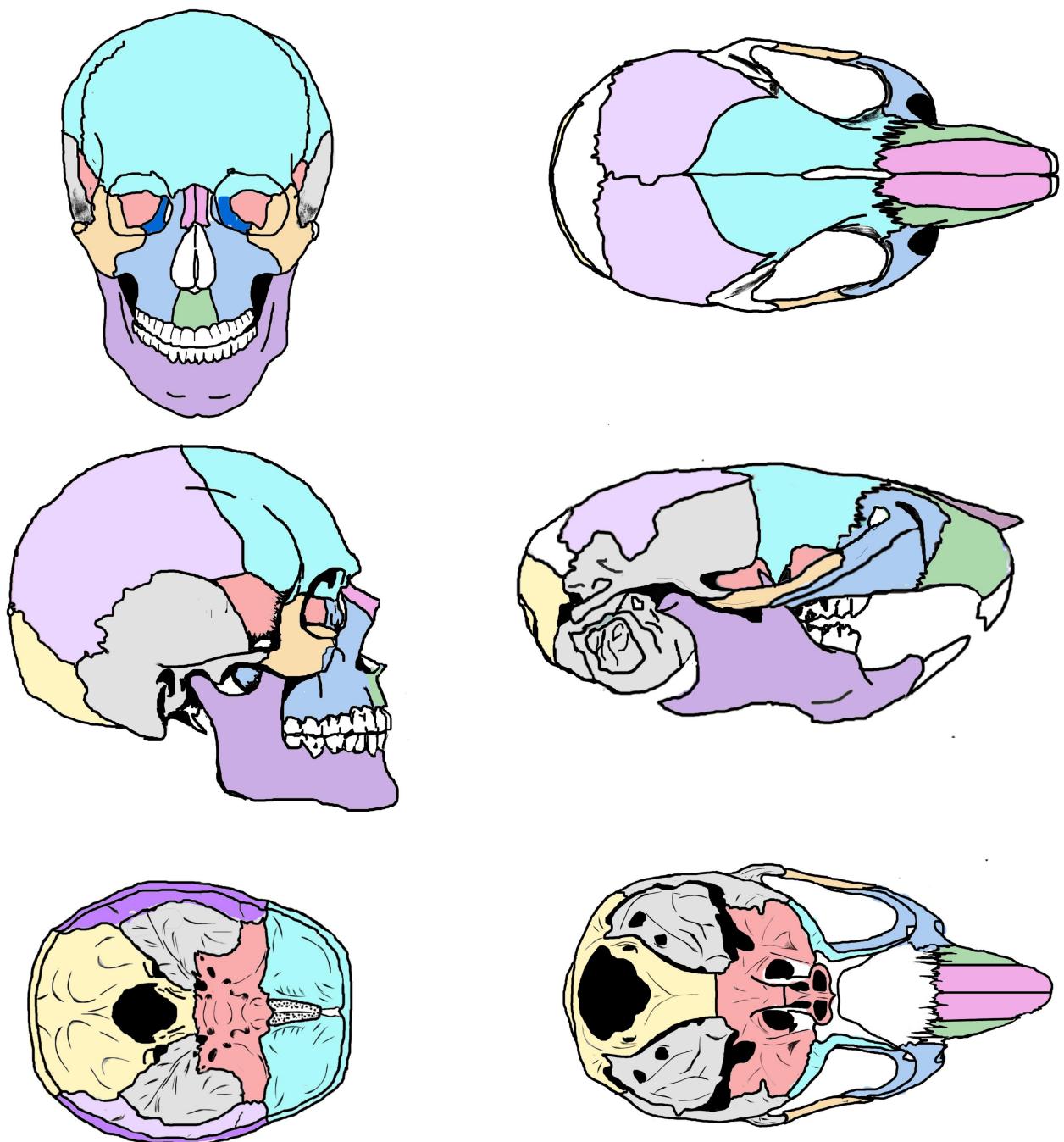


Figure 1: Homology

Craniofacial bones are conserved between humans and mice.(Gans, 1993; Richtsmeier, Baxter, and Reeves, 2000)

Key

Green, premaxilla
 Blue, maxilla
 Purple, mandible
 Pink, nasal bones
 Light blue, frontal bones
 Yellow-orange, zygomatic

Salmon, sphenoid
 Gray, temporal bones and bulla
 Light purple, parietal bones
 Light yellow, occipital
 White, mouse interfrontal and interparietal bones

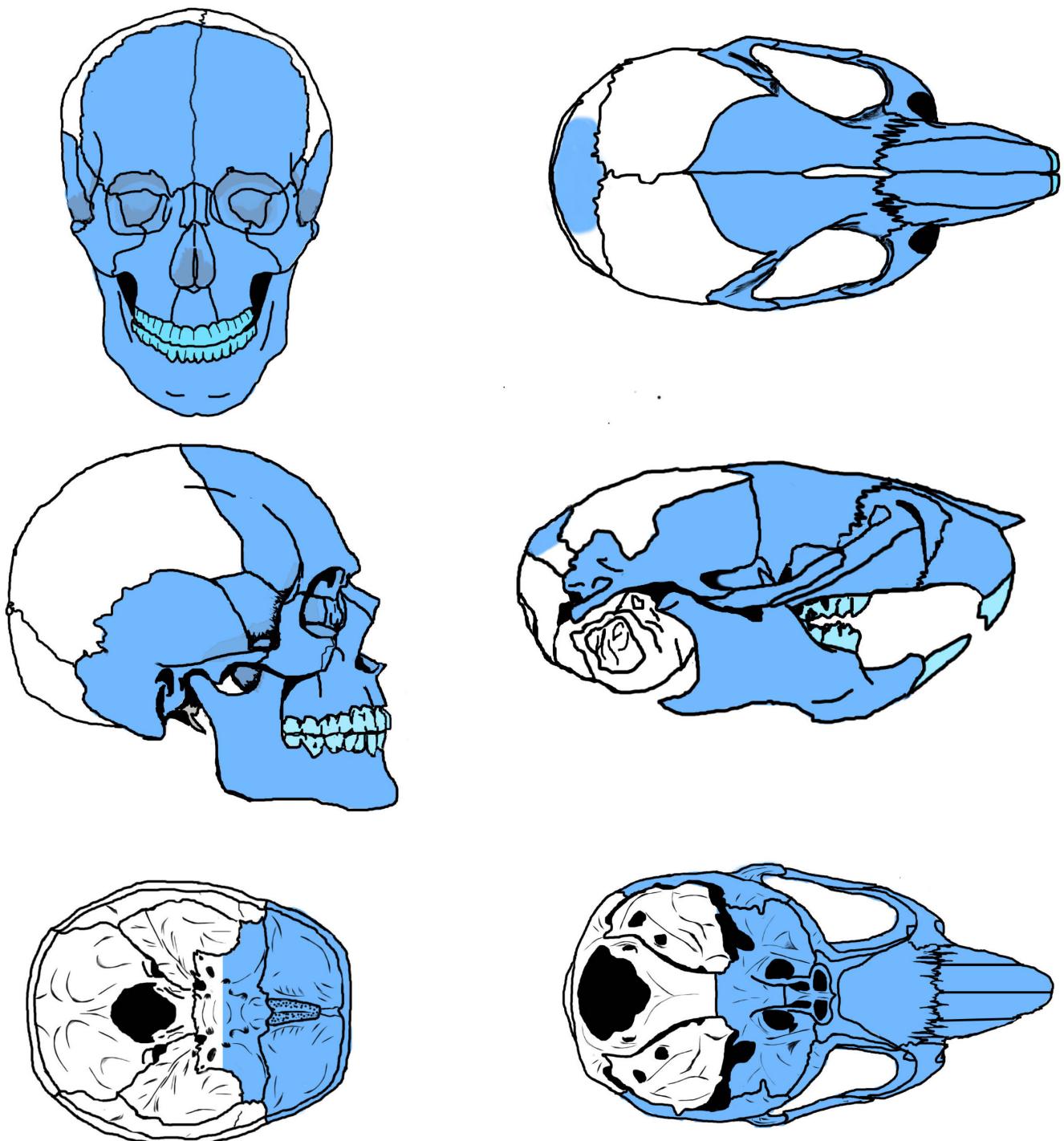


Figure 2: Bones of CNCC origin

Bones derived from cranial neural crest cells.(McBratney-Owen et al., 2008; G. H. Sperber, S. M. Sperber, and Guttman, 2010)

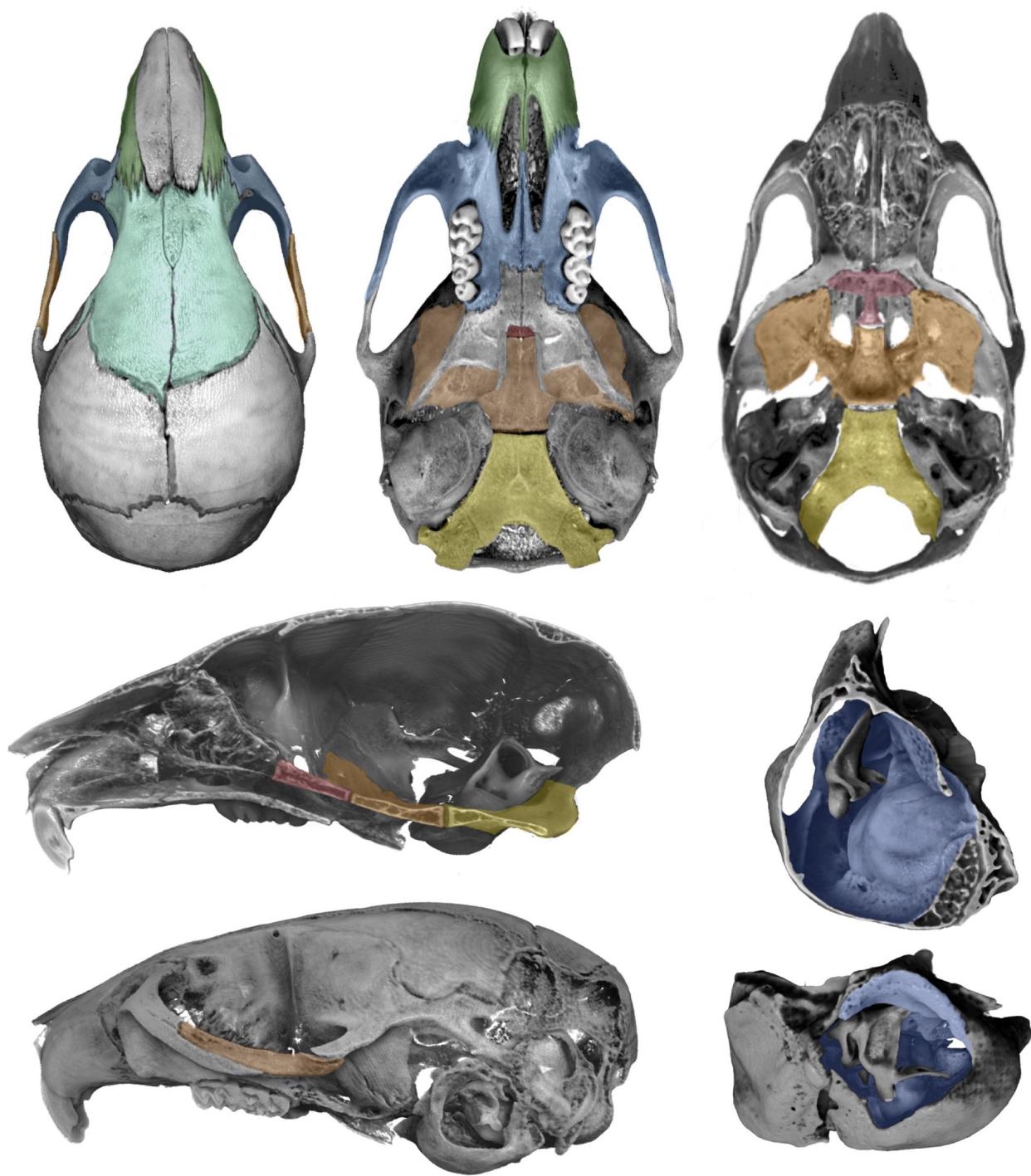


Figure 3: Cranial bones

μ CT scan rendering of C57BL/6J crania at postnatal day 28.

Key

Green, premaxilla

Blue, maxilla

Light green, frontal and interfrontal bones

Red, presphenoid

Orange, basisphenoid

Yellow, basioccipital

Dark blue, middle ear

Slightly different orange, jugal bone

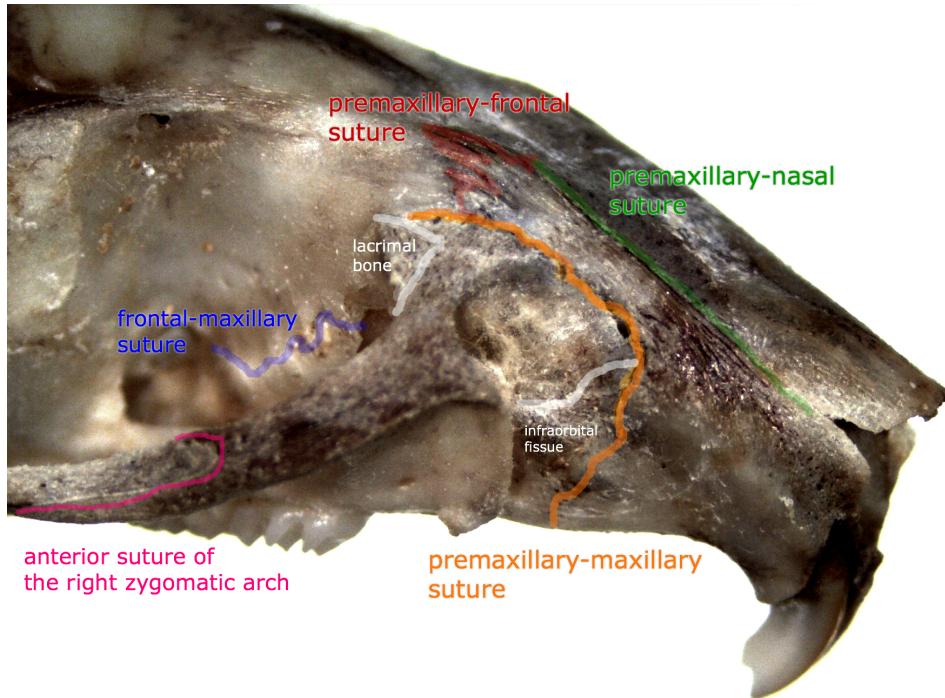


Figure 4: Facial sutures

Photograph of an adult C57BL/6J skull with labeled facial sutures.

Key

- Pink, anterior suture of the zygomatic
- Red, premaxillary-frontal
- Orange, premaxillary-maxillary
- Green, premaxillary-nasal
- Blue, frontal-maxillary

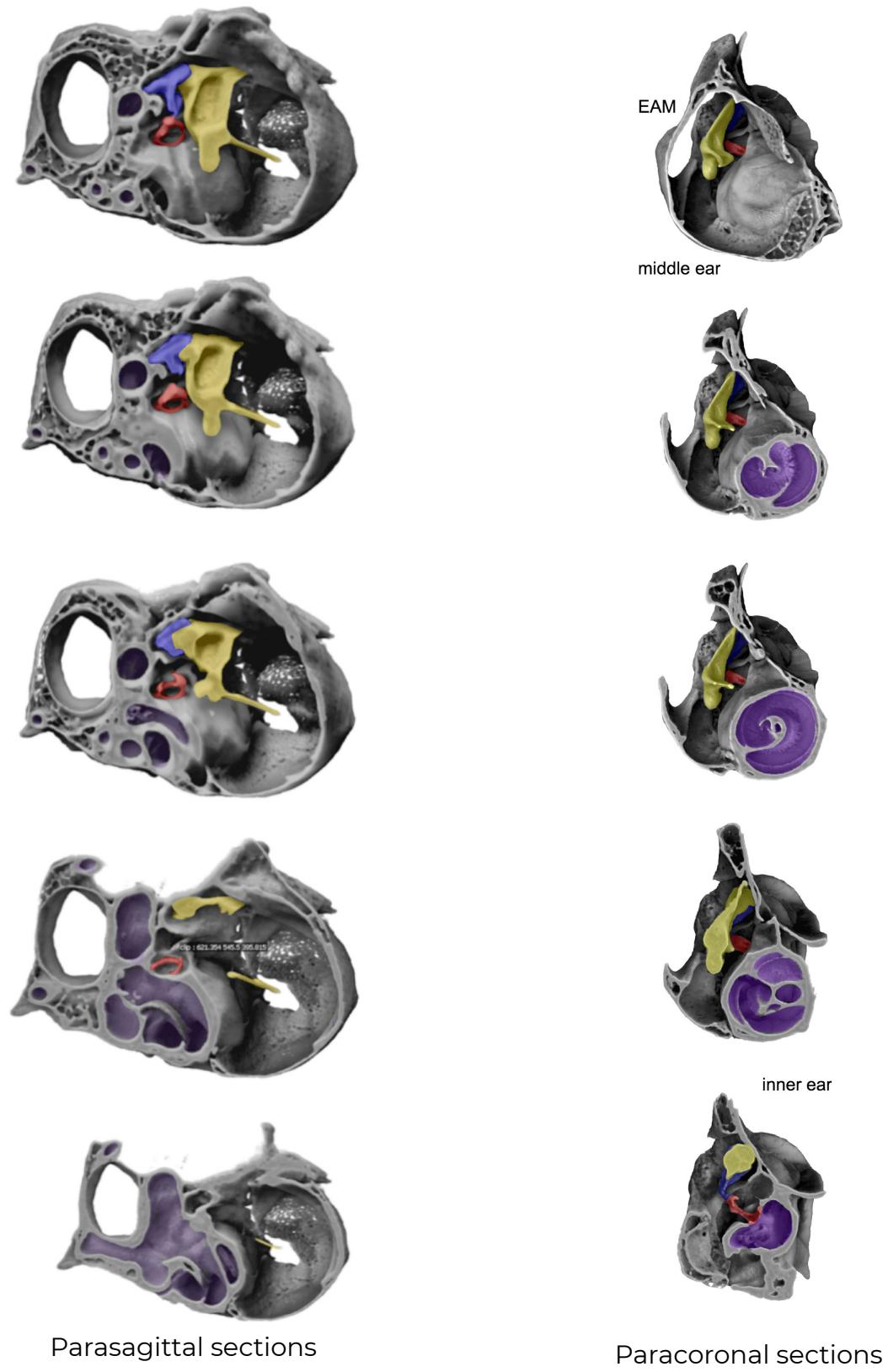


Figure 5: Tympanic bulla

Pseudosections through a disarticulated tympanic bulla, showing the position of the ossicles. μ CT scan rendering from a C57BL/6J mouse older than 50 days.

Key

- Yellow, incus
- Blue, malleus
- Red, stapes
- Purple, inner ear

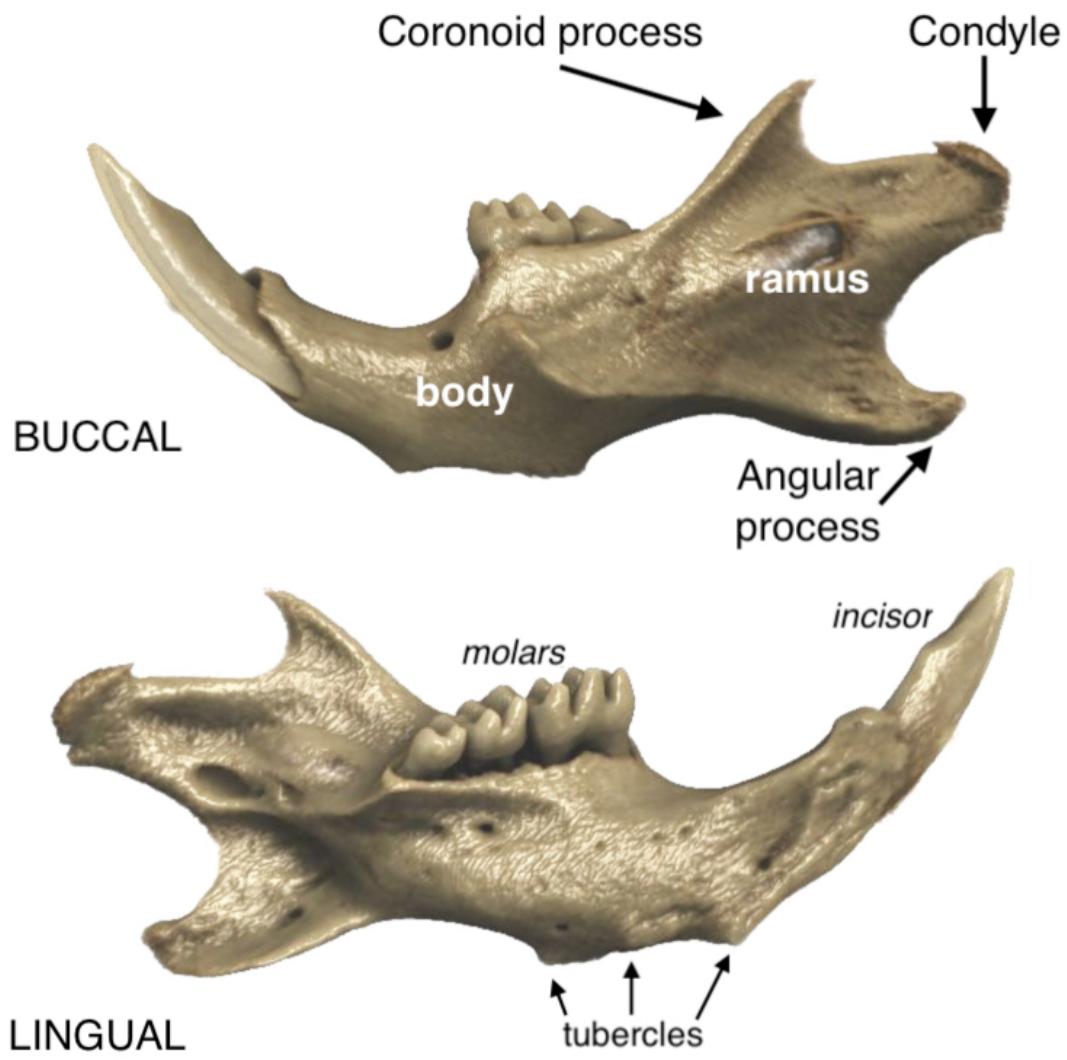


Figure 6: Hemimandible

μ CT scan renderings of lingual and buccal sides of an adult mouse hemimandible.

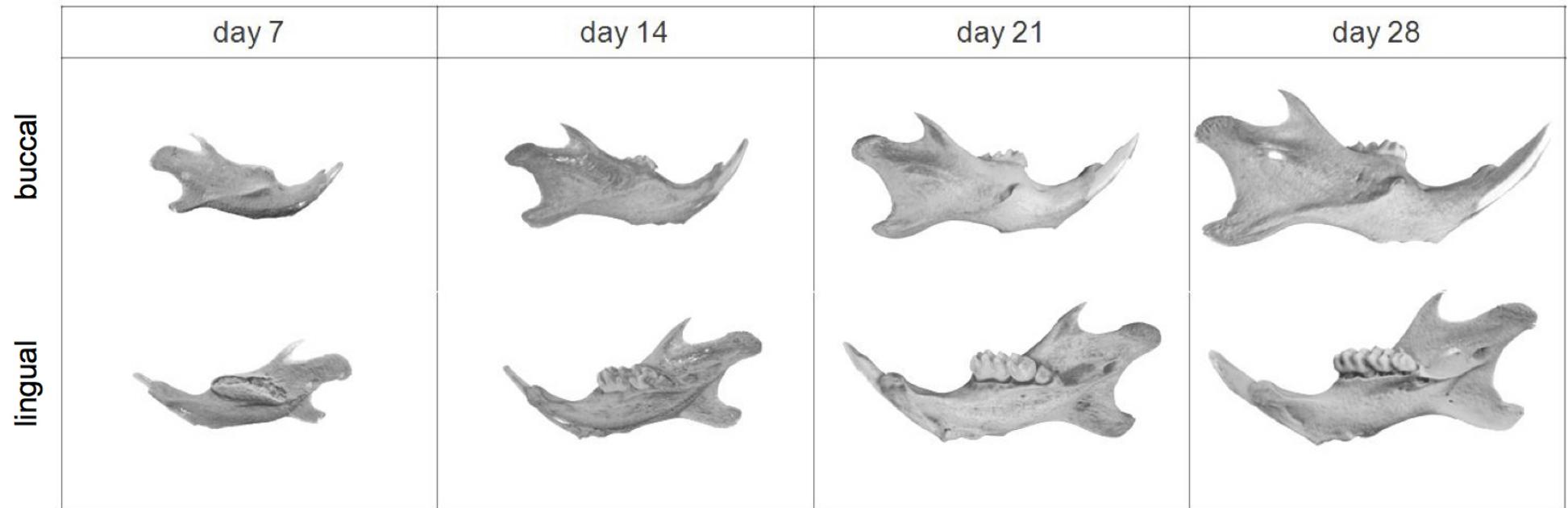


Figure 7: Hemimandibular morphology over the first month of life

μ CT scan renderings of mouse hemimandibles at postnatal days 7, 14, 21 and 28.

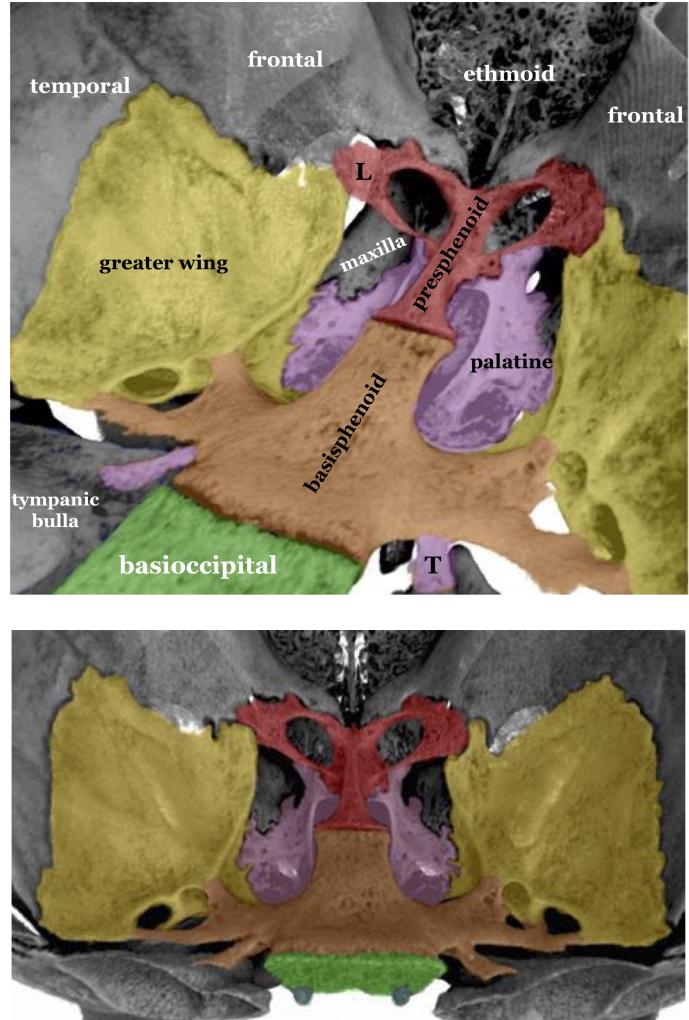
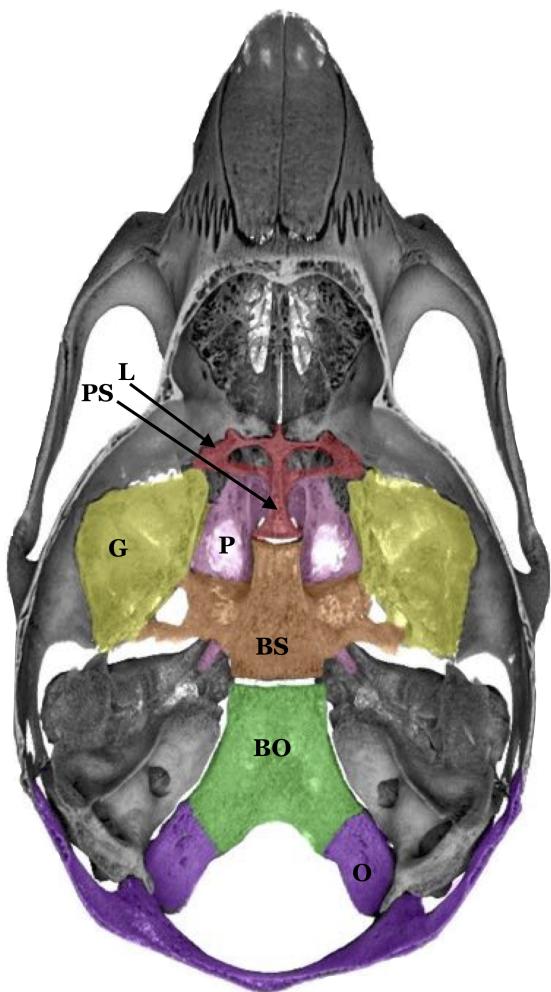


Figure 8: Cranial base anatomy

μ CT scan rendering of the C57BL/6J cranial base at postnatal day 28.

key

Red, presphenoid

Orange, basisphenoid with Yellow, greater wing of the sphenoid

Pink, palatine

Green, basioccipital

Purple, exoccipital



Figure 9: Cranial base morphology over the first month of life
µCT scan renderings of the C57BL/6J cranial base at postnatal days 7, 14, 21 and 28.

Key

- Yellow, presphenoid synchondrosis
- Green, sphenooccipital synchondrosis
- Blue, basioccipital-exoccipital synchondrosis



Figure 10: Cervical vertebra

μ CT scan rendering of the cervical vertebral stack of a 28 day old *sbse* mutant.

key

- Red, C1 (Atlas)
- Orange, C2 (Axis)
- Yellow, C3
- Green, C4
- Blue, C5

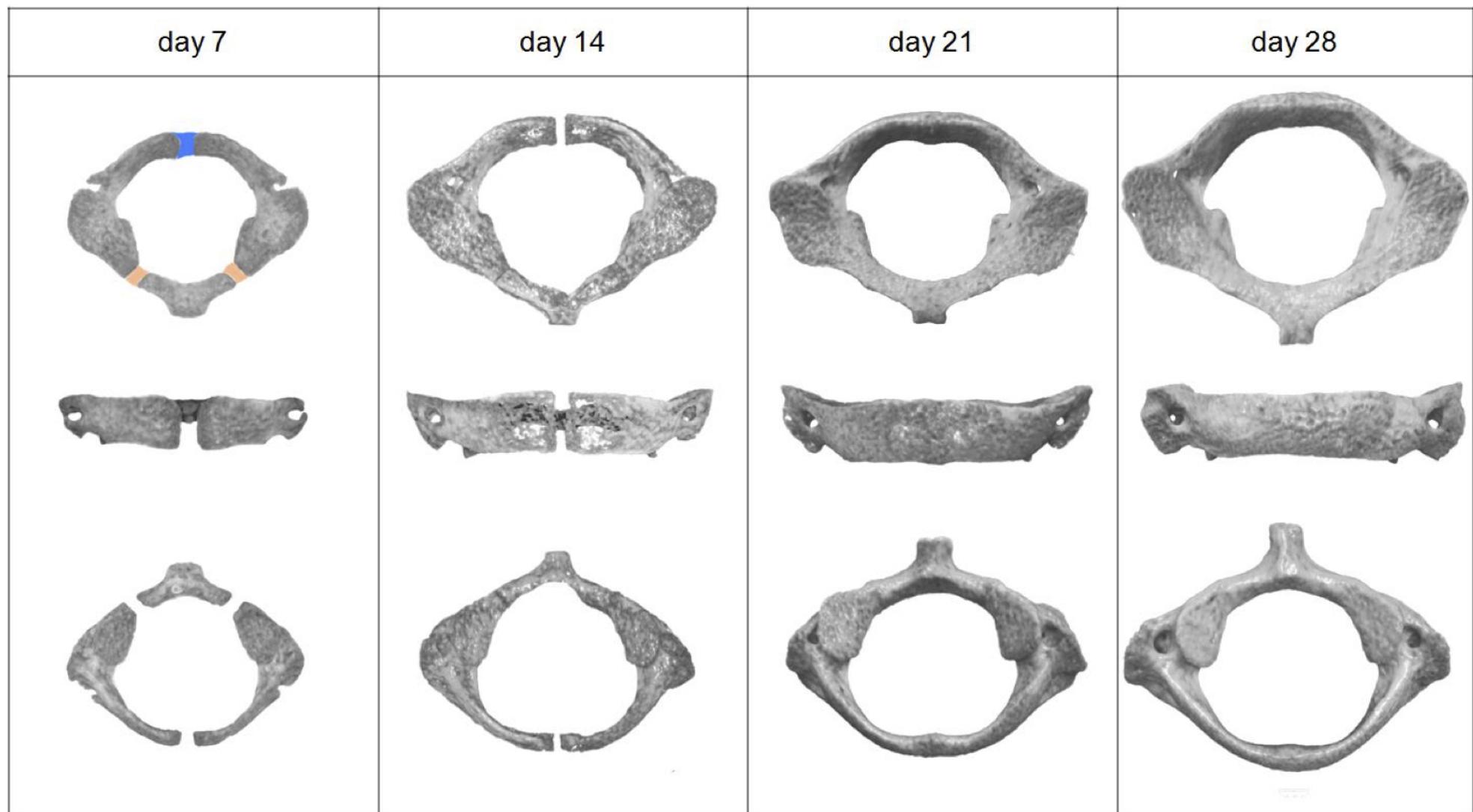


Figure 11: C1 morphology over the first month of life

μ CT scan renderings of representative mouse cervical vertebra 1 (C1) at postnatal days 7, 14, 21 and 28.

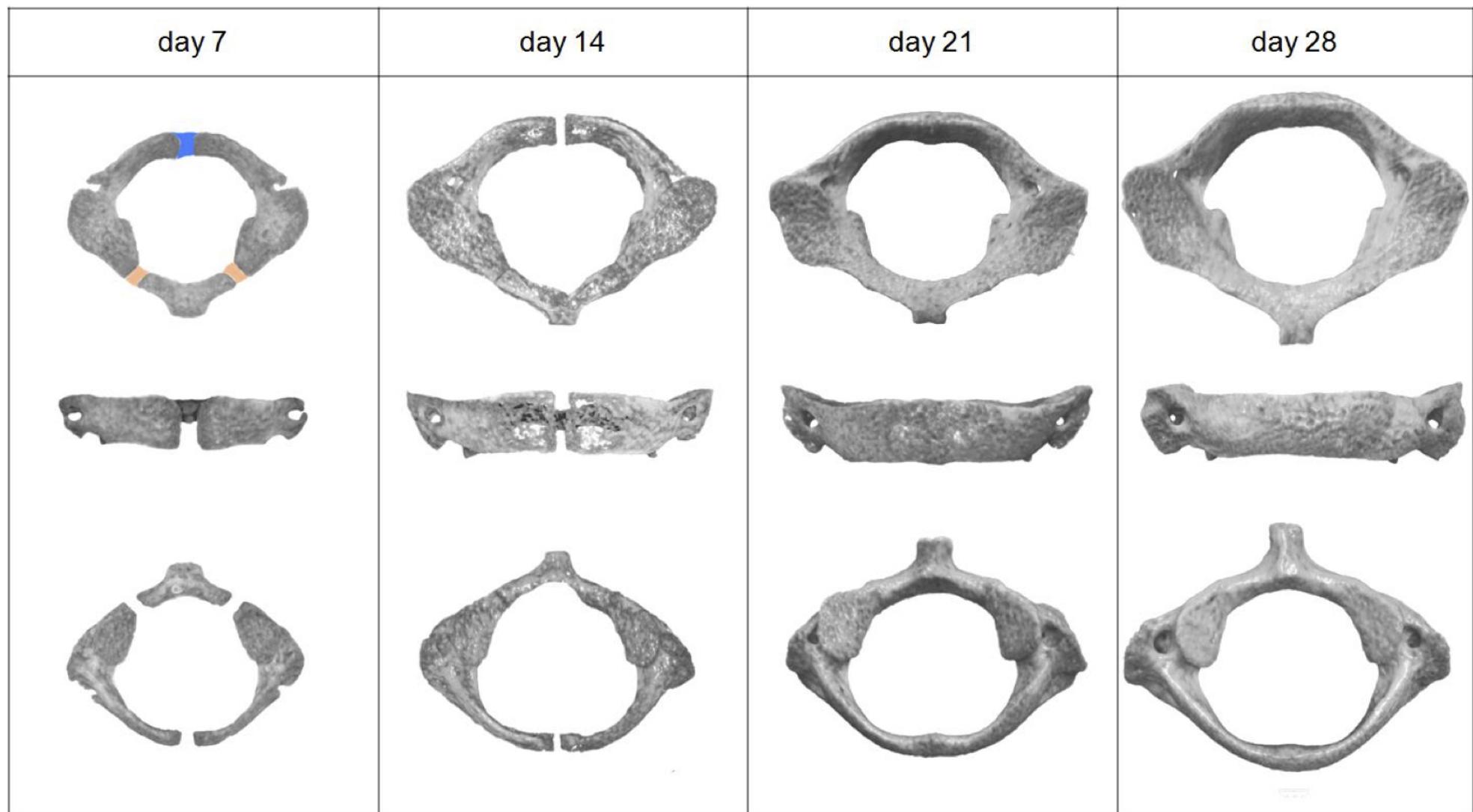


Figure 12: C2 morphology over the first month of life

μ CT scan renderings representative of mouse cervical vertebra 2 (C2) at postnatal days 7, 14, 21 and 28.

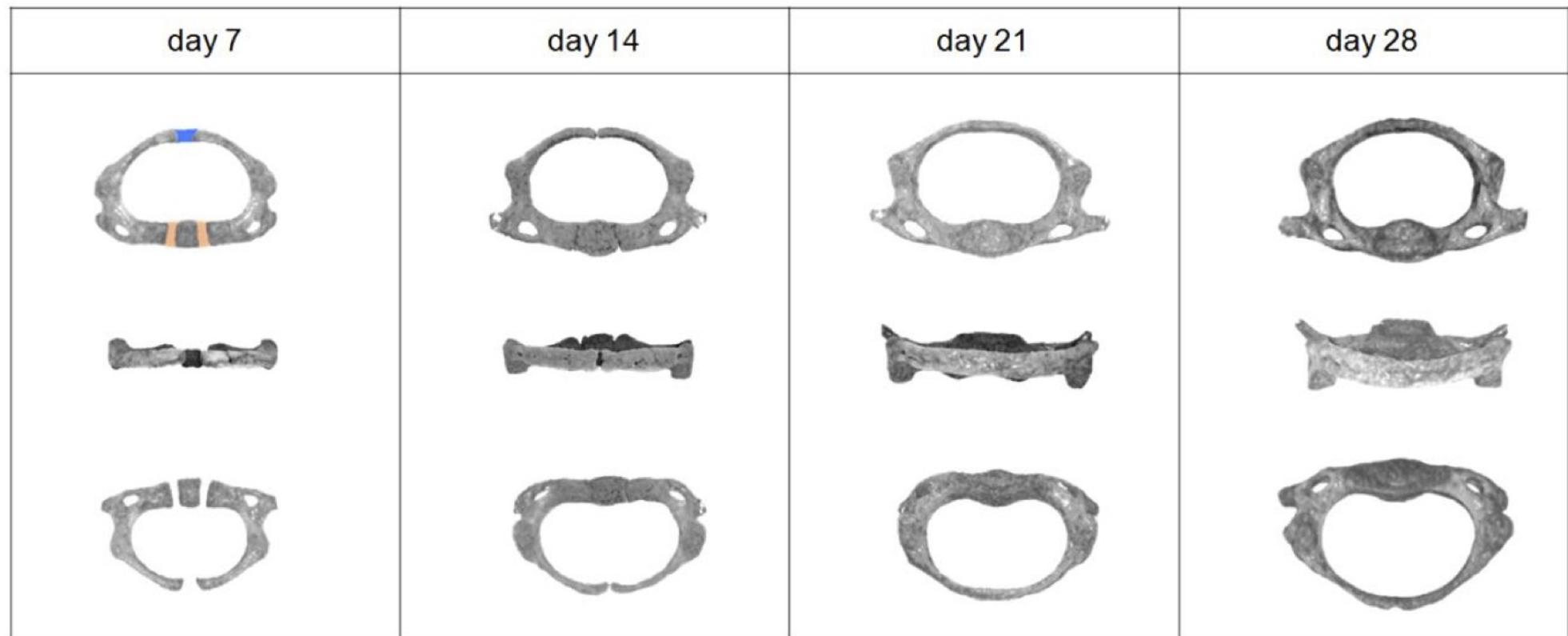
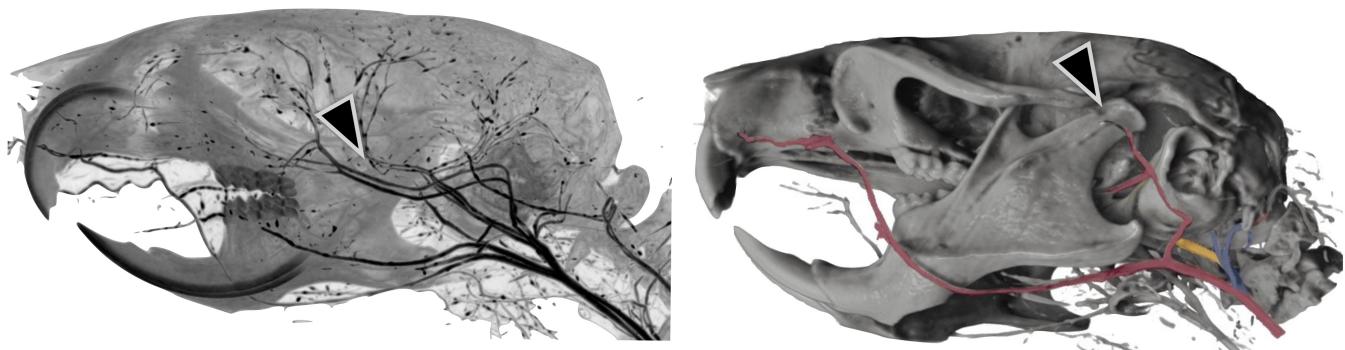


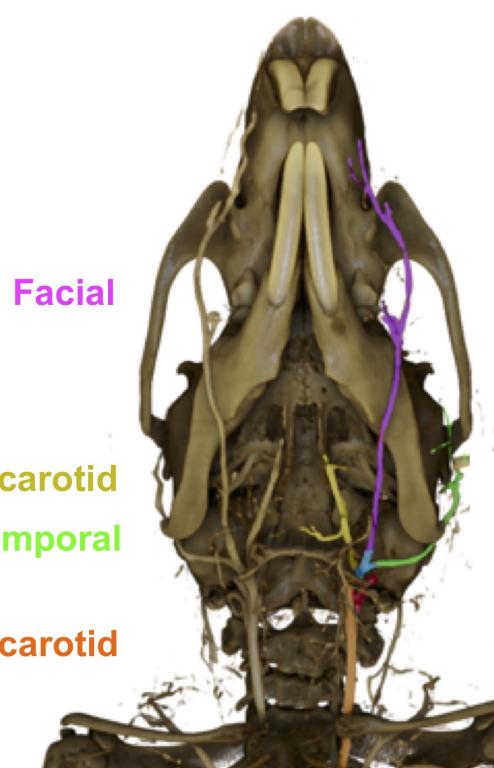
Figure 13: C3 morphology over the first month of life

μ CT scan renderings representative of mouse cervical vertebra 3 (C3) at postnatal days 7, 14, 21 and 28.



Lateral view

Black arrowhead, mandibular condyle



Facial
Internal carotid
Superficial temporal
Common carotid

Ventral view with major vessels



Dorsal endocranial view

Figure 14: Cranial vasculature

μ CT scan renderings of the cranium of a 145 day old C57BL/6J mouse after perfusion with radioopaque contrast media.

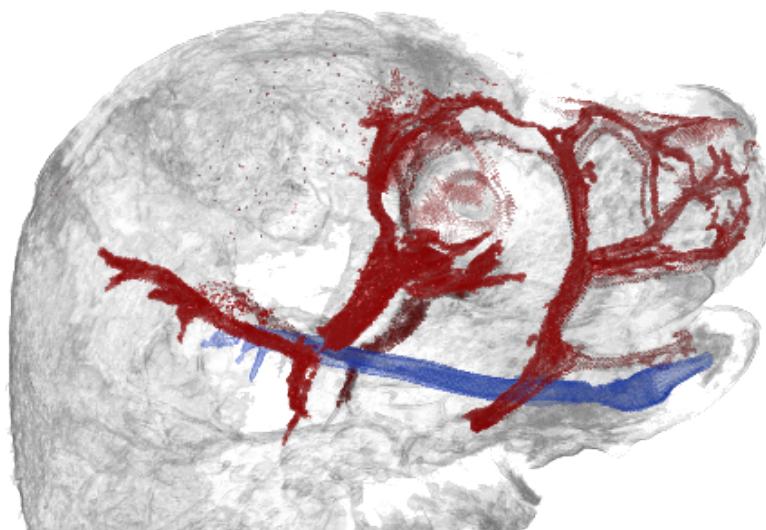


Figure 15: Meckel's cartilage and superficial vasculature

Meckel's cartilage and superficial cranial vasculature in an embryonic mouse pup stained with Alcian blue to label cartilage. The image was generated by segmenting an OPT (Optical Projection Tomography) scan reconstruction and selectively rendering the mandibular cartilage, vasculature, and skin. Absent from this image is the nasal capsule and endochondral bone anlage.

Key

- Blue, Meckel's cartilage
- Red, Superficial craniovasculature

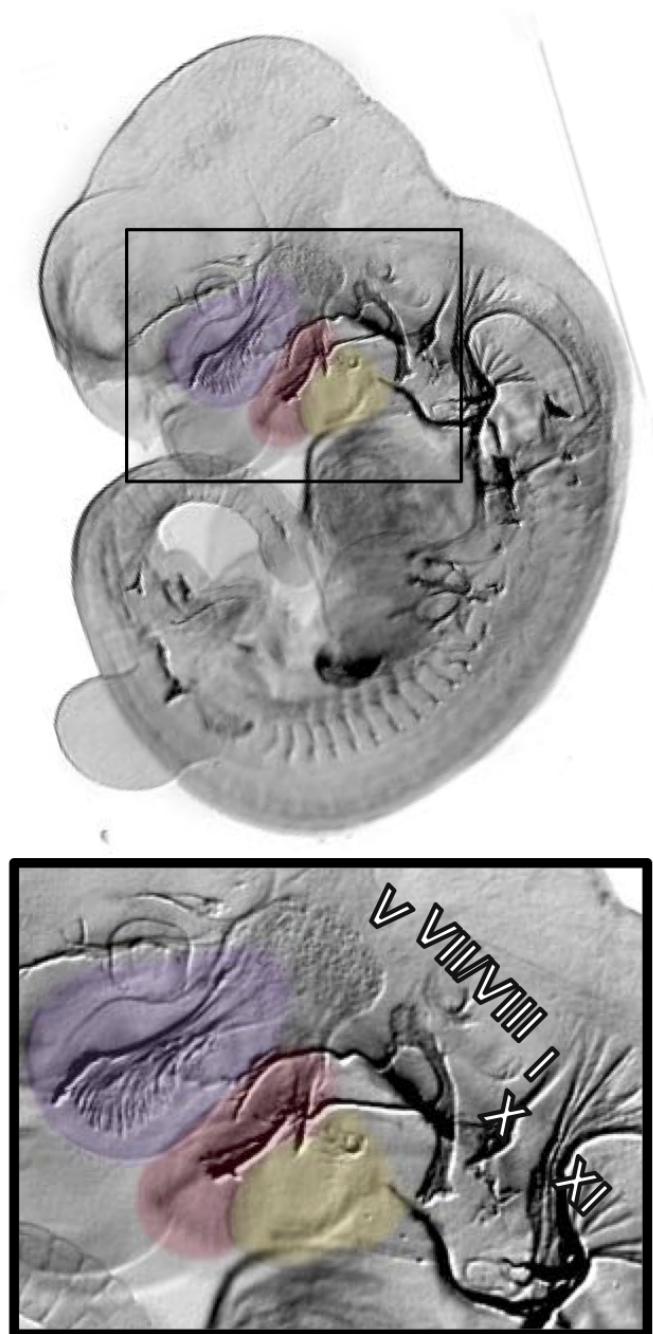


Figure 16: Embryonic cranial nerves

Cranial nerves in the embryonic day 11 C57BL/6J mouse, labeled with mouse α -rat neurofilament (2h3) antibody and stained with DAB.

Key

Purple and red, branchial arch 1
Yellow, branchial arch 2

CN V trigeminal
CN VII facial
CN VIII vestibulocochlear
CN IX glossopharyngeal
CN XI accessory

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