

ATHYMIC NUDE RAT BRAIN

Bengt Mattsson, Malin Parmar and Anders Björklund



ATLAS



Athymic Nude Rat Brain Atlas

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Introduction

The use of human pluripotent stem cells (hPSCs – embryonic stem cells (hESCs) and induced pluripotent stem cells (iPSCs) – has opened up new possibilities for cell-based therapies in the central nervous system. Neuronal replacement using progenitors derived from hESCs or iPSCs is being explored for a range of neurodegenerative conditions, and clinical trials are currently under way in patients with Parkinson's disease, epilepsy, and retinal degeneration (see Parmar et al., 2020). The experimental work underpinning these trials, and the pre-clinical validation of the safety, functional maturation, and potency of the clinical product have to be carried out in xenograft models, i.e., the transplantation of human cells into the brains of rodents or non-human primates. The most common method to circumvent the problem of xenograft rejection is the daily administration of immunosuppressive drugs, such as ciclosporin A or FK 506. However, since neurons derived from human iPSCs mature slowly there is often a need to study the cells for longer time periods than is possible in immunosuppressed animals. For this reason, the immune-incompetent hosts, such as athymic nude rats, that allow for up to 12-month graft survival, are increasingly used for experimental work and pre-clinical safety and efficacy studies.

One strain, the Envigo athymic nude rat, has emerged as particularly useful for human-to-rat xenograft studies. In our own research we have made use of this strain of rats in experiments where human neurons or glia have been implanted into the brain using stereotaxic surgery. Early on in this work, however, we came to realize that the brain of the Envigo rat is smaller, and also somewhat different in shape, than the brain of the same-size/weight Sprague-Dawley (SD) rats that we normally use. As a result, the coordinates that we derived from the standard Paxinos and Watson atlas (Paxinos and Watson, 2005, 2014) did not define the same site in the Envigo rat brain. The Envigo rat is also smaller in size than SD rats of the same age. This size difference starts to appear at about 7-8 weeks of age and becomes larger over time. In our work we use 4-5 months old female rats, at which time they weigh about 220 g.

This size and shape difference poses a problem when calculating coordinates to target specific structures for toxin, virus, or cell delivery using stereotaxic surgery. To overcome this, we collected brains from female SD (Envigo) and Envigo nude rats of the same weight (220 g) and processed them in parallel. Brains from each strain were cut into 30- μ m sections and every fourth section, stained with cresyl violet, was scanned and placed in 3D using the Maxon Cinema 4D R26 software, allowing each major brain structure to be illustrated as a volume object. Comparison between the two strains showed that the Envigo brain differed in thickness and shape of the neocortex, and the volume of deeper brain structures, such as thalamus, caudate-putamen, and external globus pallidus, differed by as much as 20-30%.

As we went on to generate our own list of modified coordinates for the implantation sites used in our surgeries, we came to realize the need of a full-scale stereotaxic atlas of the Envigo nude rat brain to assist in the selection of coordinates of surgical targets. Drawing on his expertise in working with tissue clearing and rendering of 3D images of the brain, one of us (BM) took hold of this idea, but instead of using histological sections cut in the three planes (coronal, sagittal, and horizontal) derived from three different brains, he decided to use the 3D image of a single brain (in fact, a single hemi-brain) as the template for mapping, thus allowing maps in all three planes to be rendered from the same brain. Two series of coronal sections, stained with cresyl violet and tyrosine hydroxylase antibodies, were generated from a second brain and inserted into the 3D image using the well-visible white matter structures as a template. To assist in the identification and delineation of the anatomical structures, the stained sections were superimposed on the corresponding sections from the Paxinos and Watson atlas (5th edition; 2005), as described in METHODS below. Finally, and as a reflection of our interest in the dopaminergic system, we added a representation of the cell bodies and projections of the A8-A14 dopamine cell groups. This information was taken from the Björklund and Lindvall atlas published in the 2nd volume of Handbook of Chemical Neuroanatomy (Björklund and Lindvall, 1984) and transferred onto the left side of the atlas coronal maps. The representation of the dopaminergic innervation of the septal nuclei is taken from the map published by Lindvall (1975).

To adjust for the inevitable shrinkage occurring in the iDISCO clearing protocol we used a large number of reference points located in substantia nigra, the medial forebrain bundle, the striatum (head of caudate-putamen and accumbens shell), the dorsal and ventral hippocampus, and the pre-limbic frontal cortex. The coordinates derived from the coordinate grid were applied to female Envigo nude rats of the determined size (220 g), and the deviation from the correct position was used to guide the adjustment of the grid so as to make sure that the positions in the maps matched the positions in the living rat. Based on the experience we have acquired, so far, the error in defining any point in the brain should be less than the brain should be less than 0.5 mm, i.e., within the stated limits of the Paxinos and Watson atlas.

The Paxinos and Watson atlas, now in its 7th edition (2014), has become the standard tool for stereotaxic surgery in the rat brain. At the outset, therefore, it was important that the Envigo nude rat brain atlas was fully compatible with this atlas with respect to orientation of the section planes, the delineation of the anatomical structures, and the nomenclature and abbreviations used. In this way, we foresee that the Envigo nude rat brain atlas can be used as a companion to the Paxinos and Watson atlas.

Animals

For the preparation of the atlas we made use of brains from two 220-g female nude athymic rats (Hsd:RHFoxn1tm; Envigo). One rat was perfused transcardially with 2% ice-cold paraformaldehyde for 1 h. The brain was divided by a midline sagittal cut and the two hemi-brains were processed individually for light-sheet microscopy using the iDISCO clearing method (Renier et al., 2014) and one of the hemi-brains was selected for use. Due to the limitations set by the size of the sample holder in the light-sheet microscope, the olfactory bulb and the caudal part of the brainstem had to be cut off and are thus not included in the atlas. The second rat was perfused transcardially with physiological saline solution followed by ice-cold 4% paraformaldehyde. The brain was post-fixed for 24 h in the same solution, transferred to 25% sucrose for 48 h. Serial coronal sections were cut at 35- μ m thickness on a freezing microtome in a plane perpendicular to the bregma-lambda axis. Alternate sections were stained with cresyl violet or processed for tyrosine hydroxylase immunostaining, using a rabbit anti-TH antibody (1:2000, Merck Millipore ab152), as described (Adler et al. 2019).

The stereotaxic surgeries used to validate the reference points were performed in accordance with the European Union Directive (2010/63/EU) and approved by the local ethical committee at Lund University, as well as the Swedish Department of Agriculture (Jordbruksverket). These surgeries were carried out under general anesthesia using a solution of fentanyl (0.36 mg/kg) and medetomidine hydrochloride (domitor; 0.36 mg/kg). Animals were placed into a stereotaxic frame and the tooth bar was adjusted to the flat-head position with bregma and lambda at the same level plane.

Generation of the maps

(Numbers refer to the 6 steps illustrated in Figure 1)

1. The cleared hemi-brain was scanned in the sagittal plane using a LaVision UltraMicroscope II equipped with a 1.3 $\times$ objective (LVMI-Fluor 1.3 $\times$ /00.8 MI Plan) and a sCMOS camera (Andor Neo model 5.5-CL3). Images were acquired in 5- μ m steps under illumination with a 488-nm laser (used to visualize white matter tracts) using the ImspectorPro64 software (LaVision).

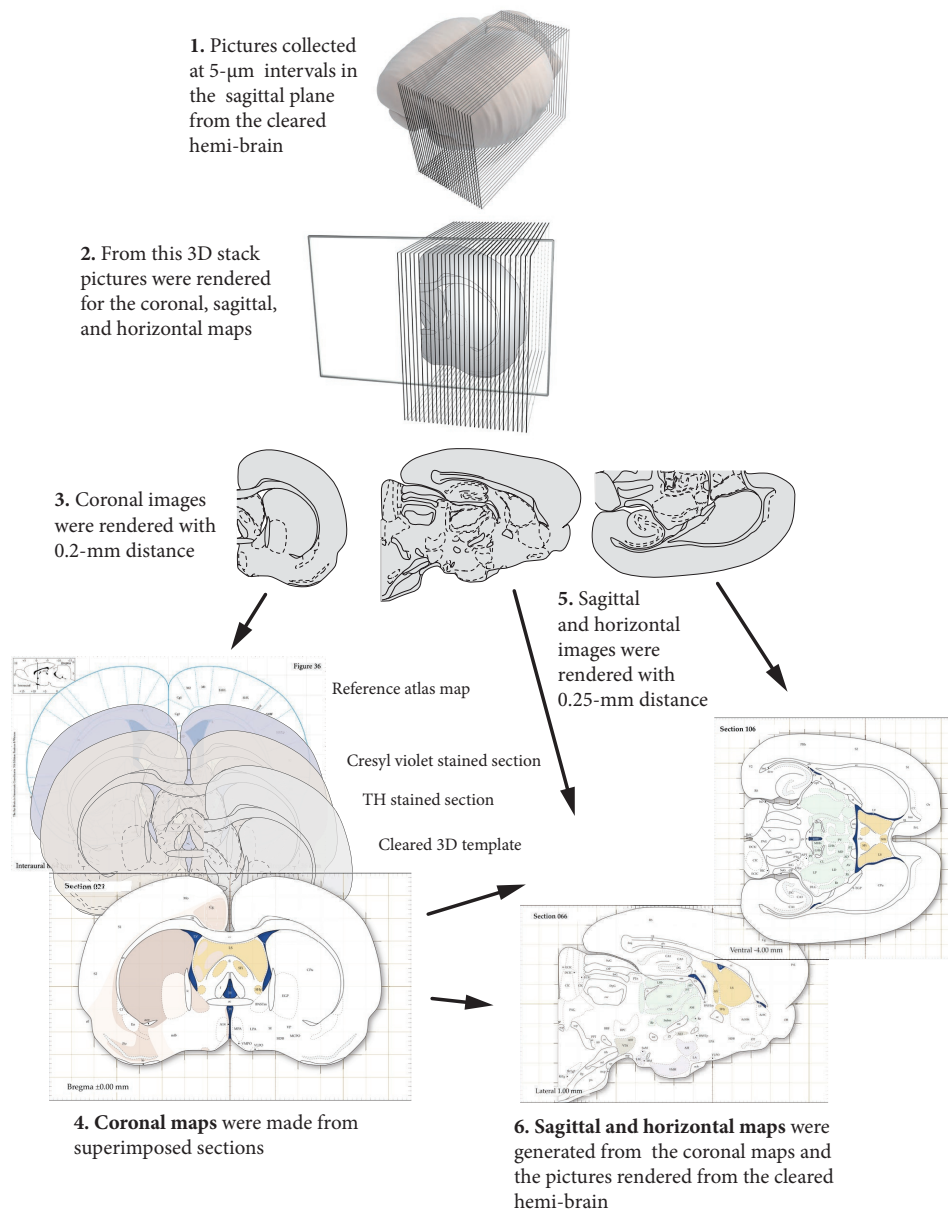


Figure 1

2. A 3D image of the hemi-brain was generated using Arivis Vision 4D 3.5 software. From this 3D image complete series of sections were rendered with a distance of 0.2 mm in the coronal plane, and with a distance of 0.25 mm in the sagittal and horizontal planes.
3. The outline of anatomical structures was added to the coronal sections, using the Maxon Cinema 4D R26 software, as illustrated in Figure 2. Prominent white matter structures (such as corpus callosum, internal capsule, and the anterior and posterior commissures), which are well visible in the cleared 3D image under 488 nm laser illumination, were used as anatomical landmarks. For each individual section these structures were used as a template onto which the corresponding cresyl violet and/or tyrosine hydroxylase-stained sections were superimposed, and the corresponding sections from the Paxinos and Watson atlas (5th edition; 2005) were used to assist in the definition of anatomical structures.
4. Complete bilateral coronal maps were generated by fusing the individual hemi-brain images with their mirror images, using Adobe Illustrator 2022. The mirror images (*i.e.*, the left half of the maps) were used to illustrate the distribution of the A8-A14 dopamine cell groups and their projections. This information was transferred from scanned images taken from the dopamine atlas of Björklund and Lindvall (1984) (shown in three shades of brown).
5. Using the Maxon Cinema 4D software (see point 3) the anatomical structures were finally transferred onto the sagittal and horizontal sections, as illustrated schematically in Figure 3. Again, the well visible white matter structures were used as landmarks and each structure delineated on the coronal sections was mapped onto the sagittal and horizontal sections. Faint coloring was used to facilitate delineation and to identify structures belonging to four major anatomical regions– thalamus, hypothalamus, septum, and amygdala.

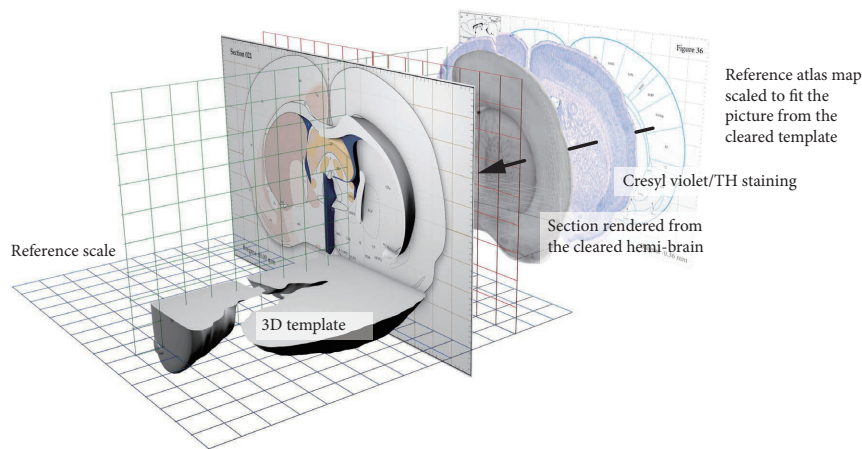


Figure 2

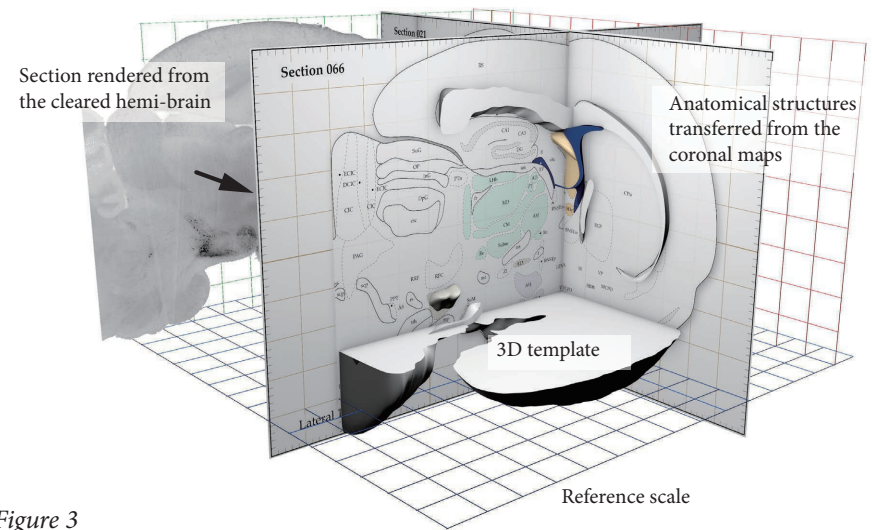


Figure 3

Validation of the stereotactic coordinates

The maps are superimposed onto a stereotactic reference grid with a scale divided in 0.2-mm intervals. To facilitate comparison with the Paxinos and Watson atlas the zero planes are in the same position, i.e., in the coronal series at the level of the bregma, in the sagittal series at the mid-line, and in the horizontal series at the level of the bregma-lambda axis. The accuracy of the coordinate grid has been validated in tests where the coordinates derived from the atlas have been applied in 220-g female nude rats, with the selected points placed in prelimbic frontal cortex striatum, nucleus accumbens shell, dorsal and ventral hippocampus, the nigrostriatal bundle and substantia nigra, pars compacta. The results have been satisfactory and suggest that the potential error at these points is less than 0.5 mm. Although these tests have been performed in females, the data quoted by Paxinos and Watson (2005) suggest that they will be valid also for use in males provided that they are of similar size.

Nomenclature

The nomenclature and abbreviations follow closely those used in the Paxinos and Watson atlas (5th edition, 2005). Since our atlas is intended to be used primarily as a guide for stereotaxic surgery performed in nude rats, and not as a source of anatomical information, we have chosen to reduce the number of labeled structures and, in some cases, lump them together in order to simplify the nomenclature. As emphasized in Introduction, our intention is that our atlas is used as a companion to the Paxinos and Watson atlas.

Labeling and colors

Nuclei and fiber bundles are outlined using dashed and solid lines, respectively, and illustrated on the right side of the coronal maps.

Color coding is used for the following structures: thalamus (light green), hypothalamus (light violet), amygdala (light red), septum (yellow), dopamine neuron cell groups (greenish gray), and ventricular spaces (dark blue).

Dopamine projections are illustrated in brown on the left side in the coronal maps. The innervation density is represented in three shades: dark brown for high density innervation (such as in striatum and olfactory tubercle), medium dark brown for medium terminal density (such as in prefrontal and cingulate cortex and amygdala), and light brown (such as in intervening areas of the cortex).

References

- Adler *et al.*, hESC-derived dopaminergic transplants integrate into basal ganglia circuitry in a preclinical model of Parkinson's disease. *Cell Rep.* 28, 3462–3473.e5 (2019).
- Björklund A. and Lindvall O. *Dopamine-containing systems in the CNS*, Handbook of Chemical Neuroanatomy, Vol 2, pp 55-122, A. Björklund and T. Hökfelt, eds. (Elsevier Science Publishers, 1984).
- Lindvall, O. Mesencephalic dopaminergic afferents to the lateral septal nucleus of the rat, *Brain Research* 87, 89-95 (1975).
- Parmar M, Grealish S and Henchcliffe C. The future of stem cell therapies for Parkinson disease. *Nat Rev Neurosci.* 21(2):103-115 (2020).
- Paxinos, G. and Watson, C. *The Rat Brain in Stereotaxic Coordinates*, 5th Edition, (Academic Press, London, 2005).
- Paxinos, G. and Watson, C. *The Rat Brain in Stereotaxic Coordinates*, 7th Edition, (Academic Press, London, 2014).
- Renier *et al.*, iDISCO: A simple, rapid method to immunolabel large tissue samples for volume imaging. *Cell* 159, 896–910 (2014).

List of structures

2nd Cb lob
2nd & 3rd Cb lob
2ary somatosensory cortex
3rd Cb lob
3rd ventricle
4th Cb lob
4th ventricle
4th & 5th Cb lob

2Cb
2/3Cb
S2
3Cb
3V
4Cb
4V
4/5Cb

A

A7 noradr cell gr
A8 dopamine cell gr
A9 dopamine cell gr
A10 dopamine cell gr
A11 dopamine cell gr
A12 dopamine cell gr
A13 dopamine cell gr
A14 dopamine cell gr
A14 dopamine cell gr, dorsal
accumbens nu, core
accumbens nu, shell
alveus hippocampus
amygdalohip area
ant amyg area
ant cortical amygdaloid nu
anterior commissure
anterior commissure, anterior
anterior commissure, posterior
anterior hypothalamic area
anterior olf nucleus
anteriorodors th nu
anteriomedial th nu
anteriorvent th nu
ant pretectal
arcuate nu
aqueduct

A7
A8
A9
A10
A11
A12
A13
A14
A14d
AcbC
AcbSh
alv
AHi
AA
ACo
ac
aca
acp
AH
AON
AD
AM
AV
APT
Arc
aq

B

basolateral amygdaloid
basolateral amygdaloid nu, vent
basomedial amygdaloid nu
brachium inf coll
brachium sup coll
bed nu of ST lat
bed nu of ST med
bed nu of ST post
bed nu of ST ventr

BL
BLV
BM
bic
bsc
BNSTl
BNSTm
BNSTp
BNSTv

C

CA1 field

CA1

CA2 field
CA3 field
caudal A10 dopamine cell gr
caudate putamen
central amygdaloid nu
central nu
centralmedial thal nu
centrallateral thal nu
cerebral peduncle
cingulate cortex
cingulum
claustrum
comm of inf coll
commissure of sup colliculus
corpus callosum
cortical amyg
cortex-amygdala transition zone

D

deep gray
dentate gyrus
dorsal ctx inf coll
dorsal lateral geniculate nu
dorsal hipp comm
dorsal hy area
dorsal nu lat lem
dorsal raphe nu
dorsal tegm nu
dorsal third ventricle
dorsomedial hypothalamic nu

E

endopiriform nu
entorhinal cortex
ext ctx inf coll
external capsule
external globus pallidus

F

fasciculus retroflexus
fimbria hippocampus
forceps minor
forceps major
fornix

G

genu corpus callosum

H

horizontal limb diagonal band

CA2
CA3
A10c
CPu
Ce
CIC
CM
CL
cp
Cg
cg
Cl
cic
csc
cc
Co
CxA

DpG
DG
DCIC
DLG
dhc
DH
DLL
DR
DTg
D3V
DM

En
Ent
ECIC
ec
EGP

fr
fi
fmi
fmj
f

gcc

HDB

I

intercalated nu
interfascicular nu
intermediate gray layer
intermediate nu lat lemn
intermediadors nu
int capsule
interpeduncular nu
interstit nu Cajal
island of Calleja
island of Calleja, major

L

lat ant hypoth nu
lat mammid nu
lat lemniscus
lateral amyg nu
lat habenular nu
lateral olfactory tract
lateral preoptic area
lateral posterior thal nu
lateral septum
lateral ventricle
laterodorsal thal nu
linear raphe
long fasc pons

M

magnocell lat hy
magnocell preoptic
mamm recess 3V
mammillary ped
mammilloteg tract
mammillothalamic tract
med mamm nu
med terminal nu
medial amyg nu
medial forebrain bundle
med habenular nu
medial geniculate nu
medial lemniscus
med long fasc
medial septum
medial preoptic area
median eminence
median raphe nu
mediodorsal thal nu
mesencephalic trigeminal tract
mid cerebellar ped
motor cortex
motor root of trig nerve

I
IF
InG
ILL
IMD
ic
IP
InC
ICj
ICjM

LA
LM
ll
La
LHb
lo
LPA
LP
LS
LV
LD
Li
lfp

MCLH
MCPO
MRe
mp
mtg
mt
MM
MT
Me
mfb
MHb
MG
ml
mlf
MS
MPA
ME
MnR
MD
me5
mcp
Mo
m5

N

nu basalis
nu brachium inf coll
nu of optic tract

NB
BIC
OTn

O

oculomotor nu
olfactory tubercle
olivary preect nu
olfactory bulb
olfactory ventricle
orbital cortex
optic chiasm
optic nerve
optic n layer
optic tract

3N
OT
OPT
OB
OV
Or
och
2n
OP
opt

P

parafascic th nu
paralambdoid septal nu
pararubral nu
paratenial th nu
paravent hyp nu
paraventricular thal nu
paraventricular thal nu ant
parietal cortex
pedunculopontine tegmental nu
periaqueduct gray
perirhinal cx
piriform cortex
pontine nuclei
post intralam thal nu
post thalamic nu
posterior commissure
posterior hypoth area
posterolat cortical amygdaloid nu
prelimbic cortex
pretectal nu
primary somatosensory cortex
primary visual
primary visual 2

PF
PLd
PaR
PT
PVH
PV
PVA
Par
PPT
PAG
PRh
Pir
Pn
PIL
Po
pc
PH
PLCo
PrL
PTn
S1
V1
V2

R

recess of inf coll
red nu magnocell
red nu parvicell
reticular thal nu
reticulotegmental
reticulotegmental pericen
retrotrubral field
retrosple cortex
reuniens th nu

RelC
RMC
RPC
Rt
RtTg
RtTgP
RRF
RS
Re

rhinal fissure
rhomboid thal nu
rost linear raphe
rubro spinal tract

rf
Rh
RLi
rs

Z
zona incerta

ZI

S

sensory root of trig nerve
septofoimbrial nu
septohipp nu
septohypothal nu
subgeniculate nu
stria medullaris thal
stria terminalis
subbrachial nu
subfornical organ
subiculum
submedius th nu
subst innominata
subst nigra compacta
subst nigra lat
subst nigra retic
subthalamic nu
sup coll peduncle
superficial gray layer
suprachiasmatic nu
supramamm
supraoptic nu
supraoptic decussation

s5
SFi
SHi
SHy
SubG
sm
st
SubB
SFO
Sub
Subm
SI
SNC
SNL
SNR
STh
scp
SuG
SCh
SuM
SO
sod

T

tectospinal tract
trigeminothal tr
trochlear nu

ts
tth
4N

V

vent lat geniculate nu
ventral hipp comm
ventral nu lat lemniscus
ventral pallidum
ventral posteromed thal nu
ventral posterolat thal nu
ventral tegm nu
ventral tegmental area
ventrolat preopt
ventrolateral thal nu
ventromed preopt area
ventromedial hypoth nu
ventromedial thal nu
vertical limb diagonal band

VLG
vhc
VLL
VP
VPM
VPL
VTg
VTA
VLPO
VL
VMPO
VMH
VM
VDB

Index of Abbreviations

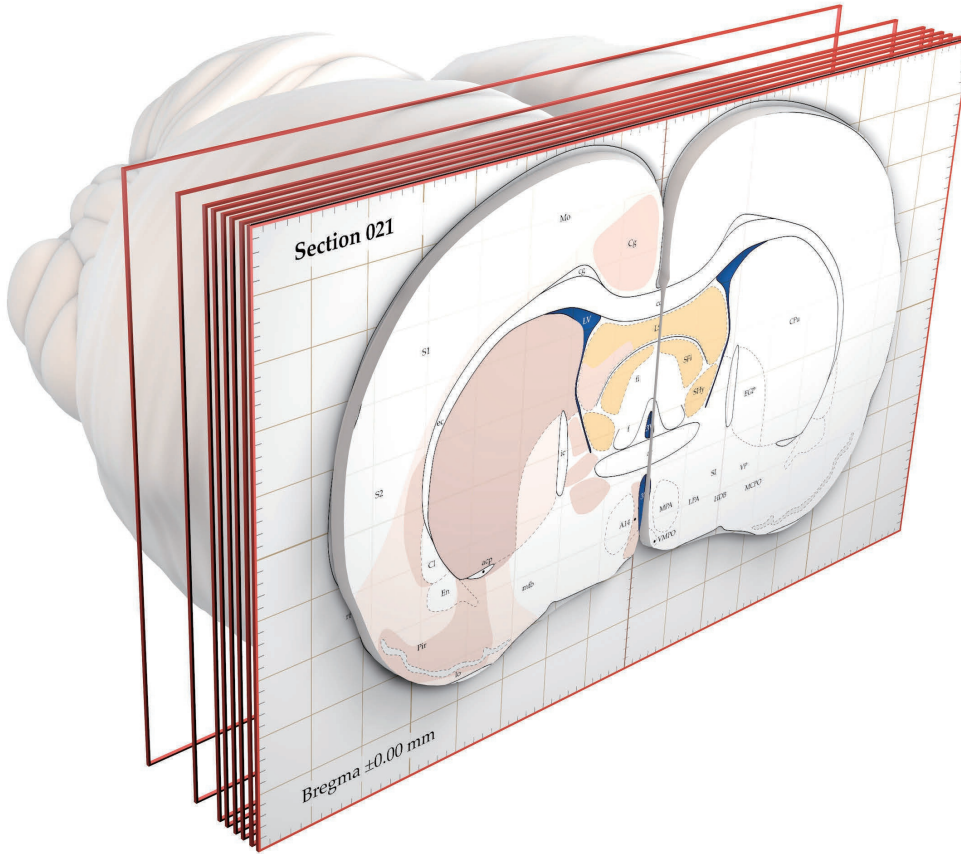
2Cb	2nd Cb lobes	cg	cingulum	LS	lateral septum	rf	rhinal fissure
2n	optic nerve	Cg	cingulate cortex	LV	lateral ventricle	Rh	rhomboid thal nu
2/3Cb	2nd & 3rd Cb lobes	CL	centrallateral thal nu	m5	motor root of trig nerve	RMC	red nu magnocell
3Cb	3rd Cb lobes	CI	claustrum	MCLH	magnocell lat hy	RLi	rost linear raphe
3N	oculomotor nu	CM	centralmedial thal nu	mcp	mid cerebellar ped	RPC	red nu parvicell
3V	3rd ventricle	Co	cortical amyg	MCPO	magnocell preoptic	RRF	retrobulbar field
4/5Cb	4th & 5th Cb lobes	cp	cerebral peduncle	MD	mediodorsal thal nu	RS	retrosple cortex
4Cb	4th Cb lobes	CPu	caudate putamen	ME	median eminence	rs	rubro spinal tract
4N	trochlear nu	csc	commissure of sup colliculus	Me	medial amyg nu	Rt	reticular thal nu
4V	4th ventricle	CxA	cortex-amygdala transition zone	me5	mesencephalic trigeminal tract	RtTg	reticulotegmental
A7	A7 noradr cell gr	D3V	dorsal third ventricle	mfb	medial forebrain bundle	RtTgP	reticulotegmental pericen
A8	A8 dopamine cell gr	DCIC	dorsal ctx inf coll	MG	medial geniculate nu	S1	primary somatosensory cortex
A9	A9 dopamine cell gr	DH	dorsal hy area	MHb	med habenular nu	S2	2ary somatosensory cortex
A10	A10 dopamine cell gr	dhc	dorsal hipp comm	ml	medial lemniscus	s5	sensory root of trig nerve
A10c	caudal A10 dopamine cell gr	DG	dentate gyrus	mlf	med long fasc	SCh	suprachiasmatic nu
A11	A11 dopamine cell gr	DLL	dorsal lateral geniculate nu	MM	med mamm nu	scp	sup coll peduncle
A12	A12 dopamine cell gr	DM	dorsomedial hypothalamic nu	MnR	median raphe nu	SFi	septohippocampal nu
A13	A13 dopamine cell gr	DpG	deep gray	Mo	motor cortex	SFO	subfornical organ
A14	A14 dopamine cell gr	DR	dorsal raphe nu	mp	mammillary ped	SHi	septohipp nu
A14d	A14 dopamine cell gr, dorsal	DTg	dorsal tegm nu	MPA	medial preoptic area	SHy	septohypothal nu
AA	ant amyg area	ec	external capsule	MRe	mamm recess 3V	SI	subst innominata
ac	anterior commissure	ECIC	ext ctx inf coll	MS	medial septum	sm	stria medullaris thal
aca	anterior commissure, anterior	EGP	external globus pallidus	MT	med terminal nu	SNC	subst nigra compacta
AcbC	accumbens nu, core	En	endopiriform nu	mt	mammillothalamic tract	SNL	subst nigra lat
AcbSh	accumbens nu, shell	Ent	entorhinal cortex	mtg	mammilloteg tract	SNR	subst nigra retic
ACo	ant cortical amygdaloid nu	f	fornix	NB	nu basalis	SO	supraoptic nu
acp	anterior commissure, posterior	fi	fimbria hippocampus	OB	olfactory bulb	sod	supraoptic decussation
AD	anteriordors th nu	fmi	forceps minor	och	optic chiasm	st	stria terminalis
AH	anterior hypothalamic area	fmj	forceps major	OP	optic n layer	STh	subthalamic nu
AHi	amygdalohip area	fr	fasciculus retroflexus	Or	orbital cortex	Sub	subiculum
alv	alveus hippocampus	gcc	genu corpus callosum	OT	olfactory tubercle	SubB	subbrachial nu
AM	anteromedial thal nu	HDB	horizontal limb diagonal band	OTn	nu of optic tract	SubG	subgeniculate nu
AON	anterior olf nucleus	I	intercalated nu	OPT	olivary preect nu	Subm	submedius th nu
APT	ant preectal	ic	int capsule	opt	optic tract	SuG	superficial gray layer
aq	aqueduct	ICj	island of Calleja	OV	olfactory ventricle	SuM	supramamm
Arc	arcuate nu	ICjM	island of Calleja, major	PAG	periaqueduct gray	ts	tectospinal tract
AV	anteriorvent th nu	IF	interfascicular nu	PaR	parabrachial nu	tth	trigeminohal tr
BIC	nu brachium inf coll	InC	interstit nu Cajal	Par	parietal cortex	V1	primary visual
bic	brachium inf coll	InG	intermediate gray layer	PIL	post intralam thal nu	V2	primary visual 2
BL	basolateral amygdaloid	ILL	intermediate nu lat lemn	Pir	piriform cortex	VDB	vertical limb diagonal band
BLV	basolateral amygdaloid nu, vent	IMD	intermediadors nu	pc	posterior commissure	vhc	ventral hipp comm
BM	basomedial amygdaloid nu	IP	interpeduncular nu	PF	parafascic nu	VL	ventrolateral thal nu
BNSTl	bed nu of ST lat	LA	lat ant hypoth nu	PH	posterior hypoth area	VLG	vent lat geniculate nu
BNSTm	bed nu of ST med	La	lateral amyg nu	PLCo	posterolat cortical amygdaloid nu	VLL	ventral nu lat lemniscus
BNSTp	bed nu of ST post	LD	laterodorsal thal nu	PLd	paralambdoid septal nu	VLPO	ventrolat preopt
BNSTv	bed nu of ST ventr	lfp	long fasc pons	Pn	pontine nuclei	VM	ventromedial thal nu
bsc	brachium sup coll	LHb	lat habenular nu	Po	post thalamic nu	VMH	ventromedial hypoth nu
CA1	CA1 field	Li	linear raphe	PPT	pedunclopontine tegmental nu	VMPO	ventromed preopt area
CA2	CA2 field	II	lat lemniscus	PRh	perirhinal cx	VP	ventral pallidum
CA3	CA3 field	LM	lat mammid nu	PrL	prelimbic cortex	VPL	ventral posterolat thal nu
cc	corpus callosum	LP	lateral posterior thal nu	PT	pretectal th nu	VPM	ventral posteromed thal nu
Ce	central amygdaloid nu	LPA	lateral preoptic area	PTn	pretectal nu	VTA	ventral tegmental area
CIC	central nu			PV	paraventricular thal nu	VTg	ventral tegm nu
cic	comm of inf coll			PVA	paraventricular thal nu ant	ZI	zona incerta
				PVH	paraventricular thal nu ant		
				Re	reuniens th nu		
				RelC	recess of inf coll		

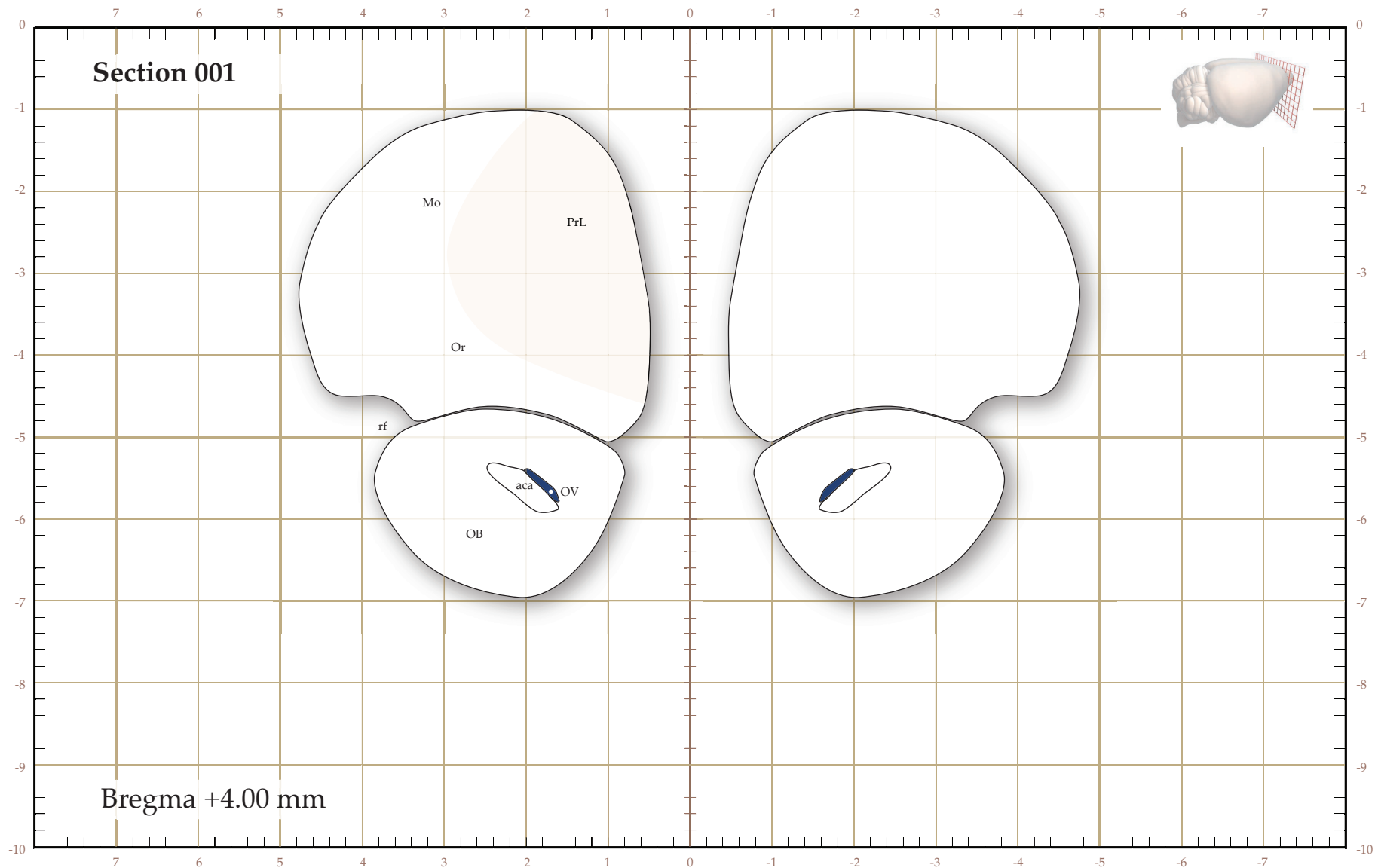
Structures organized in regions

<i>accumbens</i>		cortex-amygdala transition zone	CxA	magnocell lat hy	MCLH	periaqueduct gray	PAG
accumbens nu, core	AcbC	dorsal tegm nu	DTg	mammillary ped	mp	pedunculopontine tegmental nu	PPT
accumbens nu, shell	AcbSh	endopiriform nu	En	mammilloteg tract	mtg		
<i>amygdala</i>		external globus pallidus	EGP	med mamm nu	MM	<i>preoptic area</i>	LPA
amygdalohip area	AHi			median eminence	ME	lateral preoptic area	MPA
ant amyg area	AA	<i>diagonal band</i>		paravent hyp nu	PVH	medial preoptic area	VLPO
ant cortical amygdaloid nu	ACo	horizontal limb diagonal band	HDB	posterior hypoth area	PH	ventrolat preopt	VMPO
basolateral amygdaloid	BL	vertical limb diagonal band	VDB	supramamm	SuM	ventromed preopt area	
basolateral amygdaloid nu, vent	BLV			ventromedial hypoth nu	VMH	pretectal nu	PTn
basomedial amygdaloid nu	BM					pontine nuclei	Pn
central amygdaloid nu	Ce	<i>dopamine</i>	A7	<i>inferior colliculus</i>	bic	posterior commissure	pc
cortical amyg	Co	A7 noradr cell gr	A8	brachium inf coll	CIC		
lateral amyg nu	La	A8 dopamine cell gr	A9	central nu	cic	<i>red nu</i>	
medial amyg nu	Me	A9 dopamine cell gr	A10	comm of inf coll	DCIC	parabrual nu	PaR
posterolat cortical amygdaloid nu	PLCo	A10 dopamine cell gr	A11	dorsal ctx inf coll	ECIC	red nu magnocell	RMC
ant pretectal	APT	A11 dopamine cell gr	A12	ext ctx inf coll	BIC	red nu parvicell	RPC
<i>anterior commissure</i>	ac	A12 dopamine cell gr	A13	nu brachium inf coll	ic	retrobrual field	RRF
anterior commissure, anterior	aca	A13 dopamine cell gr	A14	int capsule	I	rubro spinal tract	rs
anterior commissure, posterior	acp	A14 dopamine cell gr	A14d	intercalated nu	IF	<i>reticulotegmental</i>	
cerebral peduncle	cp	A14 dopamine cell gr, dorsal	A10c	interfascicular nu	InC	reticulotegmental pericen	RtTgP
<i>cerebellar lobes</i>		caudal A10 dopamine cell gr	DR	interpeduncular nu	IP	rhinal fissure	rf
2nd Cb lobs	2Cb	dorsal raphe nu	Li	island of Calleja	ICj	sensory root of trig nerve	s5
2nd & 3rd Cb lobs	2/3Cb	linear raphe	MnR	island of Calleja, major	ICjM	<i>septum</i>	
3rd Cb lobs	3Cb	median raphe nu	RLi			lateral septum	LS
4th Cb lobs	4Cb	rost linear raphe	SNC	<i>lemniscus</i>	DLI	medial septum	MS
4th & 5th Cb lobs	4/5Cb	subst nigra compacta	SNL	dorsal nu lat lem	ILL	paralambdoid septal nu	PLd
claustrum	Cl	subst nigra lat	SNR	intermediate nu lat lemn	Il	septohipp nu	SFi
<i>corpus callosum</i>		subst nigra retic	VTA	lat lemniscus	ml	septohipp nu	SHi
alveus hippocampus	alv	ventral tegmental area	En	medial lemniscus	VLL	septohypothal nu	SHy
cingulum	cg	endopiriform nu	EGP	ventral nu lat lemniscus	lfp	stria terminalis	st
dorsal hipp comm	dhc	external globus pallidus	fr	long fasc pons	MCPO	<i>striatum</i>	
external capsule	ec	fasciculus retroflexus	f	magnocell preoptic	me5	bed nu of ST lat	BNSTl
forceps major	fmj	fornix		mesencephalic trigeminal tract	mlf	bed nu of ST med	BNSTm
forceps minor	fmi	<i>geniculate nu</i>	DLG	med long fasc	MT	bed nu of ST post	BNSTp
genu corpus callosum	gcc	dorsal lateral geniculate nu	MG	med terminal nu	mfb	bed nu of ST ventr	BNSTv
<i>cortex</i>		medial geniculate nu	SubG	medial forebrain bundle	mcp	caudate putamen	CPu
2ary somatosensory cortex	S2	subgeniculate nu	VLG	mid cerebellar ped	m5	subst innominata	SI
cingulate cortex	Cg	vent lat geniculate nu		motor root of trig nerve	NB	subiculum	Sub
entorhinal cortex	Ent	<i>hippocampus</i>	fi	nu basalis	3N	subbrachial nu	SubB
lateral olfactory tract	lo	fimbria hippocampus	CA1	oculomotor nu	OPT	subfornical organ	SFO
motor cortex	Mo	CA1 field	CA2	olivary pretect nu	OB	subthalamic nu	STh
orbital cortex	Or	CA2 field	CA3	<i>olfactory bulb</i>	AON	suprachiasmatic nu	SCh
parietal cortex	Par	CA3 field	DG	anterior olf nucleus		supraoptic nu	SO
perirhinal cx	PRh	dentate gyrus	vhc	<i>optic</i>		<i>superior colliculus</i>	
piriform cortex	Pir	ventral hipp comm		nu of optic tract	OTn	brachium sup coll	bsc
prelimbic cortex	PrL	<i>hypothalamus</i>	AH	optic chiasm	och	commissure of sup colliculus	csc
primary somatosensory cortex	S1	anterior hypothalamic area	Arc	optic nerve	2n	deep gray	DpG
primary visual	V1	arcuate nu	DH	optic tract	opt	intermediate gray layer	InG
primary visual 2	V2	dorsal hy area	DM	supraoptic decussation	sod	optic n layer	OP
retrosple cortex	RS	dorsomedial hypothalamic nu	LA	olfactory tubercle	OT		
		lat ant hypoth nu	LM				
		lat mammid nu					

sup coll peduncle	scp
superficial gray layer	SuG
tectospinal tract	ts
<i>thalamus</i>	
anteriordors th nu	AD
anteriomedial thal nu	AM
anteriorvent th nu	AV
centrallateral thal nu	CL
centralmedial thal nu	CM
intermediadors nu	IMD
lat habenular nu	LHb
lateral posterior thal nu	LP
laterodorsal thal nu	LD
mammillothalamic tract	mt
med habenular nu	MHb
mediodorsal thal nu	MD
parafascic th nu	PF
paratenial th nu	PT
paraventricular thal nu	PV
paraventricular thal nu ant	PVA
post intralam thal nu	PIL
post thalamic nu	Po
reticular thal nu	Rt
reuniens th nu	Re
rhomboid thal nu	Rh
stria medullaris thal	sm
submedius th nu	Subm
ventral posteromed thal nu	VPM
ventral posterolat thal nu	VPL
ventrolateral thal nu	VL
ventromedial thal nu	VM
trigeminothal tr	tth
trochlear nu	4N
ventral pallidum	VP
ventral tegm nu	VTg
<i>ventricle</i>	
aqueduct	aq
3rd ventricle	3V
4th ventricle	4V
dorsal third ventricle	D3V
lateral ventricle	LV
mamm recess 3V	MRe
olfactory ventricle	OV
recess of inf coll	RelC
zona incerta	ZI

Coronal sections





anterior commissure
anterior commissure, anterior

aca

cortex
motor cortex
orbital cortex
prelimbic cortex

Mo
Or
PrL

olfactory bulb

OB

rhinal fissure

rf

ventricle

olfactory ventricle

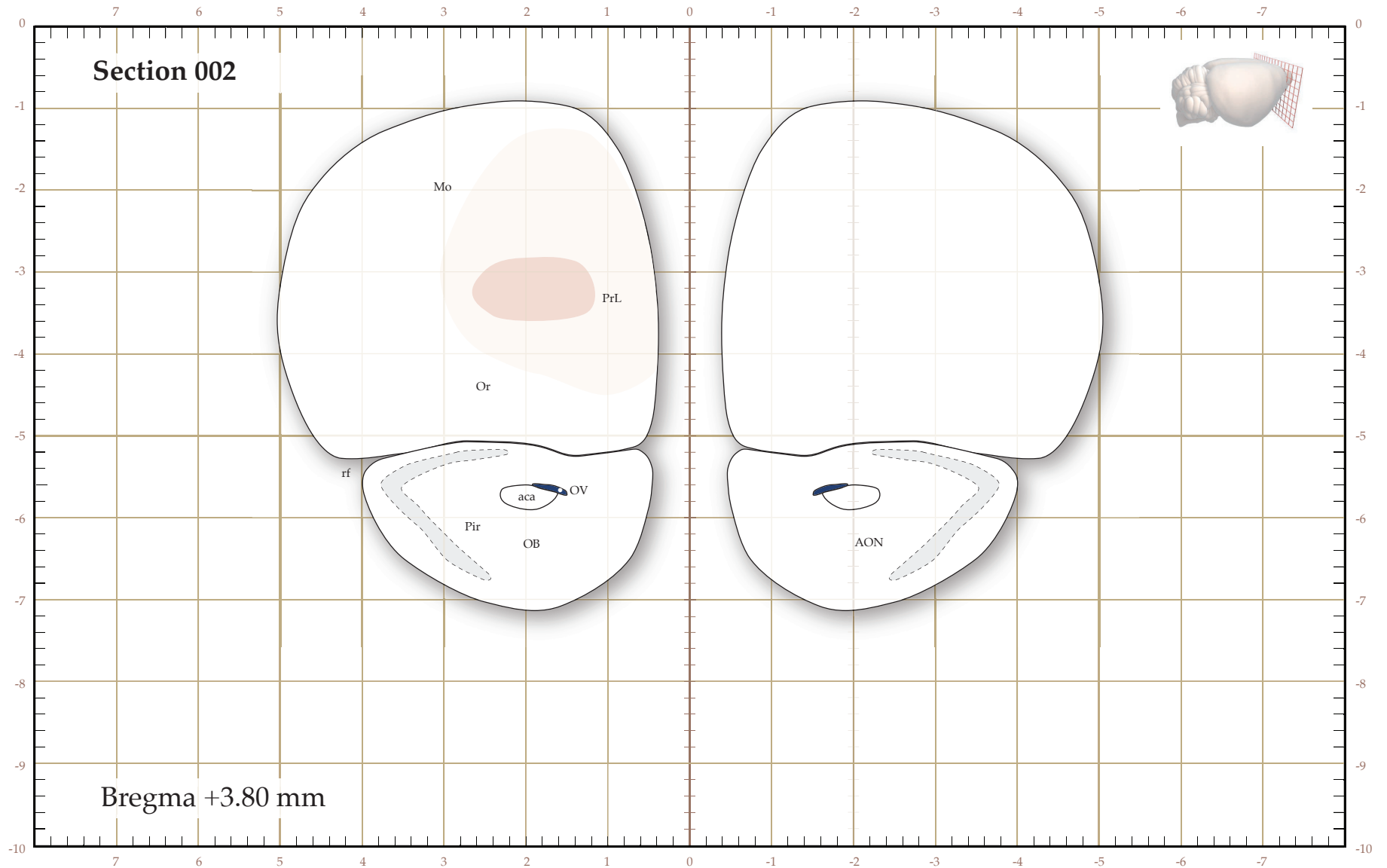
OV

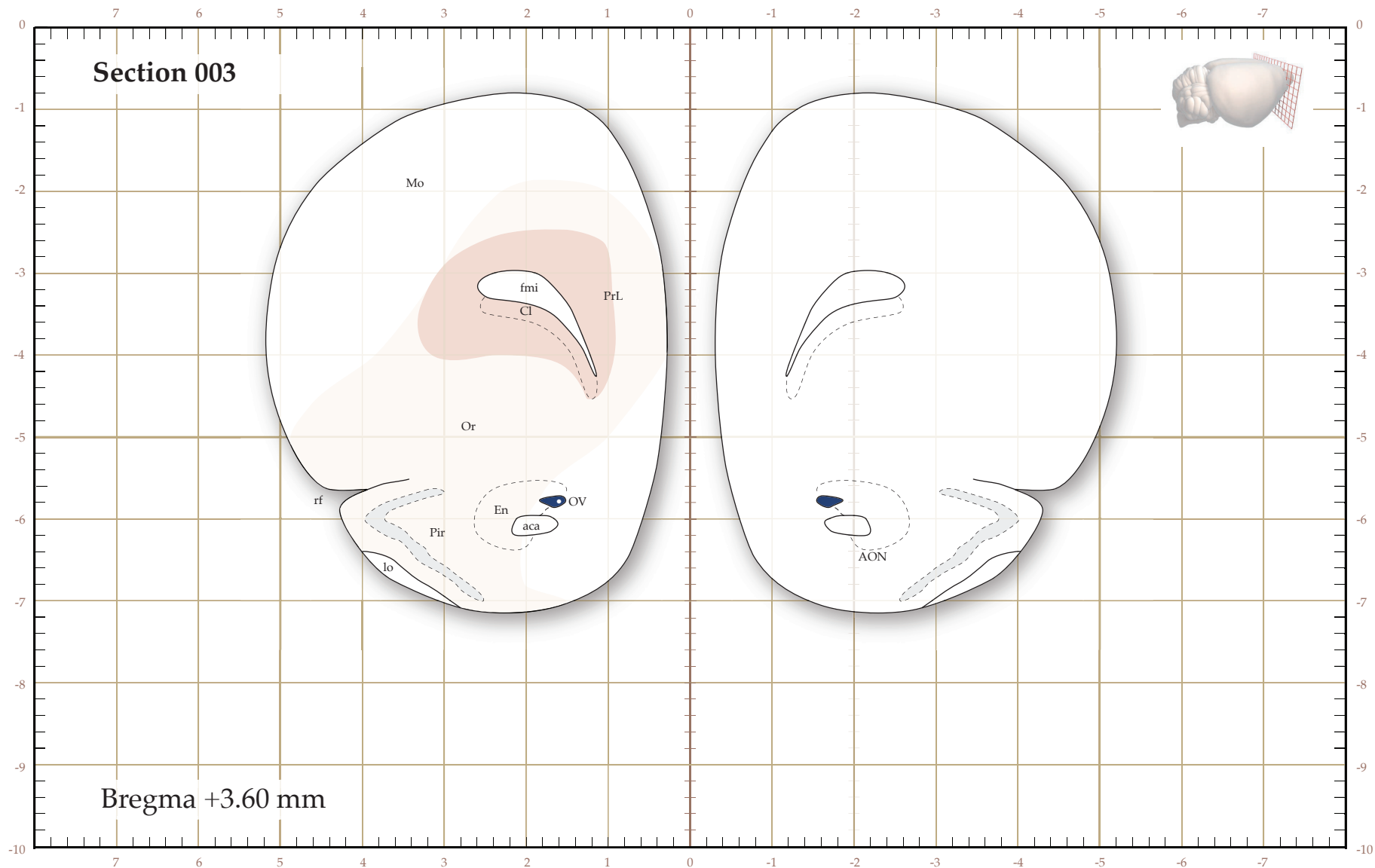
anterior commissure
 anterior commissure, anterior
 cortex
 motor cortex
 orbital cortex
 piriform cortex
 prelimbic cortex
 olfactory bulb
 anterior olf nucleus
 rhinal fissure

aca
 Mo
 Or
 Pir
 PrL
 OB
 AON
 rf

ventricle
 olfactory ventricle

OV





anterior commissure
 anterior commissure, anterior
 claustrum
 corpus callosum
 forceps minor
 cortex
 lateral olfactory tract
 motor cortex
 orbital cortex
 piriform cortex

aca
Cl
fmi
lo
Mo
Or
Pir

prelimbic cortex
 endopiriform nu
 olfactory bulb
 anterior olf nucleus
 rhinal fissure
 ventricle
 olfactory ventricle

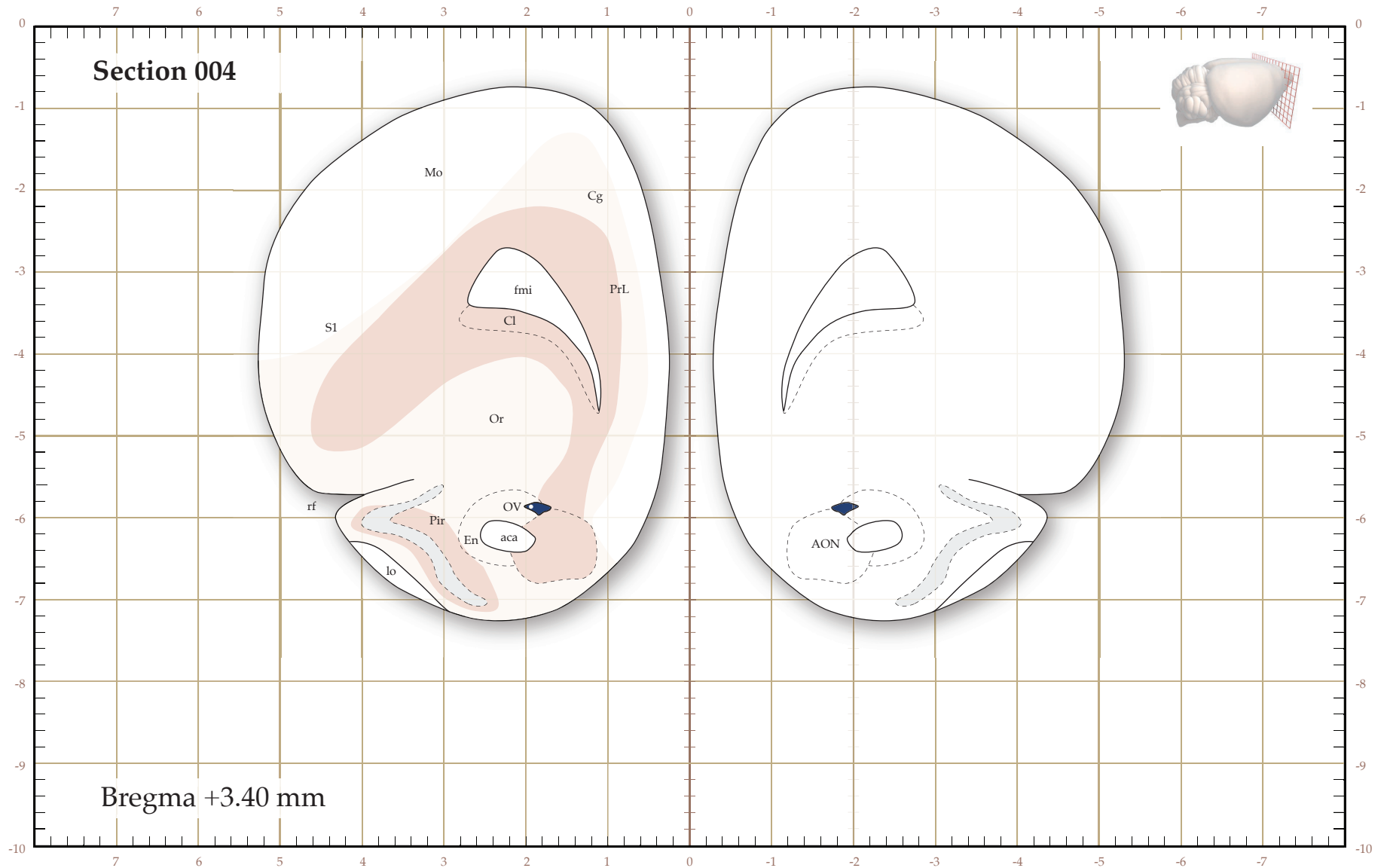
PrL
En
AON
rf
OV

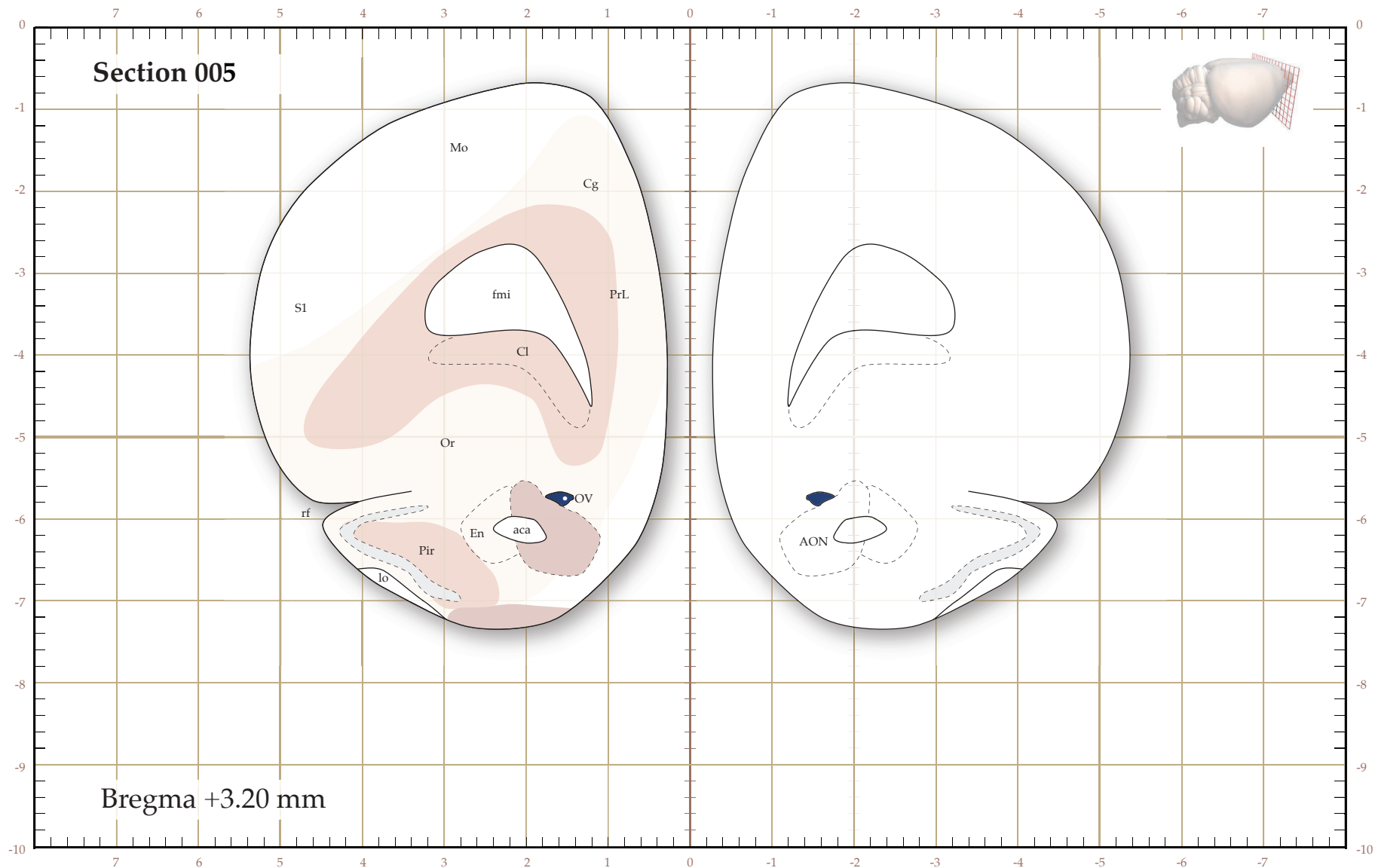
anterior commissure
 anterior commissure, anterior
 claustrum
corpus callosum
 forceps minor
cortex
 cingulate cortex
 lateral olfactory tract
 motor cortex
 orbital cortex

aca
Cl
fmi
Cg
lo
Mo
Or

piriform cortex
 prelimbic cortex
 primary somatosensory cortex
 endopiriform nu
olfactory bulb
 anterior olf nucleus
 rhinal fissure
ventricle
 olfactory ventricle

Pir
PrL
S1
En
AON
rf
OV





anterior commissure
 anterior commissure, anterior
 claustrum
corpus callosum
 forceps minor
cortex
 cingulate cortex
 lateral olfactory tract
 motor cortex
 orbital cortex

aca
Cl
fmi
Cg
lo
Mo
Or

piriform cortex
 prelimbic cortex
 primary somatosensory cortex
 endopiriform nu
olfactory bulb
 anterior olf nucleus
 rhinal fissure
ventricle
 olfactory ventricle

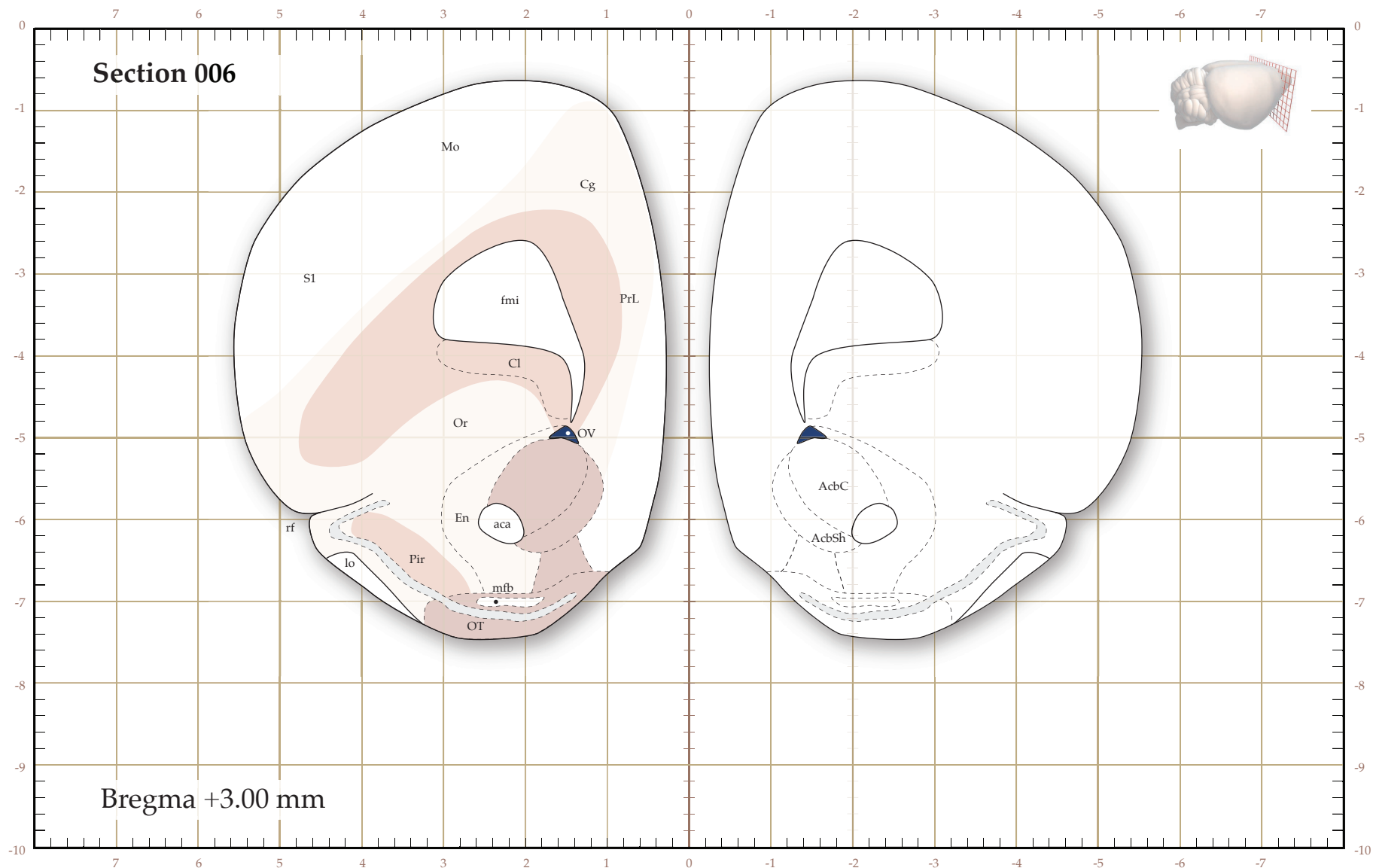
Pir
PrL
S1
En
AON
rf
OV

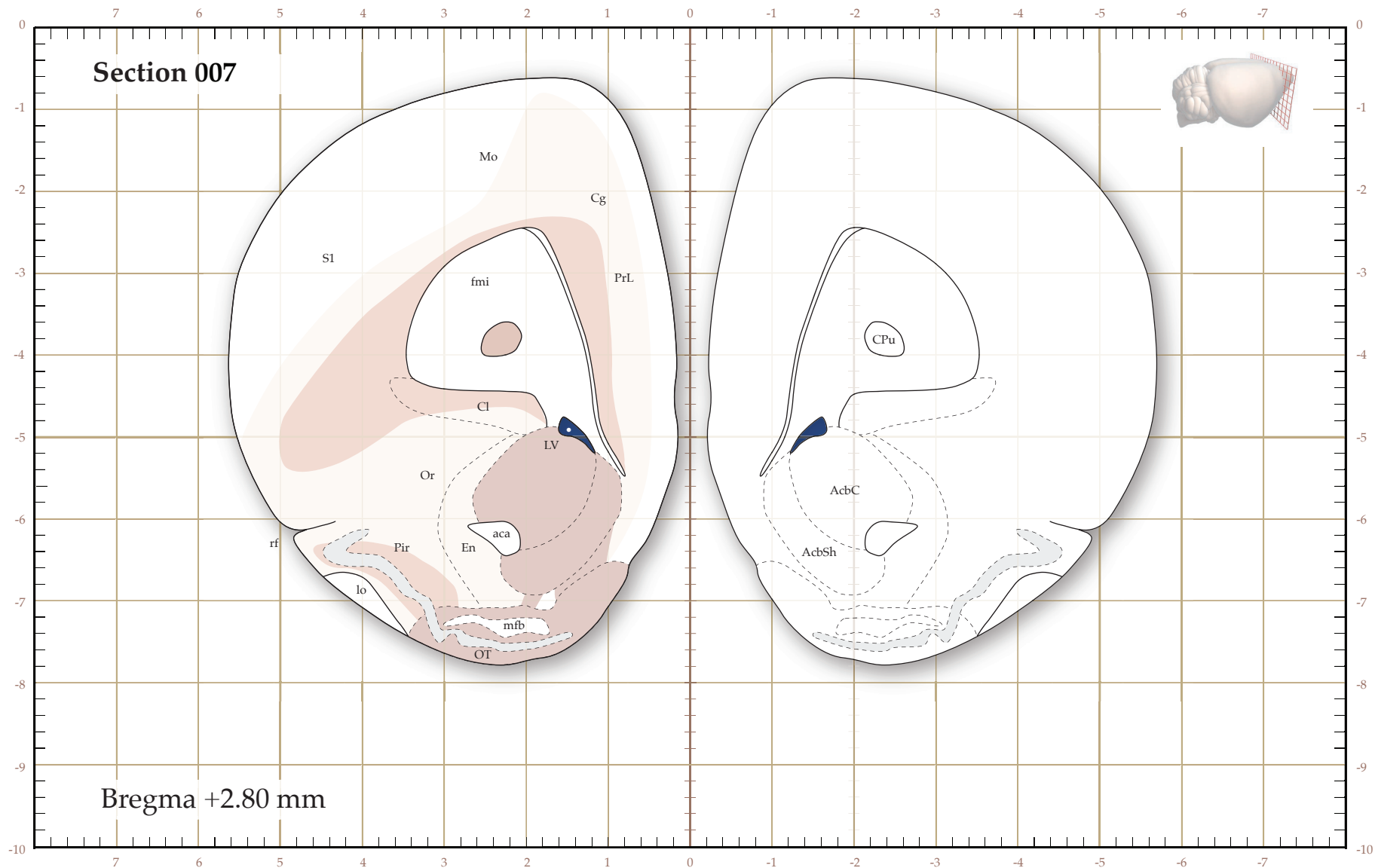
accumbens
 accumbens nu, core
 accumbens nu, shell
anterior commissure
 anterior commissure, anterior
 claustrum
corpus callosum
 forceps minor
cortex
 cingulate cortex

AcbC lateral olfactory tract
AcbSh motor cortex
 orbital cortex
aca piriform cortex
Cl prelimbic cortex
 primary somatosensory cortex
 endopiriform nu
fmi medial forebrain bundle
Cg olfactory tubercle

lo rhinal fissure
Mo ventricle
Or olfactory ventricle
Pir
PrL
S1
En
mfb
OT

rf
OV





accumbens

accumbens nu, core
accumbens nu, shell

anterior commissure

anterior commissure, anterior

claustrum

corpus callosum

forceps minor

AcbC
AcbSh

aca

Cl

fmi

cortex

cingulate cortex
lateral olfactory tract
motor cortex
orbital cortex
piriform cortex
prelimbic cortex
primary somatosensory cortex
endopiriform nu
medial forebrain bundle

Cg
lo
Mo
Or
Pir
PrL
S1
En
mfb

olfactory tubercle

striatum
caudate putamen
rhinal fissure
ventricle
lateral ventricle

OT

CPu

rf

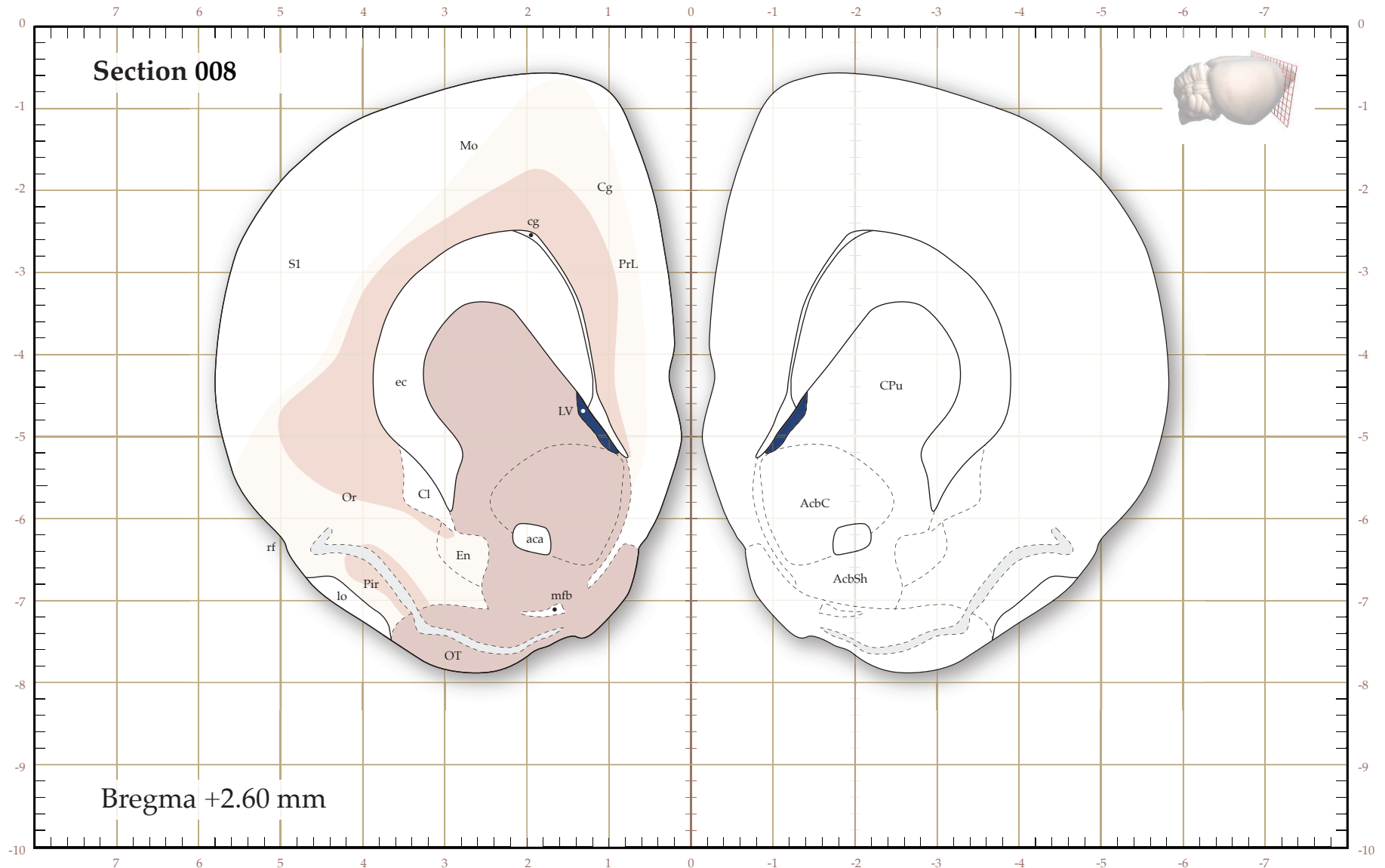
LV

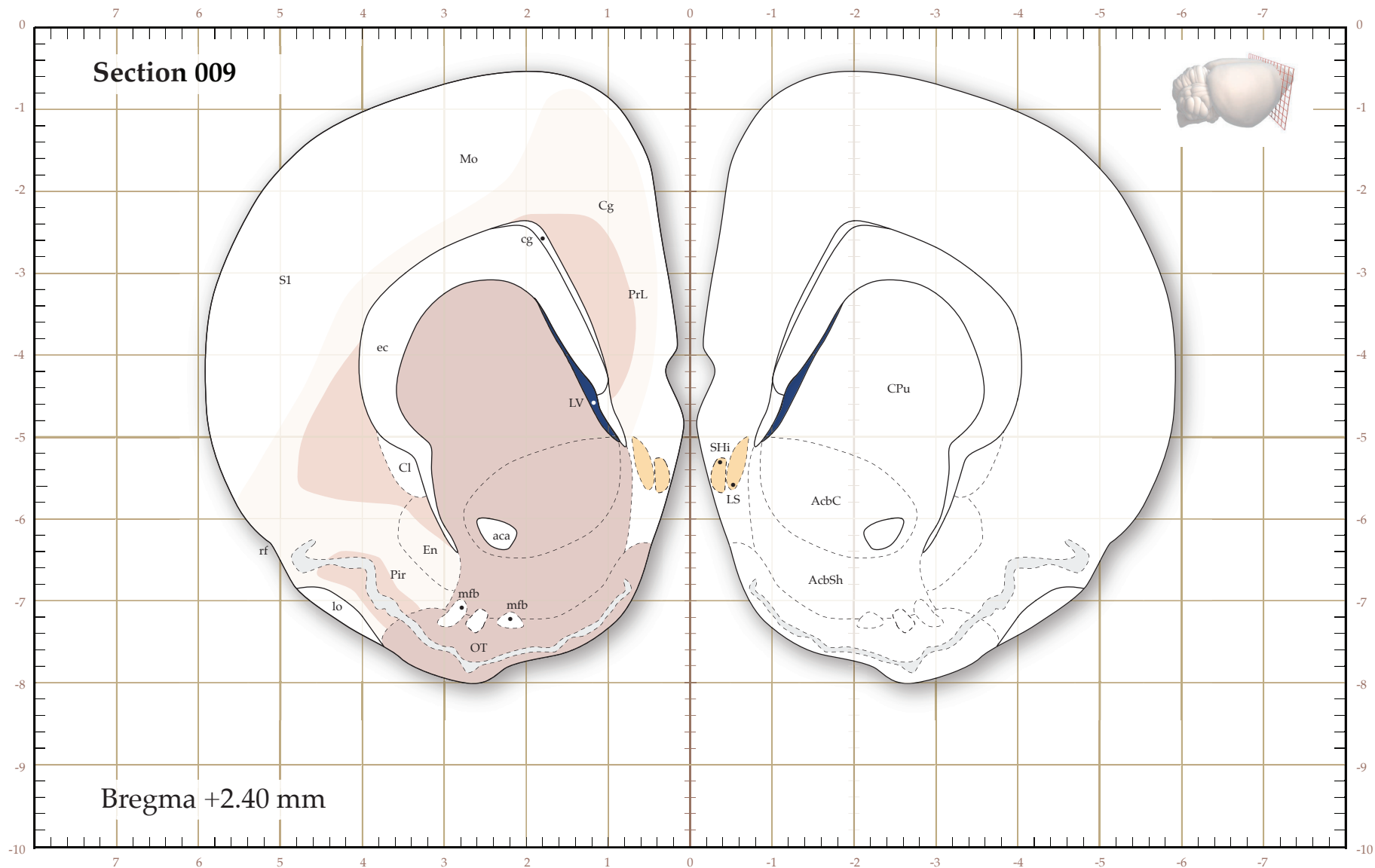
accumbens
 accumbens nu, core
 accumbens nu, shell
anterior commissure
 anterior commissure, anterior
 claustrum
corpus callosum
 cingulum
 external capsule

AcbC
AcbSh
aca
Cl
cg
ec
cortex
 cingulate cortex
 lateral olfactory tract
 motor cortex
 orbital cortex
 piriform cortex
 prelimbic cortex
 primary somatosensory cortex
 endopiriform nu
 medial forebrain bundle

Cg
lo
Mo
Or
Pir
PrL
S1
En
mfb
striatum
 caudate putamen
 olfactory tubercle
 rhinal fissure
ventricle
 lateral ventricle

CPu
OT
rf
LV





accumbens

accumbens nu, core
accumbens nu, shell

anterior commissure

anterior commissure, anterior

claustrum

corpus callosum

cingulum
external capsule

AcbC
AcbSh

aca

Cl

cg

ec

cortex

cingulate cortex
lateral olfactory tract
motor cortex
piriform cortex
prelimbic cortex
primary somatosensory cortex
endopiriform nu
medial forebrain bundle

Cg
lo
Mo

Pir

PrL

S1

En

mfb

septum

lateral septum
septohipp nu

striatum

caudate putamen
olfactory tubercle
rhinal fissure

ventricle

lateral ventricle

LS
SHi

CPu

OT

rf

LV

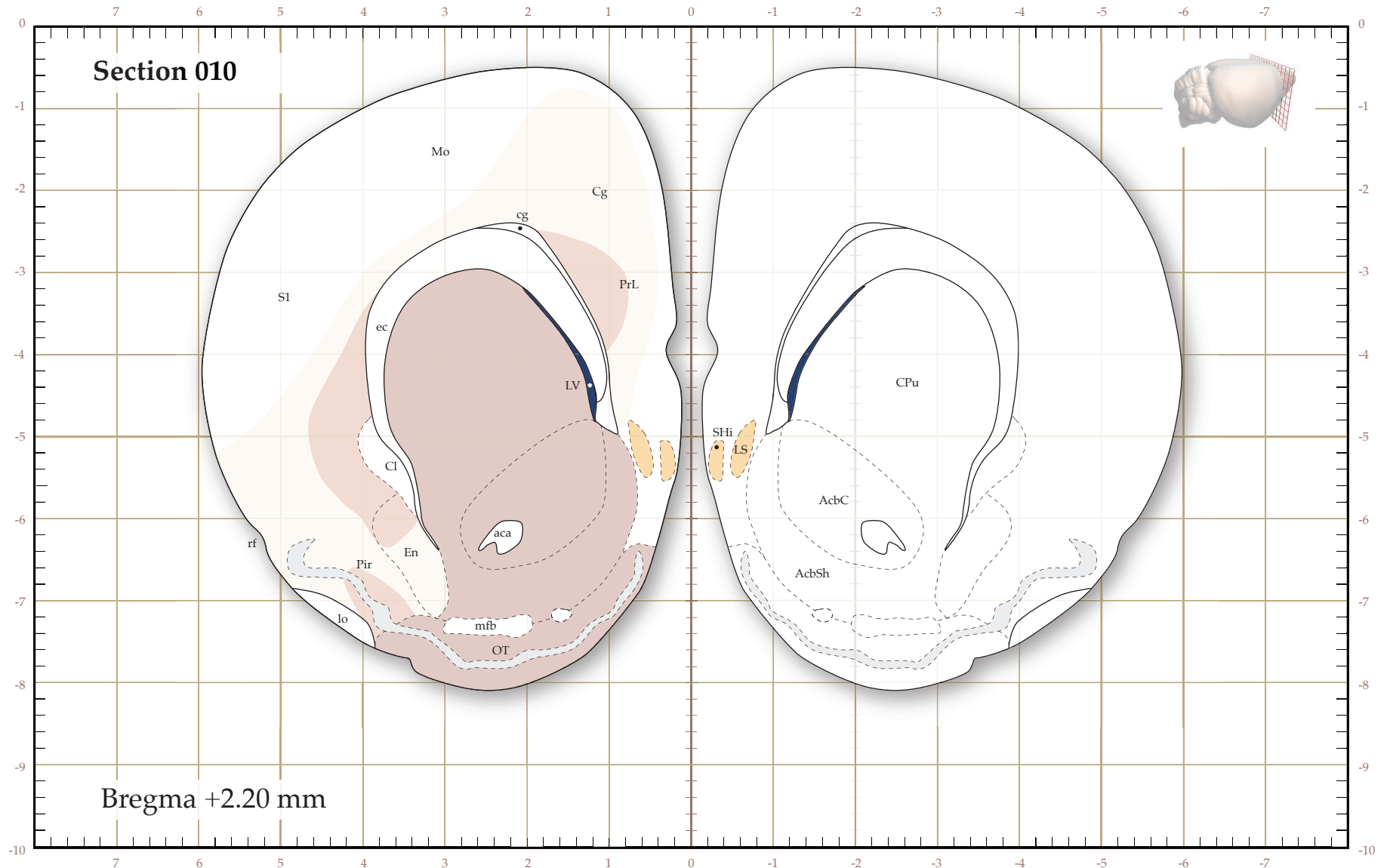
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 accumbens nu, shell
anterior commissure
 anterior commissure, anterior
 claustrum
corpus callosum
 cingulum
 external capsule

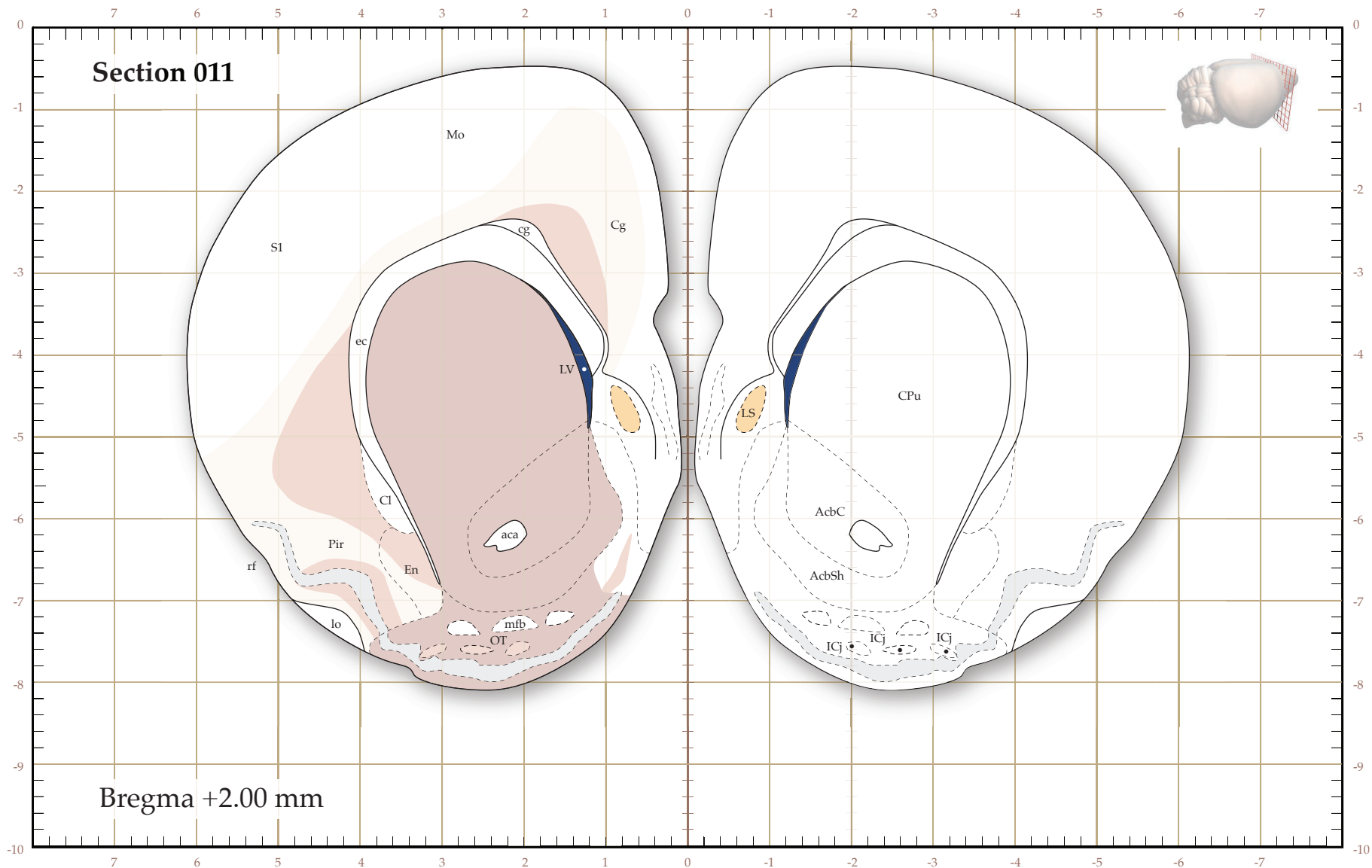
AcbC cingulate cortex
AcbSh lateral olfactory tract
Mo motor cortex
Pir piriform cortex
PrL prelimbic cortex
S1 primary somatosensory cortex
cg endopiriform nu
ec medial forebrain bundle

Cg cingulate cortex
lo lateral olfactory tract
Mo motor cortex
Pir piriform cortex
PrL prelimbic cortex
S1 primary somatosensory cortex
En endopiriform nu
mfb medial forebrain bundle

septum
 lateral septum
 septohipp nu
striatum
 caudate putamen
 olfactory tubercle
 rhinal fissure
ventricle
 lateral ventricle

LS lateral septum
SHi septohipp nu
CPu caudate putamen
OT olfactory tubercle
rf rhinal fissure
LV lateral ventricle





accumbens

accumbens nu, core
accumbens nu, shell

anterior commissure

anterior commissure, anterior

claustrum

corpus callosum

cingulum
external capsule

AcbC

AcbSh

aca

Cl

cg

ec

cortex

cingulate cortex
lateral olfactory tract
motor cortex
piriform cortex
primary somatosensory cortex
endopiriform nu
island of Calleja
medial forebrain bundle

Cg

lo

Mo

Pir

S1

En

ICj

mfb

septum

lateral septum

striatum

caudate putamen

olfactory tubercle

rhinal fissure

ventricle

lateral ventricle

LS

CPu

OT

rf

LV

accumbens

accumbens nu, core
accumbens nu, shell

anterior commissure

anterior commissure, anterior

claustrum

corpus callosum

external capsule

AcbC

AcbSh

aca

Cl

cc

ec

cortex

cingulate cortex

lateral olfactory tract

motor cortex

piriform cortex

primary somatosensory cortex

endopiriform nu

island of Calleja

medial forebrain bundle

Cg

lo

Mo

Pir

S1

En

ICj

mfb

septum

lateral septum

septohipp nu

striatum

caudate putamen

olfactory tubercle

rhinal fissure

ventricle

lateral ventricle

LS

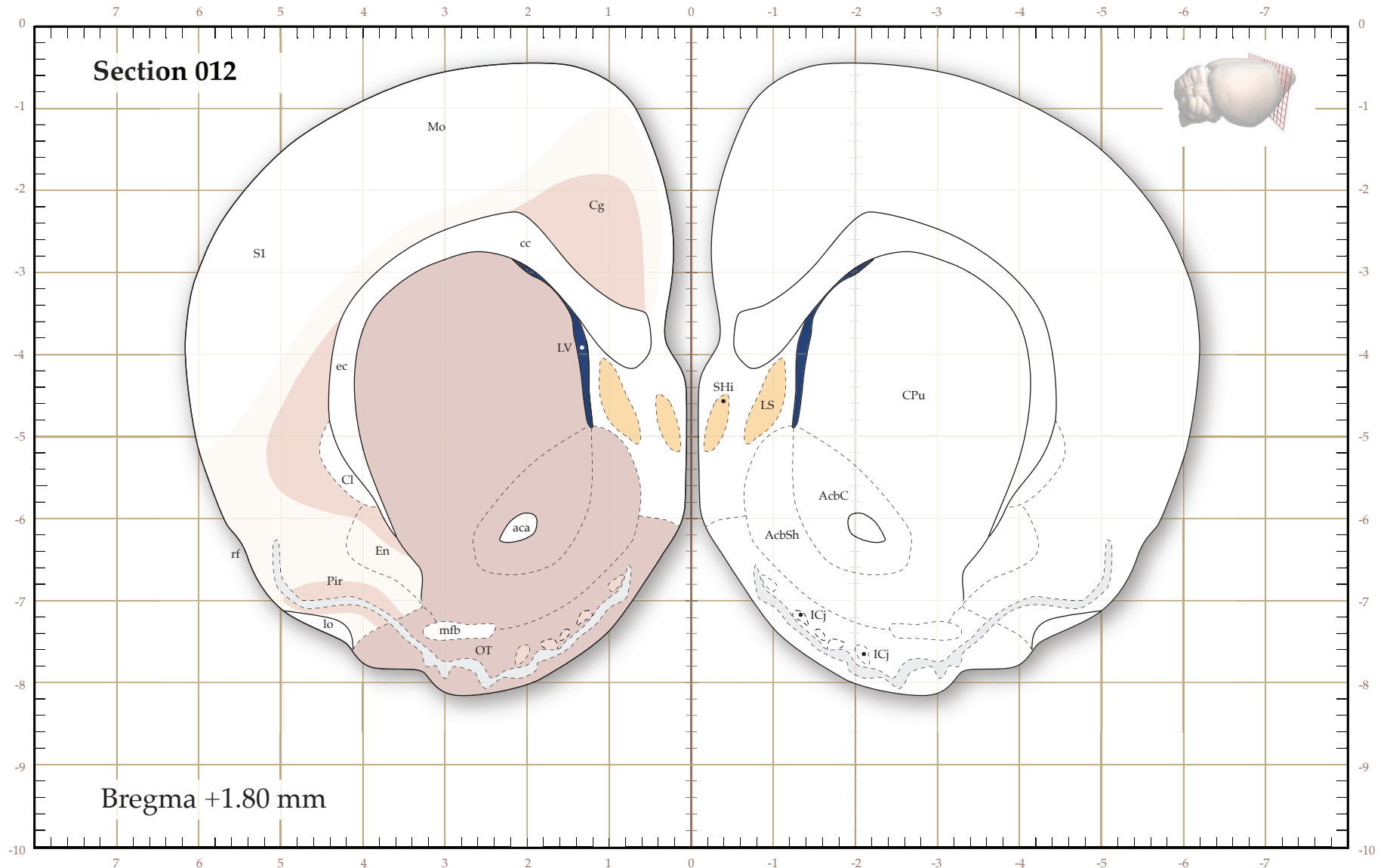
SHi

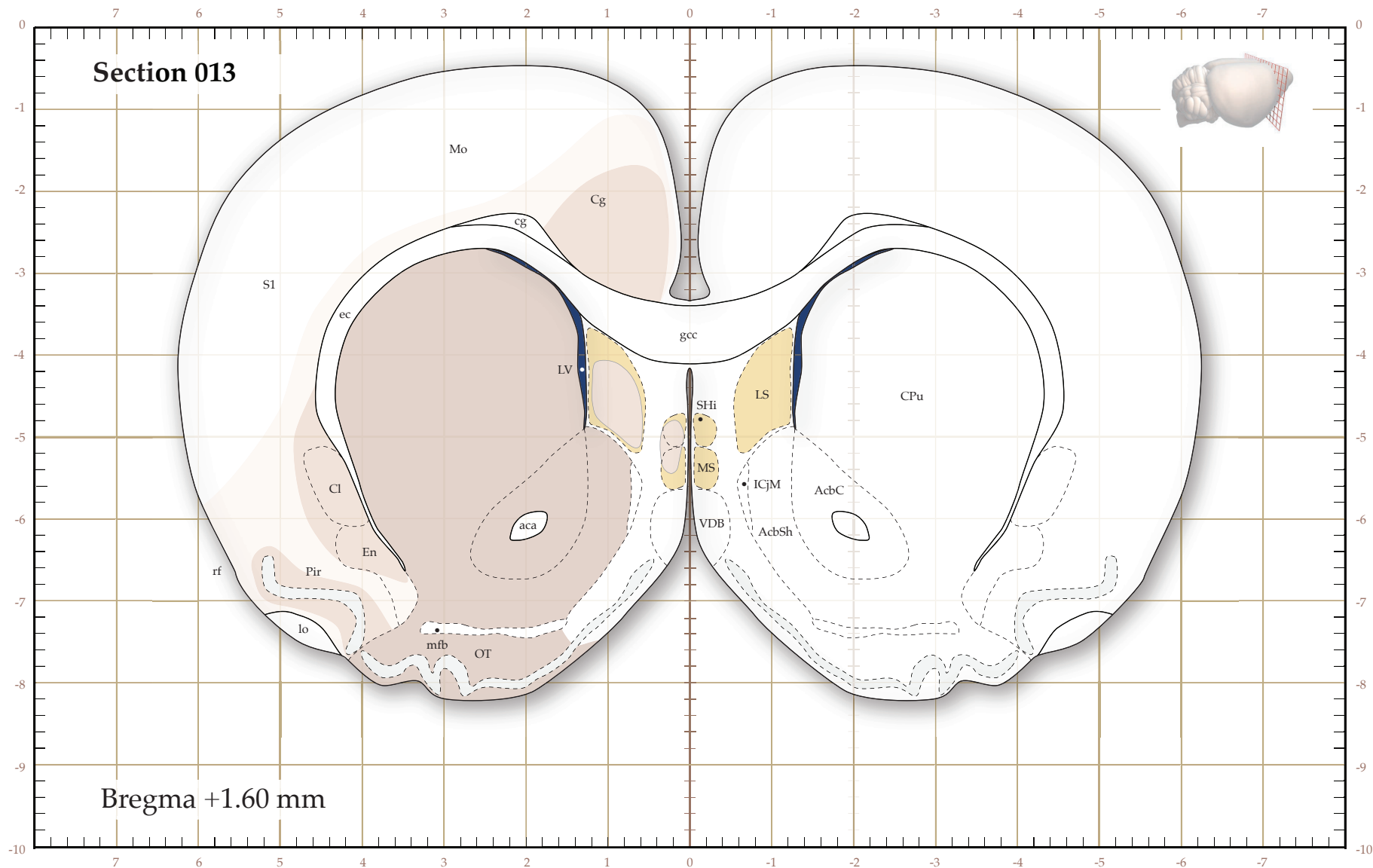
CPu

OT

rf

LV





accumbens

accumbens nu, core
accumbens nu, shell

anterior commissure

anterior commissure, anterior

claustrum

corpus callosum

cingulum
external capsule
genu corpus callosum

AcbC
AcbSh

aca
Cl

cg
ec
gcc

cortex

cingulate cortex
lateral olfactory tract
motor cortex
piriform cortex
primary somatosensory cortex
endopiriform nu
island of Calleja, major
diagonal band
vertical limb diagonal band

Cg
lo
Mo
Pir
S1
En
ICjM
VDB

medial forebrain bundle

septum

lateral septum
medial septum
septohipp nu
striatum
caudate putamen
olfactory tubercle
rhinal fissure

mfb
LS
MS
SHi
CPu
OT
rf

ventricle

lateral ventricle

LV

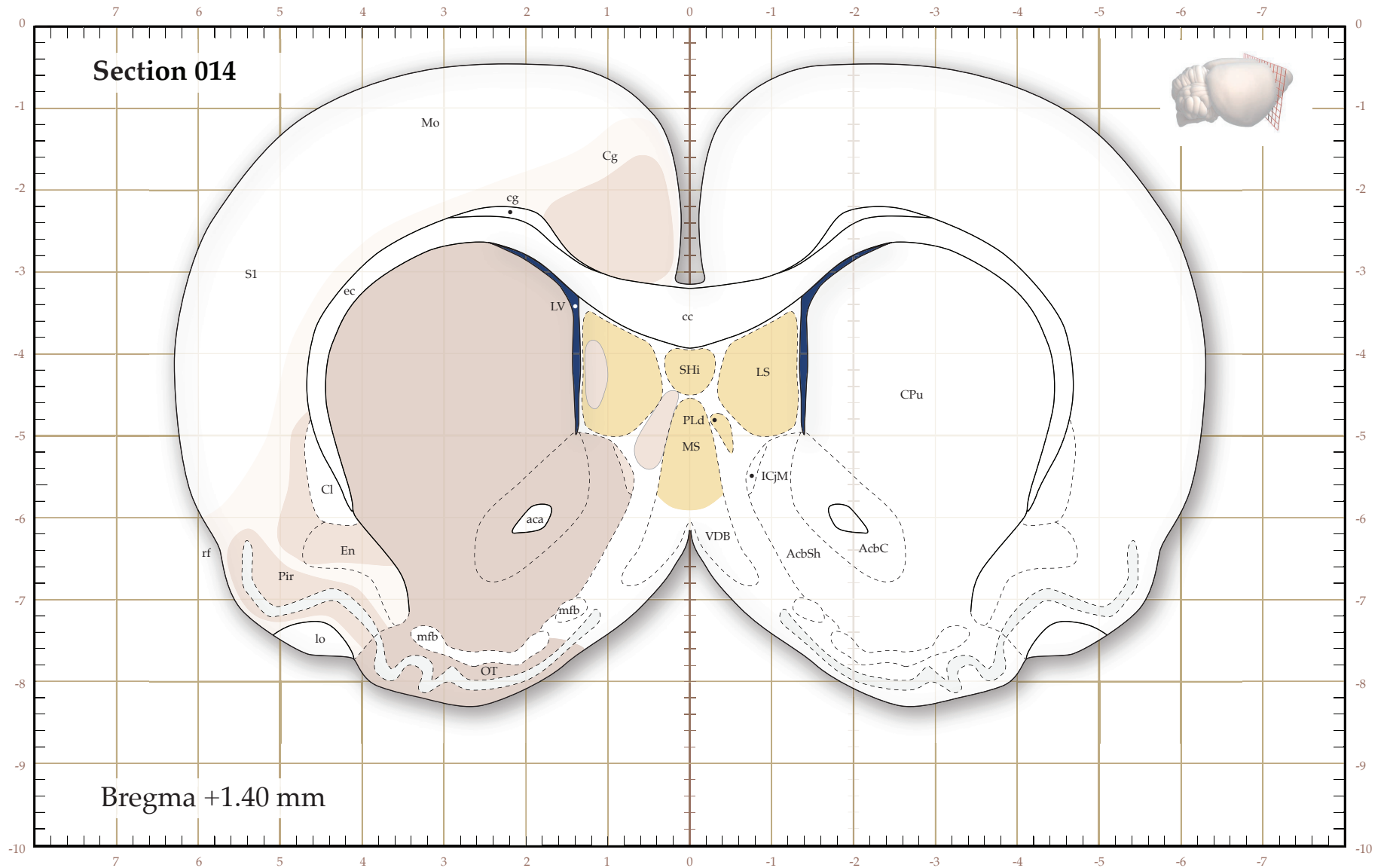
accumbens
 accumbens nu, core
 accumbens nu, shell
anterior commissure
 anterior commissure, anterior
 claustrum
corpus callosum
 cingulum
 external capsule

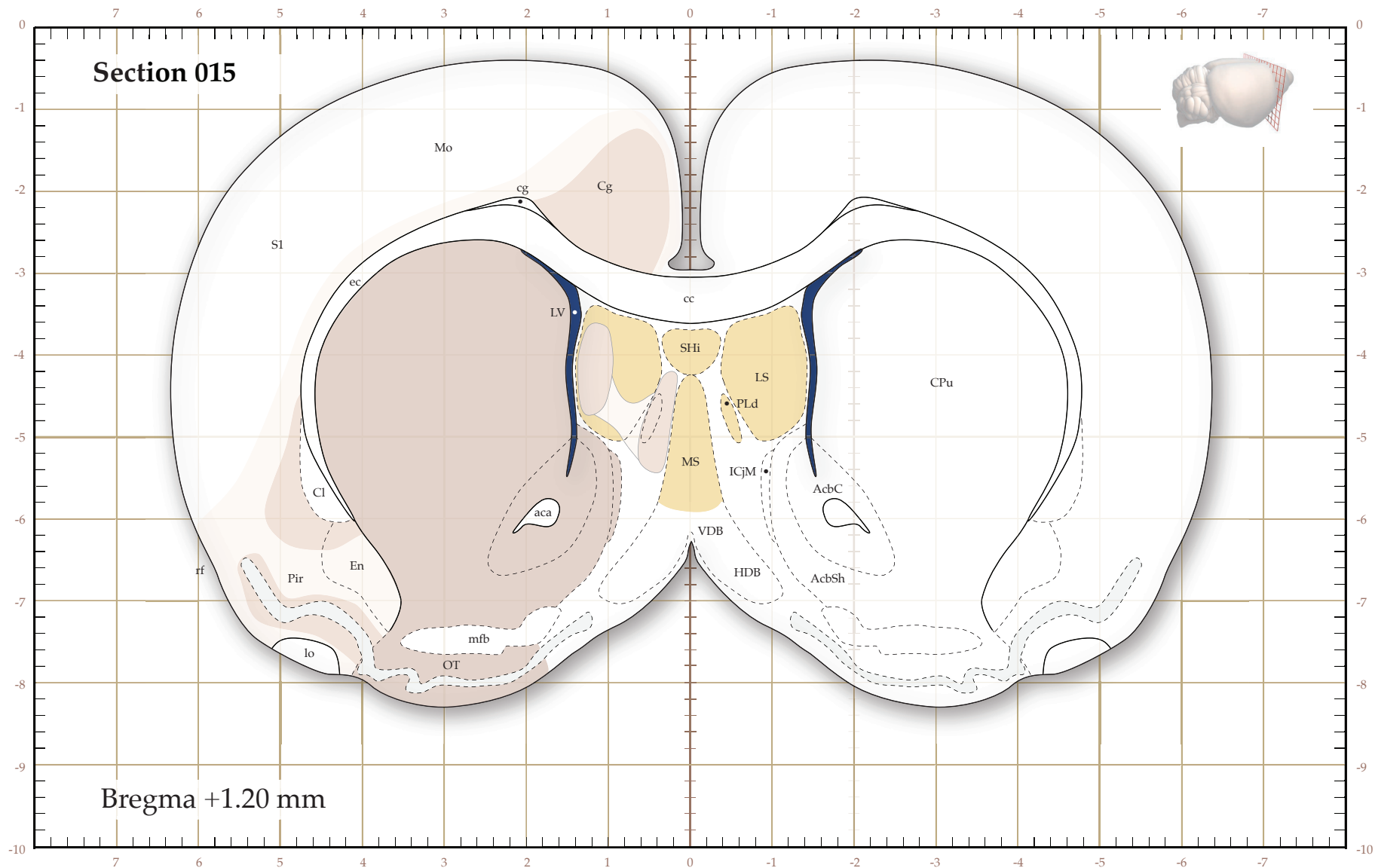
AcbC
AcbSh
aca
Cl
cc
cg
ec
cortex
 cingulate cortex
 lateral olfactory tract
 motor cortex
 piriform cortex
 primary somatosensory cortex
 endopiriform nu
 island of Calleja, major
diagonal band
 vertical limb diagonal band

Cg
lo
Mo
Pir
S1
En
ICjM
VDB
medial forebrain bundle
septum
 lateral septum
 medial septum
 paralamdoid septal nu
 septohipp nu
striatum
 caudate putamen
 olfactory tubercle
 rhinal fissure

mf
LS
MS
PLd
SHi
CPu
OT
rf
ventricle
 lateral ventricle

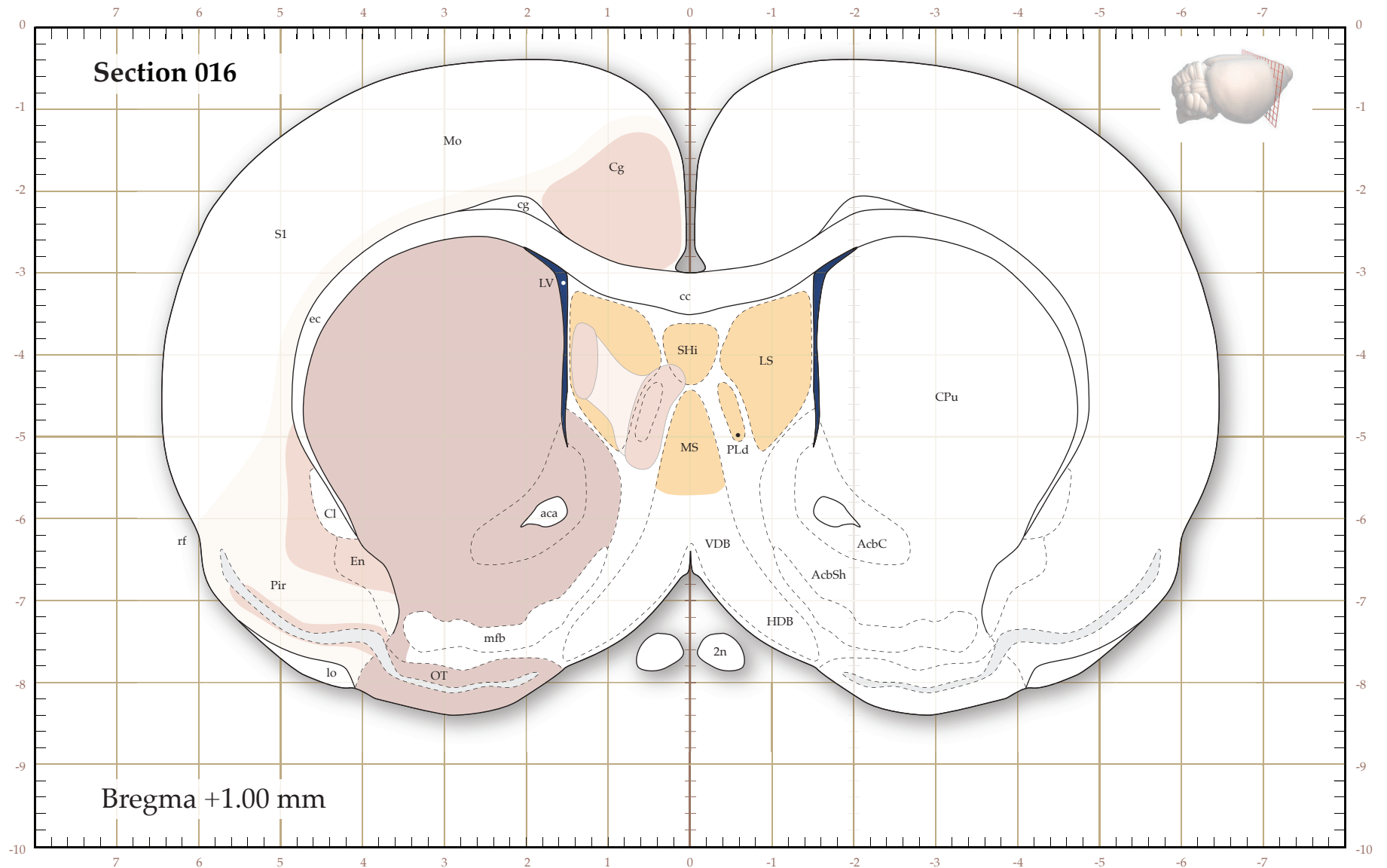
LV

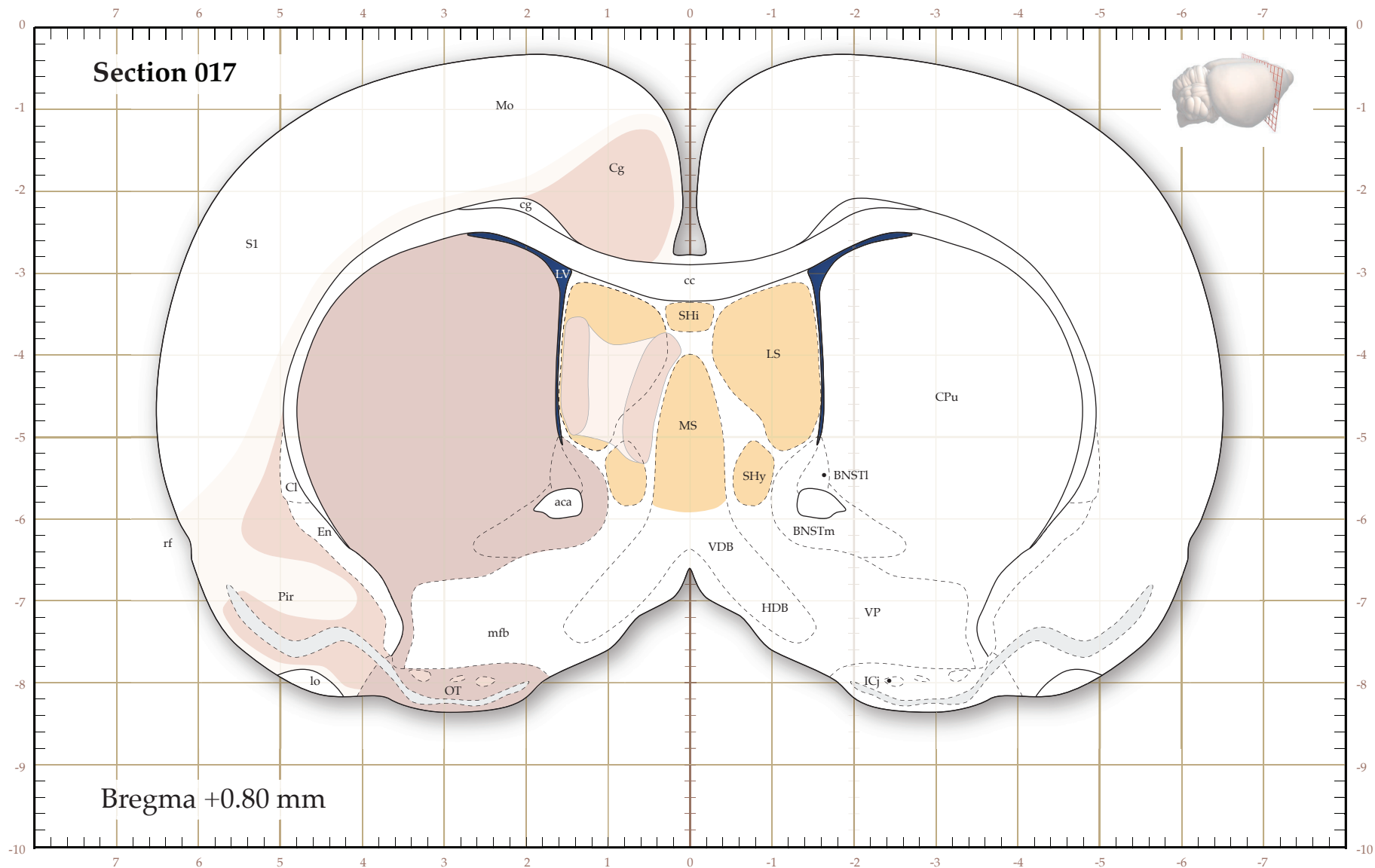




<i>accumbens</i>		<i>cortex</i>		vertical limb diagonal band	VDB	olfactory tubercle	OT
accumbens nu, core	AcbC	cingulate cortex	Cg	medial forebrain bundle	mfb	rhinal fissure	rf
accumbens nu, shell	AcbSh	lateral olfactory tract	lo				
<i>anterior commissure</i>		motor cortex	Mo	<i>septum</i>		<i>ventricle</i>	
anterior commissure, anterior	aca	piriform cortex	Pir	lateral septum	LS	lateral ventricle	LV
claustrum	Cl	primary somatosensory cortex	S1	medial septum	MS		
<i>corpus callosum</i>	cc	endopiriform nu	En	paralamdoid septal nu	PLd		
cingulum	cg	island of Calleja, major	ICjM	septohipp nu	SHi		
external capsule	ec	<i>diagonal band</i>		<i>striatum</i>			
		horizontal limb diagonal band	HDB	caudate putamen	CPu		

<i>accumbens</i>		<i>cortex</i>		<i>medial forebrain bundle</i>	mf	<i>optic</i>	
accumbens nu, core	AcbC	cingulate cortex	Cg	<i>septum</i>		optic nerve	2n
accumbens nu, shell	AcbSh	lateral olfactory tract	lo	lateral septum	LS	rhinal fissure	rf
<i>anterior commissure</i>		motor cortex	Mo	medial septum	MS	<i>ventricle</i>	
anterior commissure, anterior	aca	piriform cortex	Pir	paralambdoid septal nu	PLd	lateral ventricle	LV
claustrum	Cl	primary somatosensory cortex	S1	septohipp nu	SHi		
<i>corpus callosum</i>		endopiriform nu	En	<i>striatum</i>			
cingulum	cc	<i>diagonal band</i>		caudate putamen	CPu		
external capsule	cg	horizontal limb diagonal band	HDB	olfactory tubercle	OT		
	ec	vertical limb diagonal band	VDB				





anterior commissure
 anterior commissure, anterior
 claustrum
corpus callosum
 cingulum
cortex
 cingulate cortex
 lateral olfactory tract
 motor cortex
 piriform cortex

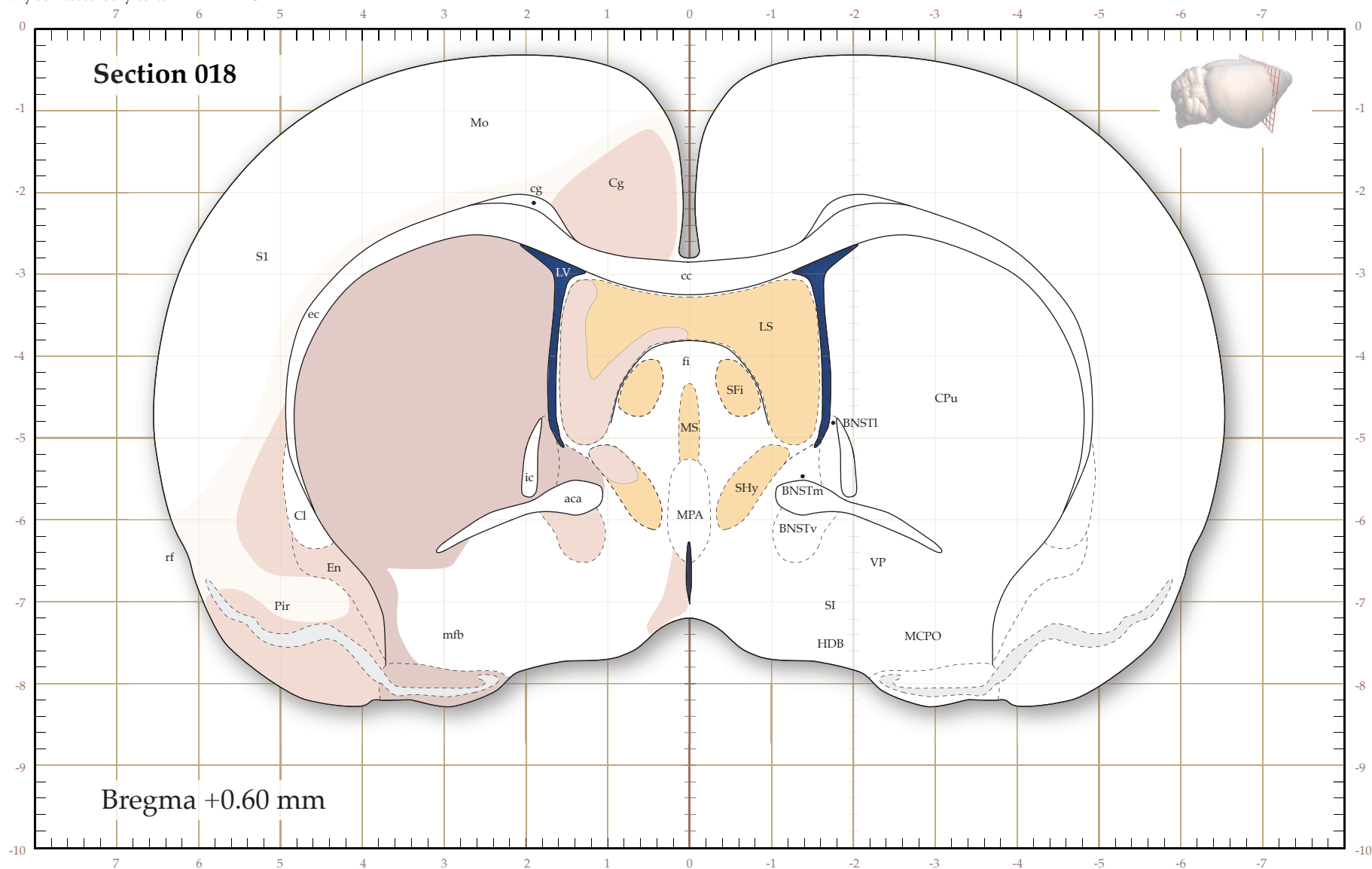
aca anterior commissure, anterior
Cl claustrum
cc corpus callosum
cg cingulum
Cg cingulate cortex
lo lateral olfactory tract
Mo motor cortex
Pir piriform cortex
 primary somatosensory cortex
 endopiriform nu
 island of Calleja
diagonal band
 horizontal limb diagonal band
 vertical limb diagonal band
 medial forebrain bundle
septum
 lateral septum

S1 primary somatosensory cortex
En endopiriform nu
ICj island of Calleja
HDB horizontal limb diagonal band
VDB vertical limb diagonal band
mf medial forebrain bundle
LS lateral septum
 medial septum
 septohipp nu
 septohypothal nu
striatum
 bed nu of ST lat
 bed nu of ST med
 caudate putamen
 olfactory tubercle
 rhinal fissure

MS medial septum
SHi septohipp nu
SHy septohypothal nu
BNSTl bed nu of ST lat
BNSTm bed nu of ST med
CPu caudate putamen
OT olfactory tubercle
rf rhinal fissure
 ventral pallidum
 ventricle
 lateral ventricle

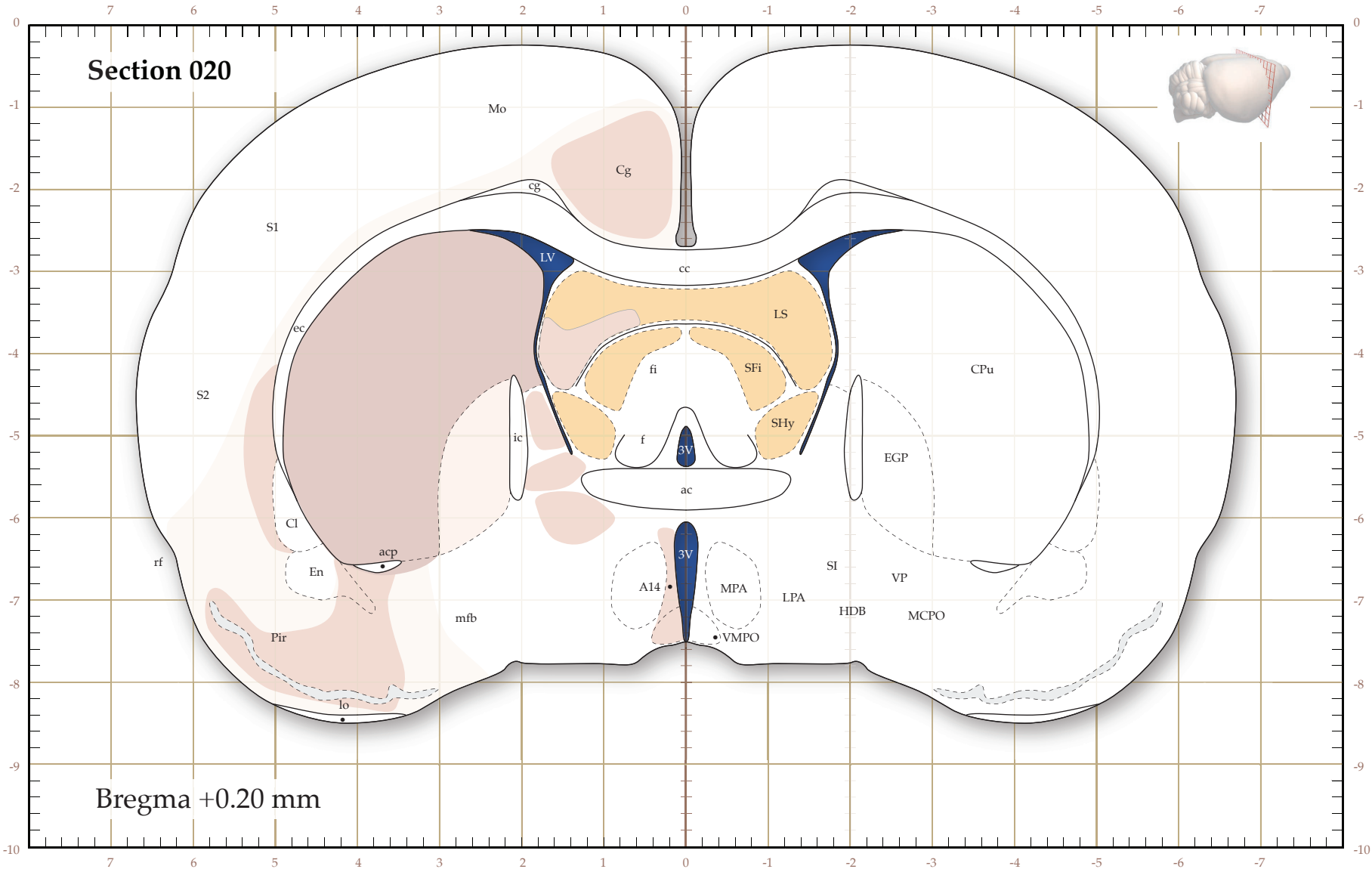
VP ventral pallidum
LV lateral ventricle

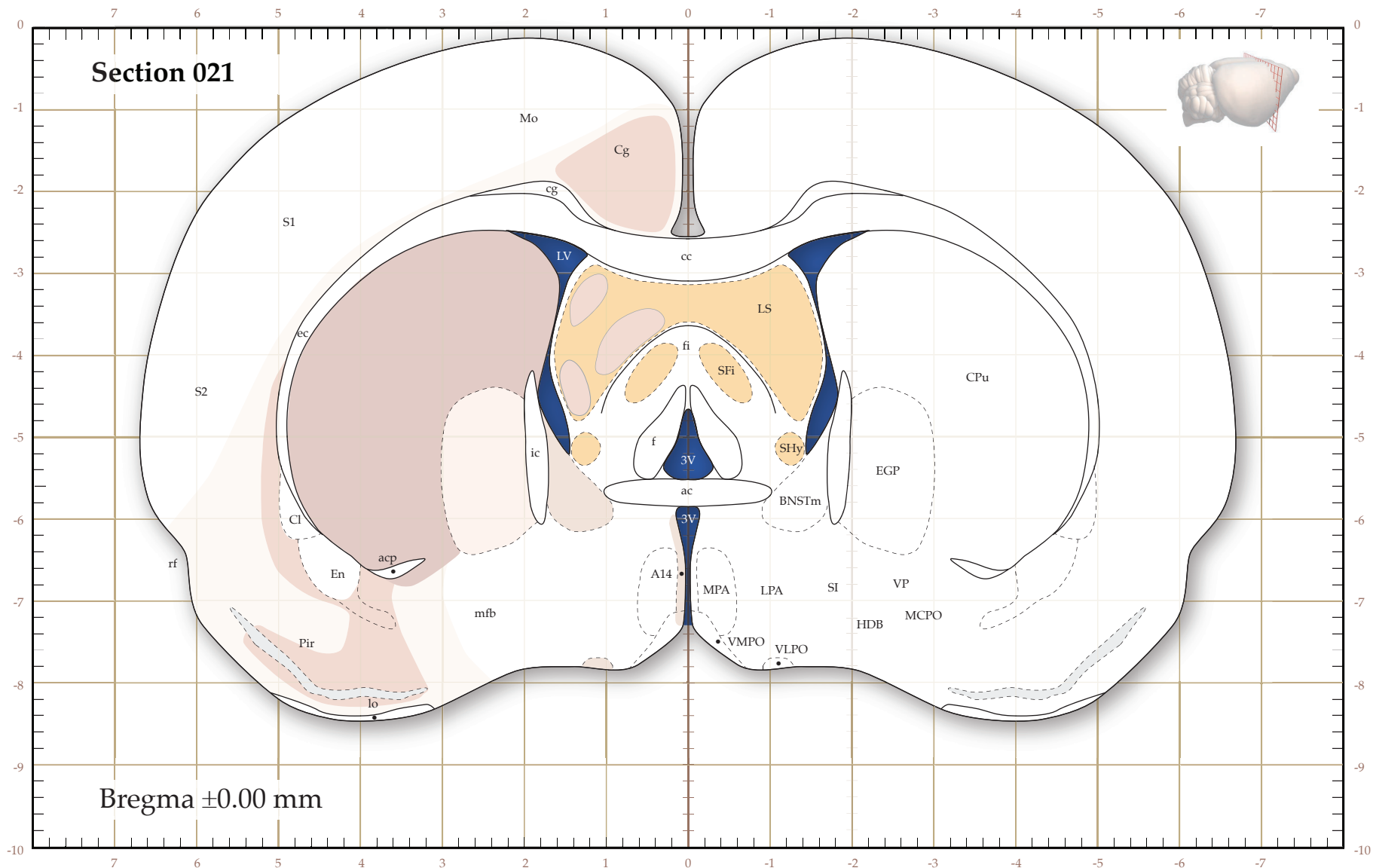
<i>anterior commissure</i>		endopiriform nu	En	rhinal fissure	rf	caudate putamen	CPu
anterior commissure, anterior	aca	int capsule	ic	<i>septum</i>		subst innominata	SI
claustrum	Cl	<i>diagonal band</i>		lateral septum	LS	ventral pallidum	VP
<i>corpus callosum</i>	cc	horizontal limb diagonal band	HDB	medial septum	MS	<i>ventricle</i>	
cingulum	cg	<i>hippocampus</i>		septofimbrial nu	SFi	lateral ventricle	LV
external capsule	ec	fimbria hippocampus	fi	septohipothal nu	SHy		
<i>cortex</i>		magnocell preoptic	MCPO	<i>striatum</i>			
cingulate cortex	Cg	medial forebrain bundle	mfb	bed nu of ST lat	BNSTl		
motor cortex	Mo	<i>preoptic area</i>		bed nu of ST med	BNSTm		
piriform cortex	Pir	medial preoptic area	MPA	bed nu of ST ventr	BNSTv		
primary somatosensory cortex	S1						



ventral pallidum
ventricle
3rd ventricle
lateral ventricle

VP
3V
LV





anterior commissure
 anterior commissure, posterior
claustrum
corpus callosum
 cingulum
 external capsule
cortex
 2ary somatosensory cortex
 cingulate cortex
 lateral olfactory tract

ac motor cortex
acp piriform cortex
Cl primary somatosensory cortex
cc *diagonal band*
cg horizontal limb diagonal band
ec *dopamine*
 A14 dopamine cell gr
S2 A14 dopamine cell gr, dorsal
Cg endopiriform nu
lo external globus pallidus

Mo fornix
Pir *hippocampus*
S1 fimbria hippocampus
HDB int capsule
A14 magnocell preoptic nu
A14d medial forebrain bundle
En nu basalis
EGP *optic*
 optic chiasm

f *preoptic area*
 lateral preoptic area
fi medial preoptic area
ic ventromed preopt area
MCPO ventrolat preopt
rf rhinal fissure
septom *septum*
 lateral septum
NB septofimbrial nu
och septohypothal nu

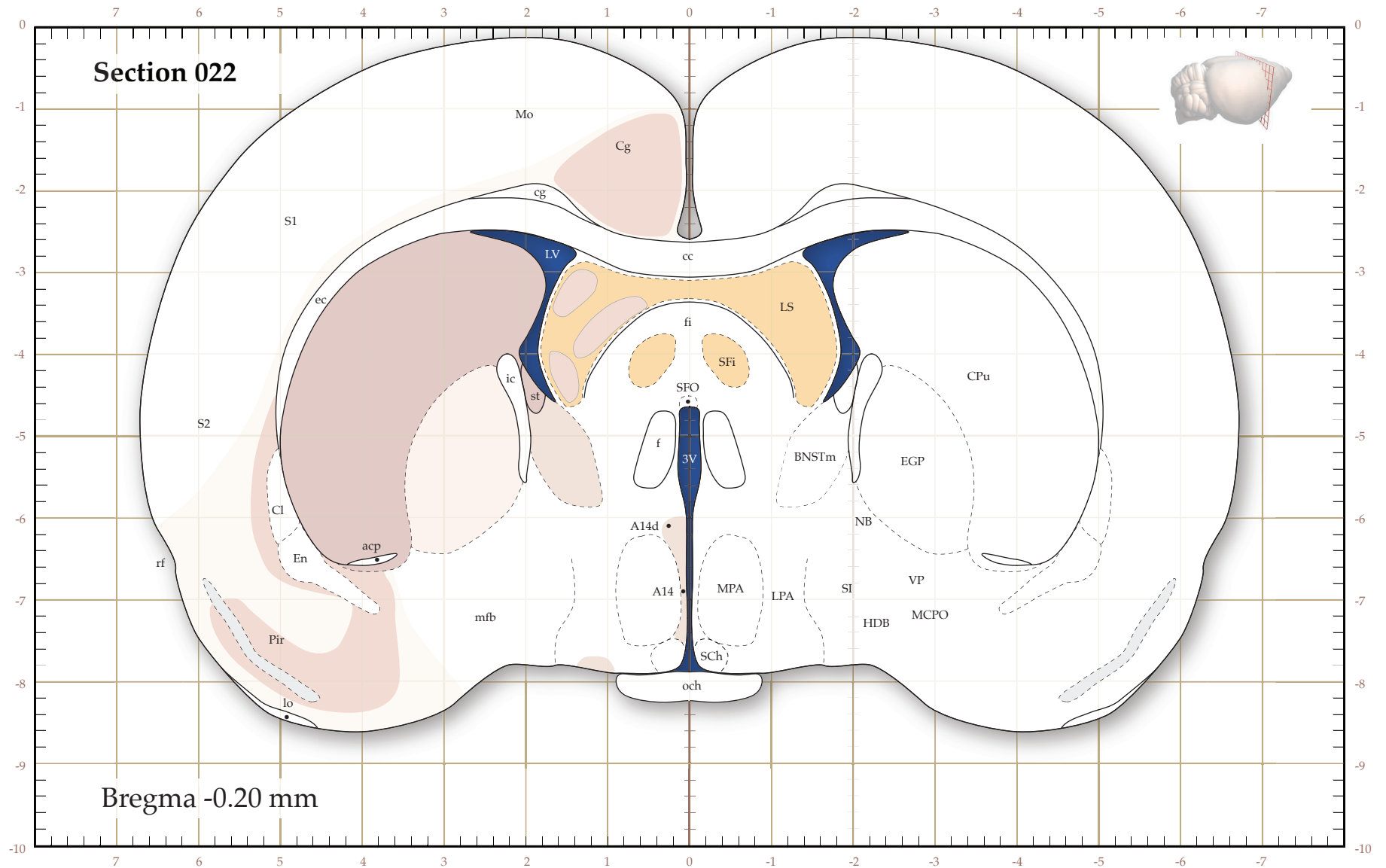
LPA
MPA
VMPO
VLPO
LS
SFi
SHy

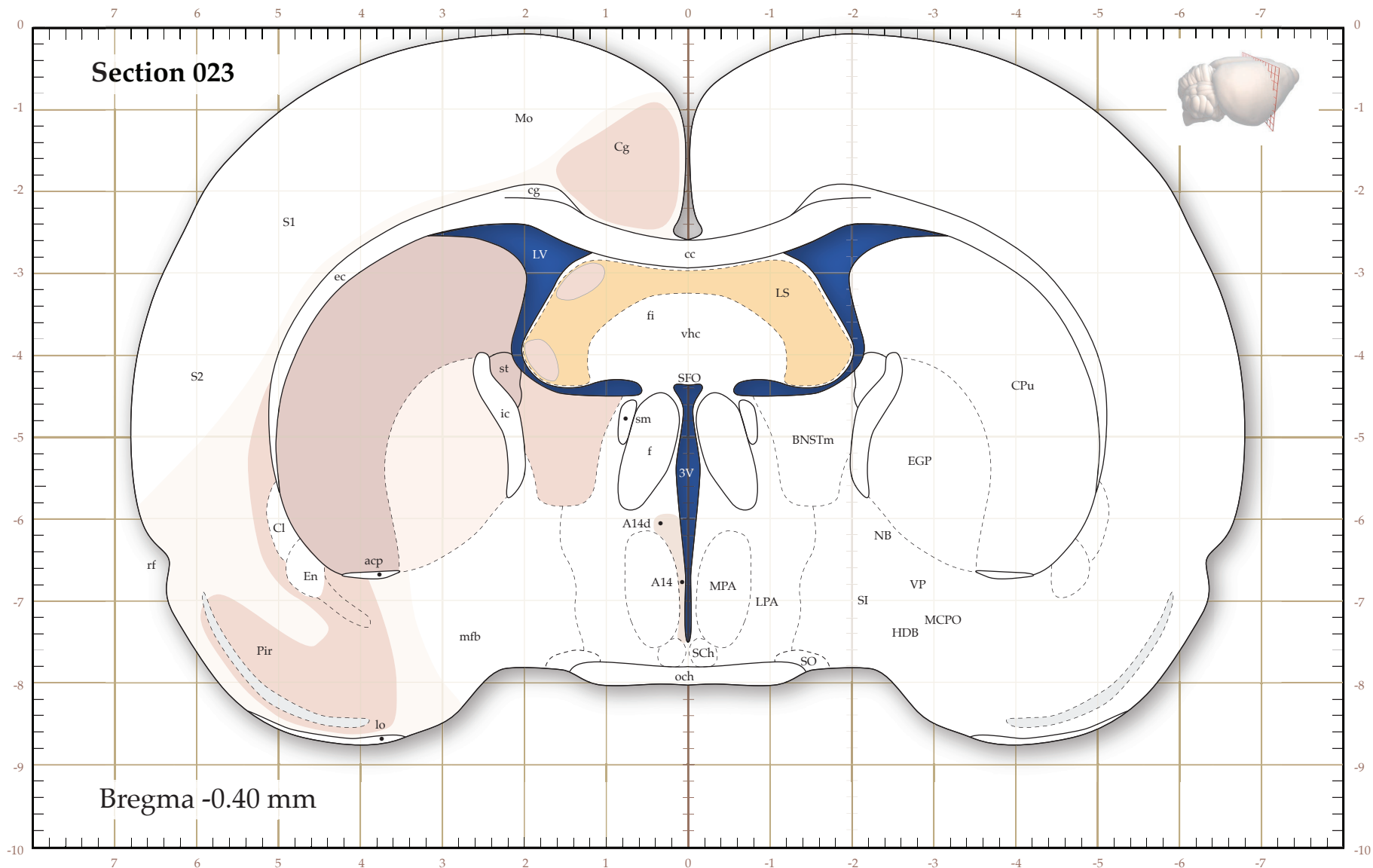
stria terminalis
 striatum
 bed nu of ST med
 caudate putamen
 subst innominata
 subfornical organ
 suprachiasmatic nu
 ventral pallidum

st
 BNSTm
 CPu
 SI
 SFO
 SCh
 VP

ventricle
 3rd ventricle
 lateral ventricle

3V
 LV





anterior commissure
 anterior commissure, posterior
 claustrum
corpus callosum
 cingulum
 external capsule
cortex
 2ary somatosensory cortex
 cingulate cortex
 lateral olfactory tract

acp
Cl
cc
cg
ec
S2
Cg
lo

motor cortex
 piriform cortex
 primary somatosensory cortex
diagonal band
 horizontal limb diagonal band
dopamine
 A14 dopamine cell gr
 A14 dopamine cell gr, dorsal
 endopiriform nu

Mo
Pir
S1
HDB
A14
A14d
En

external globus pallidus
 fornix
hippocampus
 fimbria hippocampus
 ventral hipp comm
 int capsule
 magnocell preoptic nu
 medial forebrain bundle
 nu basal

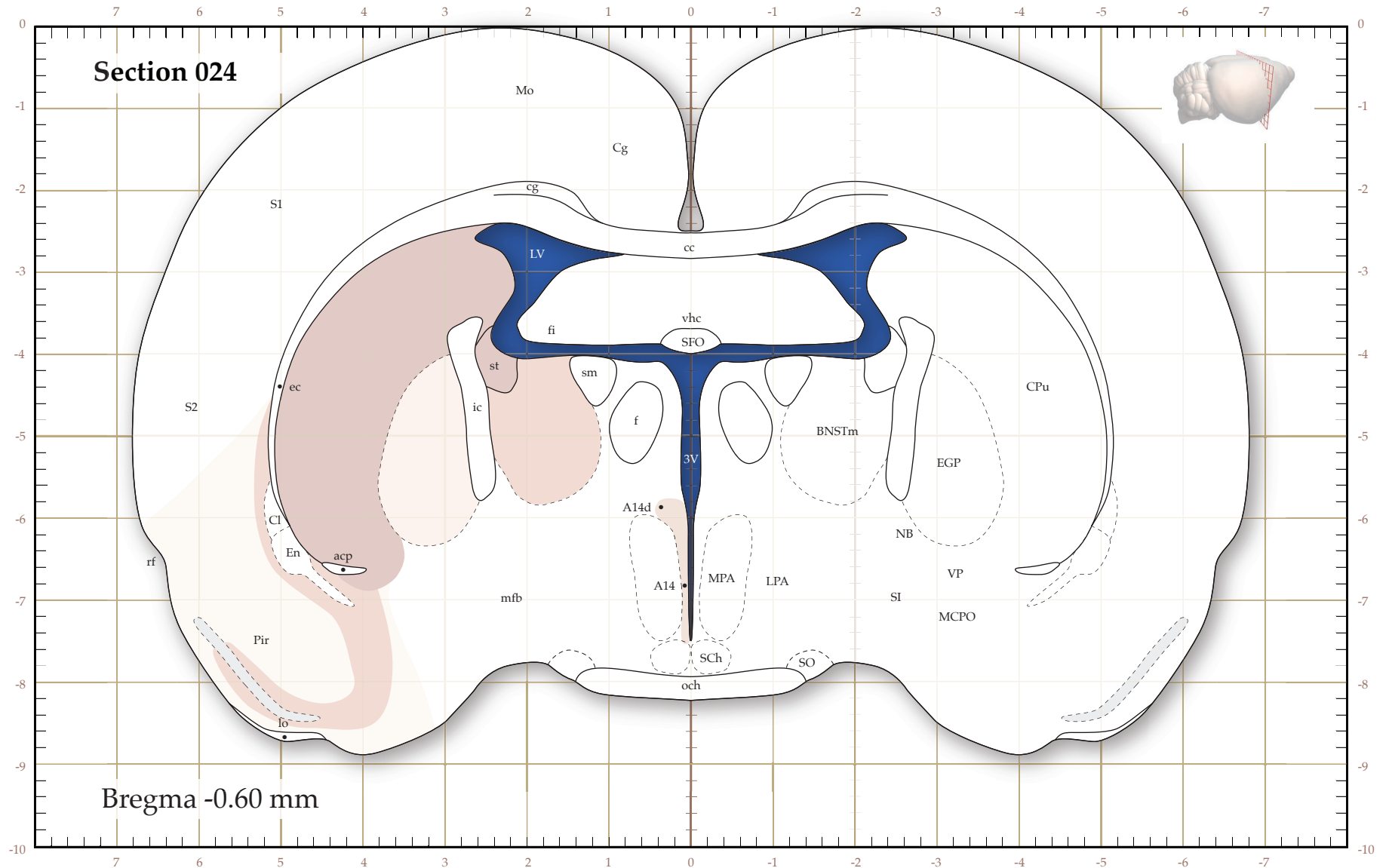
EGP
f
fi
vhc
ic
MCPO
mfb
NB

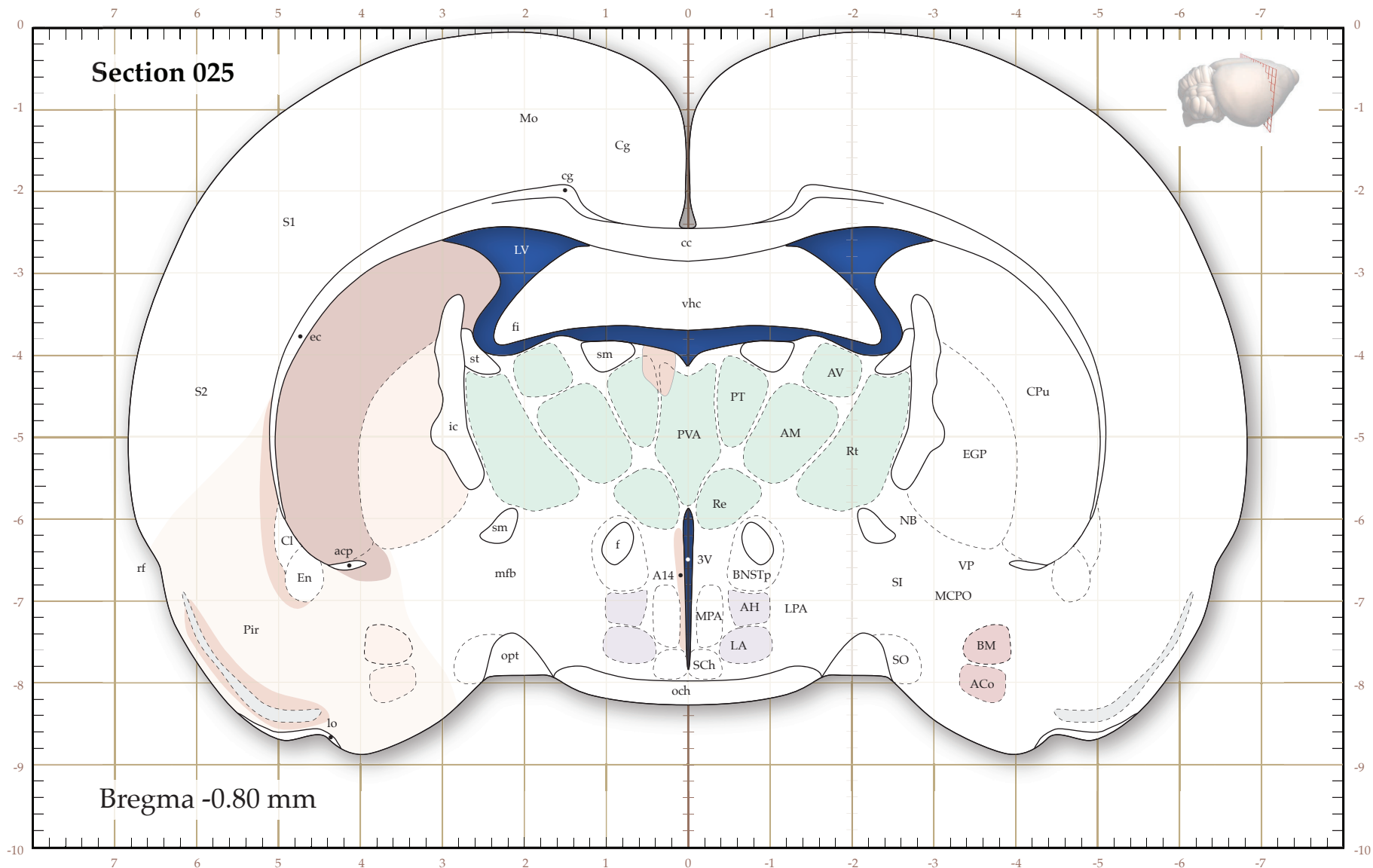
optic
 optic chiasm
preoptic area
 lateral preoptic area
 medial preoptic area
 rhinal fissure
septum
 lateral septum
 stria terminalis

och
LPA
MPA
rf
LS
st

striatum
 bed nu of ST med
 caudate putamen
 subst innominata
 subfornical organ
 suprachiasmatic nu
 supraoptic nu
thalamus
 stria medullaris thal

BNSTm	ventral pallidum	VP
CPu	ventricle	3V
SI	3rd ventricle	LV
SFO	lateral ventricle	
SCh		
SO		
sm		





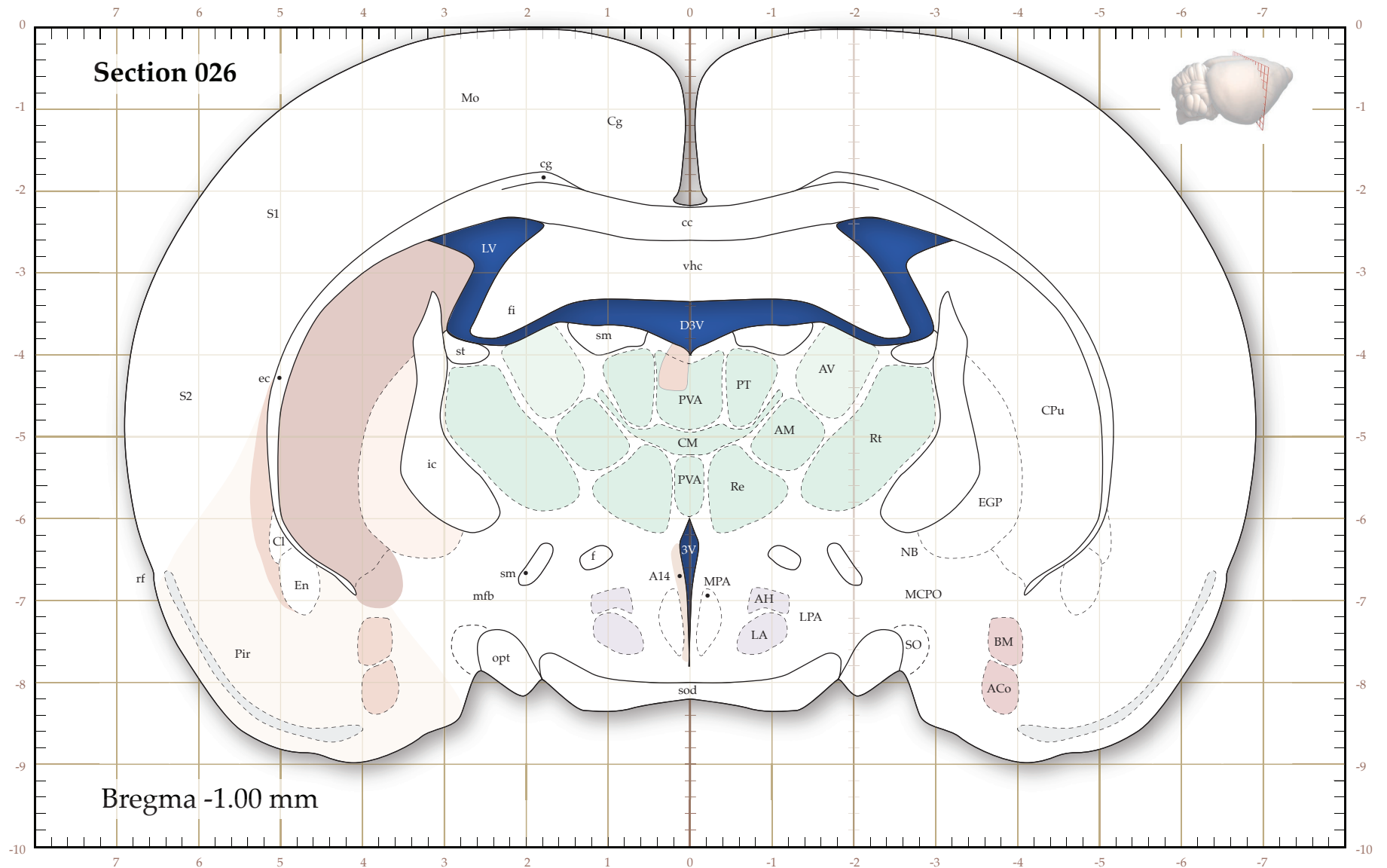
amygdala		cortex		external globus pallidus	EGP	magnocell preoptic nu	MCPO
ant cortical amygdaloid nu	ACo	2ary somatosensory cortex	S2	fornix	f	medial forebrain bundle	mfb
basomedial amygdaloid nu	BM	cingulate cortex	Cg	hippocampus		nu basalis	NB
anterior commissure		lateral olfactory tract	lo	fimbria hippocampus	fi	optic	
anterior commissure, posterior	acp	motor cortex	Mo	ventral hipp comm	vhc	optic chiasm	och
claustrum	Cl	piriform cortex	Pir	hypothalamus		optic tract	opt
corpus callosum		primary somatosensory cortex	S1	anterior hypothalamic area	AH	supraoptic decussation	sod
cingulum	cc	dopamine		lat ant hypoth nu	LA	preoptic area	
external capsule	cg	A14 dopamine cell gr	A14	int capsule	ic	lateral preoptic area	LPA
	ec	endopiriform nu	En				

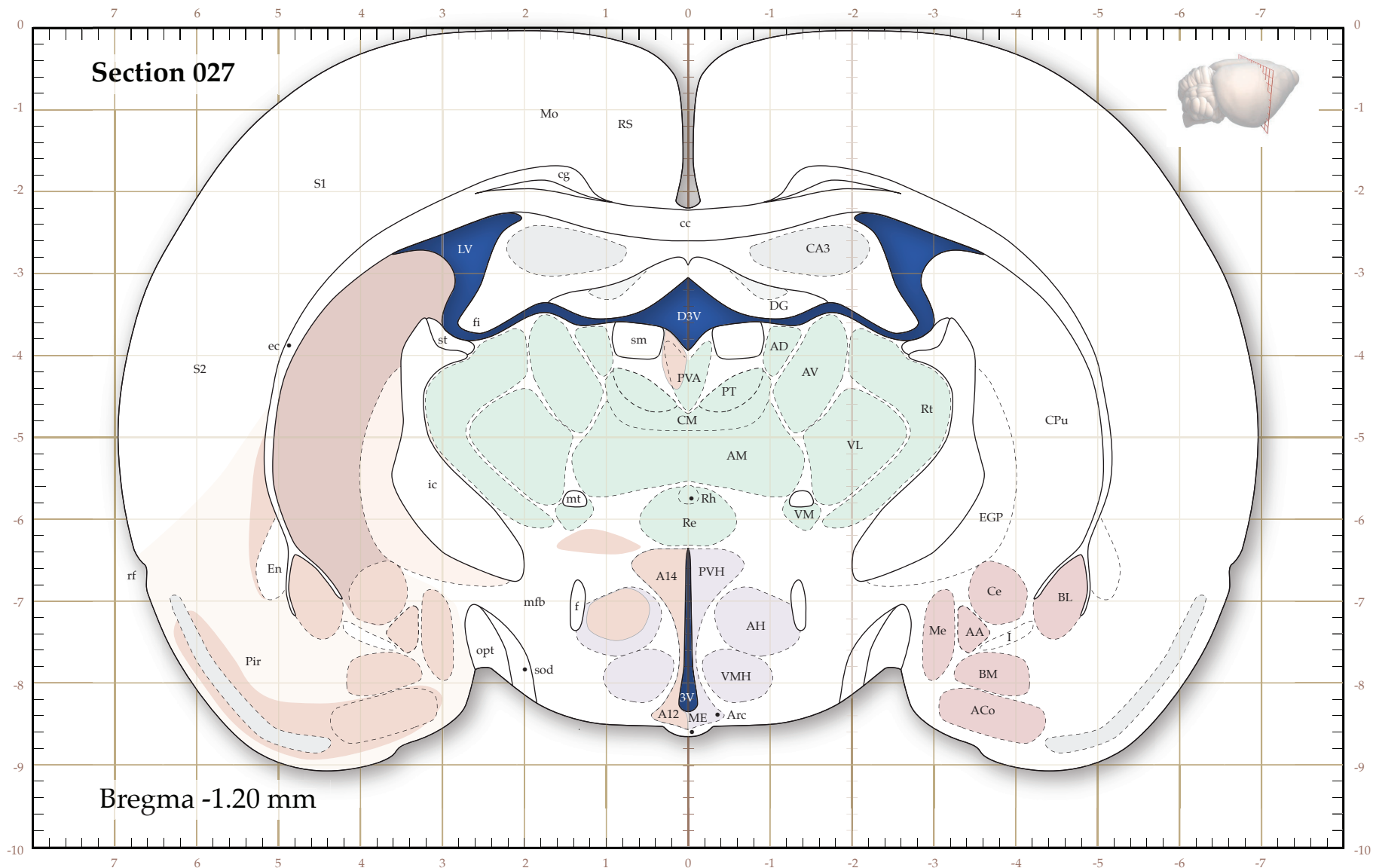
medial preoptic area
rhinal fissure
stria terminalis
striatum
bed nu of ST post
caudate putamen
subst innominata
suprachiasmatic nu

MPA	supraoptic nu
rf	<i>thalamus</i>
st	anteriomedial thal nu
	anteriorvent th nu
	centralmedial thal nu
BNSTp	paratenial th nu
CPu	paraventricular thal nu ant
SI	reticular thal nu
SCh	reuniens th nu

SO	stria medullaris thal
AM	ventral pallidum
AV	<i>ventricle</i>
CM	3rd ventricle
PT	dorsal third ventricle
PVA	lateral ventricle
Rt	
Re	

sm
VP
3V
D3V
LV





amygdala

ant amy area
ant cortical amygdaloid nu
basolateral amygdaloid
basolateral amygdaloid nu, vent
basomedial amygdaloid nu
central amygdaloid nu
medial amygd nu

corpus callosum

cingulum
external capsule

AA
ACo
BL
BLV
BM
Ce
Me
cc
cg
ec

cortex

2ary somatosensory cortex
motor cortex
piriform cortex
primary somatosensory cortex
retrosple cortex

dopamine

A12 dopamine cell gr
A13 dopamine cell gr
A14 dopamine cell gr

S2
Mo
Pir
S1
RS
A12
A13
A14

endopiriform nu

external globus pallidus
fornix
hippocampus
fimbria hippocampus
CA3 field
dentate gyrus

hypothalamus

anterior hypothalamic area
arcuate nu

En
EGP
f
fi
CA3
DG
AH
Arc

median eminence
paravent hyp nu
ventromedial hypoth nu
int capsule
intercalated nu
medial forebrain bundle
optic
optic tract
supraoptic decussation

ME
PVH
VMH
ic
I
mfb

opt
sod

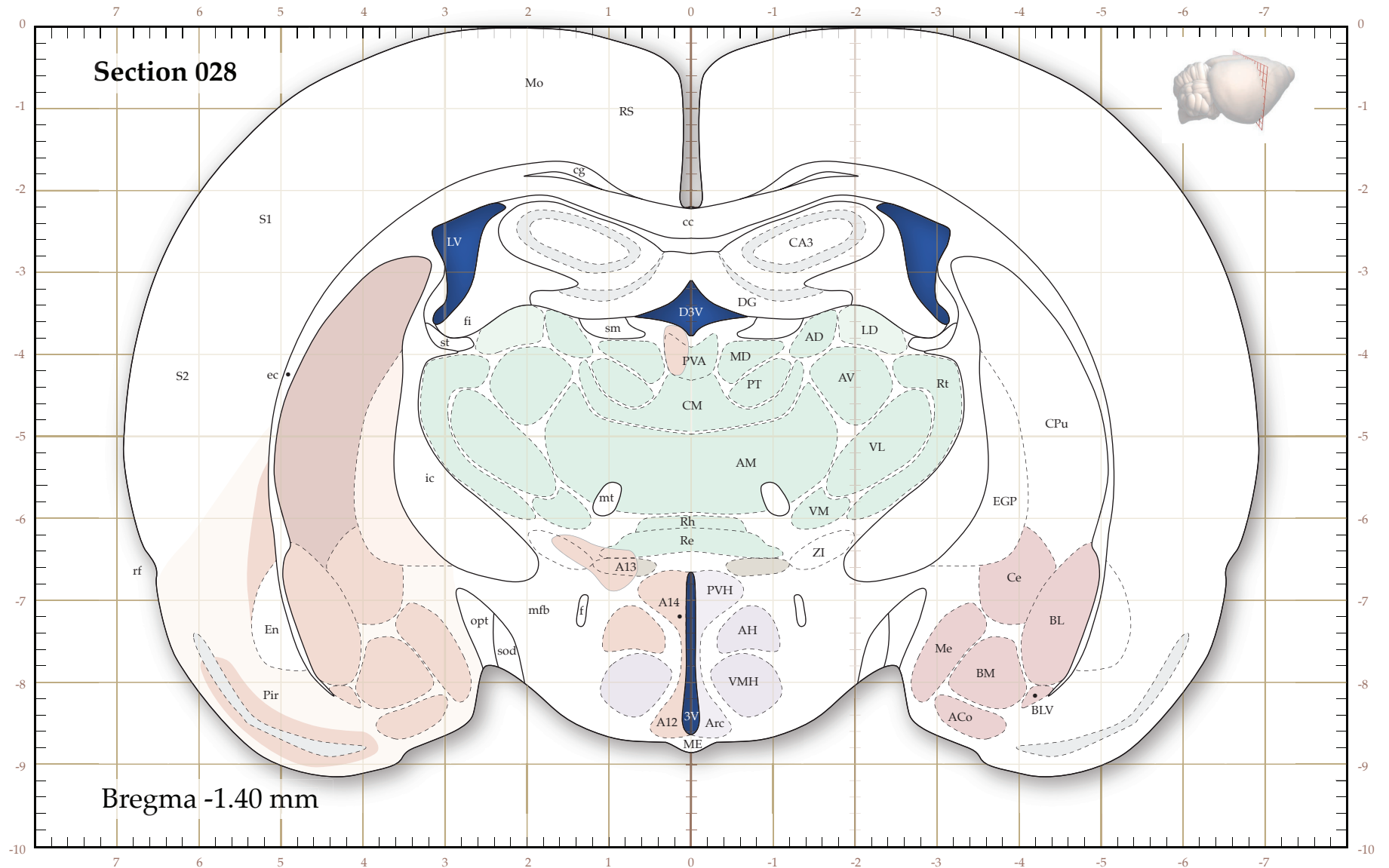
thalamus

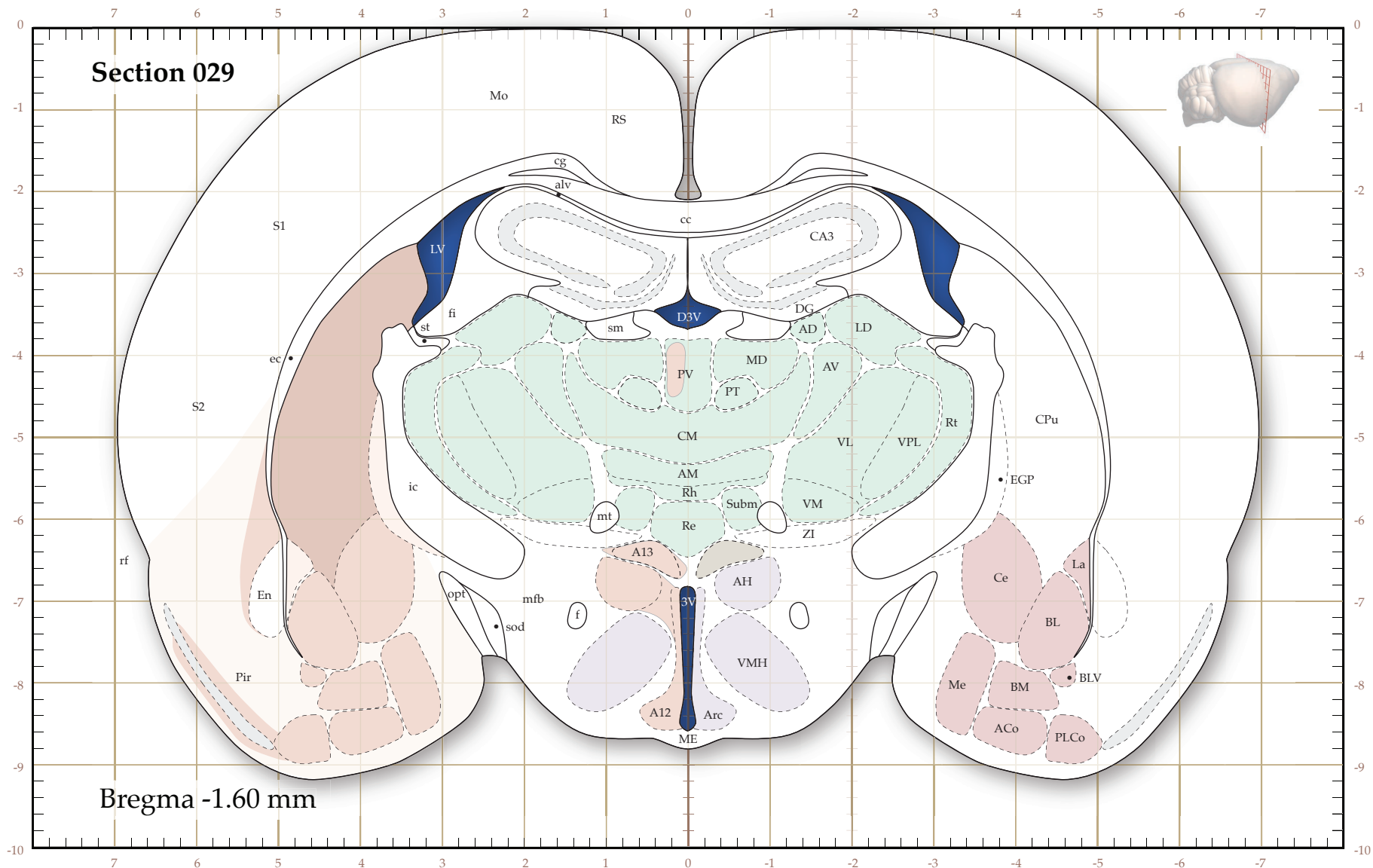
- anteriordors th nu
- anteriomedial thal nu
- anteriorvent th nu
- centralmedial thal nu
- laterodorsal thal nu

rf	mammillothalamic tract
st	mediodorsal thal nu
	paratenial th nu
CPu	paraventricular thal nu ant
	reticular thal nu
	reuniens th nu
AD	rhomboid thal nu
AM	stria medullaris thal
AV	ventrolateral thal nu
CM	ventromedial thal nu
LD	

mt	<i>ventricle</i>
MD	3rd ventricle
PT	dorsal third ventricle
PVA	lateral ventricle
Rt	zona incerta
Re	
Rh	
sm	
VL	
VM	

3V
D3V
LV
ZI





amygdala

ant cortical amygdaloid nu
basolateral amygdaloid
basolateral amygdaloid nu, vent
basomedial amygdaloid nu
central amygdaloid nu
lateral amygdaloid nu
medial amygdaloid nu
posterolateral cortical amygdaloid nu

ACo
BL
BLV
BM
Ce
La
Me
PLCo

corpus callosum

alveus hippocampus
cingulum
external capsule
cortex
2ary somatosensory cortex
motor cortex
piriform cortex
primary somatosensory cortex
retrosplenial cortex

cc

alv
cg
ec
S2
Mo
Pir
S1
RS

dopamine

A12 dopamine cell gr
A13 dopamine cell gr
endopiriform nu
external globus pallidus
fornix
hippocampus
fimbria hippocampus
CA1 field
CA3 field

A12
A13
En
EGP
f
fi
CA1
CA3

dentate gyrus

hypothalamus
anterior hypothalamic area
arcuate nu
dorsal hy area
median eminence
ventromedial hypoth nu
int capsule
medial forebrain bundle

DG

AH
Arc
DH
ME
VMH
ic
mfb

optic
 optic tract
 supraoptic decussation
rhinal fissure
 stria terminalis
striatum
 caudate putamen
thalamus
 anteriordors th nu
 anteriomedial thal nu

opt
sod
rf
st

CPu

AD
AM

anteriorvent th nu
 centrallateral thal nu
 centralmedial thal nu
 lat habenular nu
 laterodorsal thal nu
 mamillothalamic tract
 med habenular nu
 mediodorsal thal nu
 paratenial th nu
 paraventricular thal nu
 reticular thal nu

AV
CL
CM
LHb
LD
mt
MHb
MD
PT
PV
Rt

reuniens th nu
 rhomboid thal nu
 stria medullaris thal
 submedius th nu
 ventral posterolat thal nu
 ventrolateral thal nu
 ventromedial thal nu

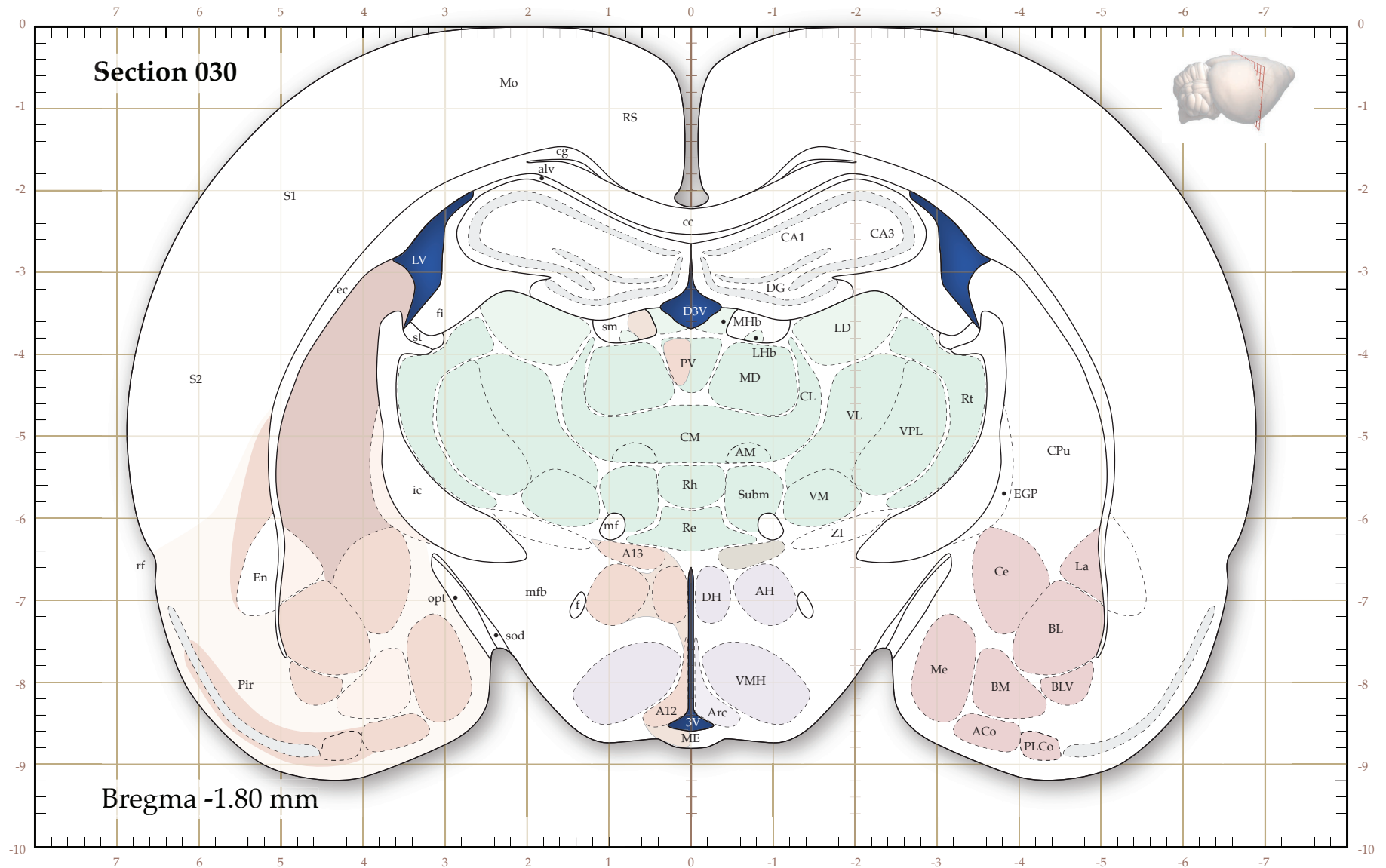
ventricle
 3rd ventricle
 dorsal third ventricle

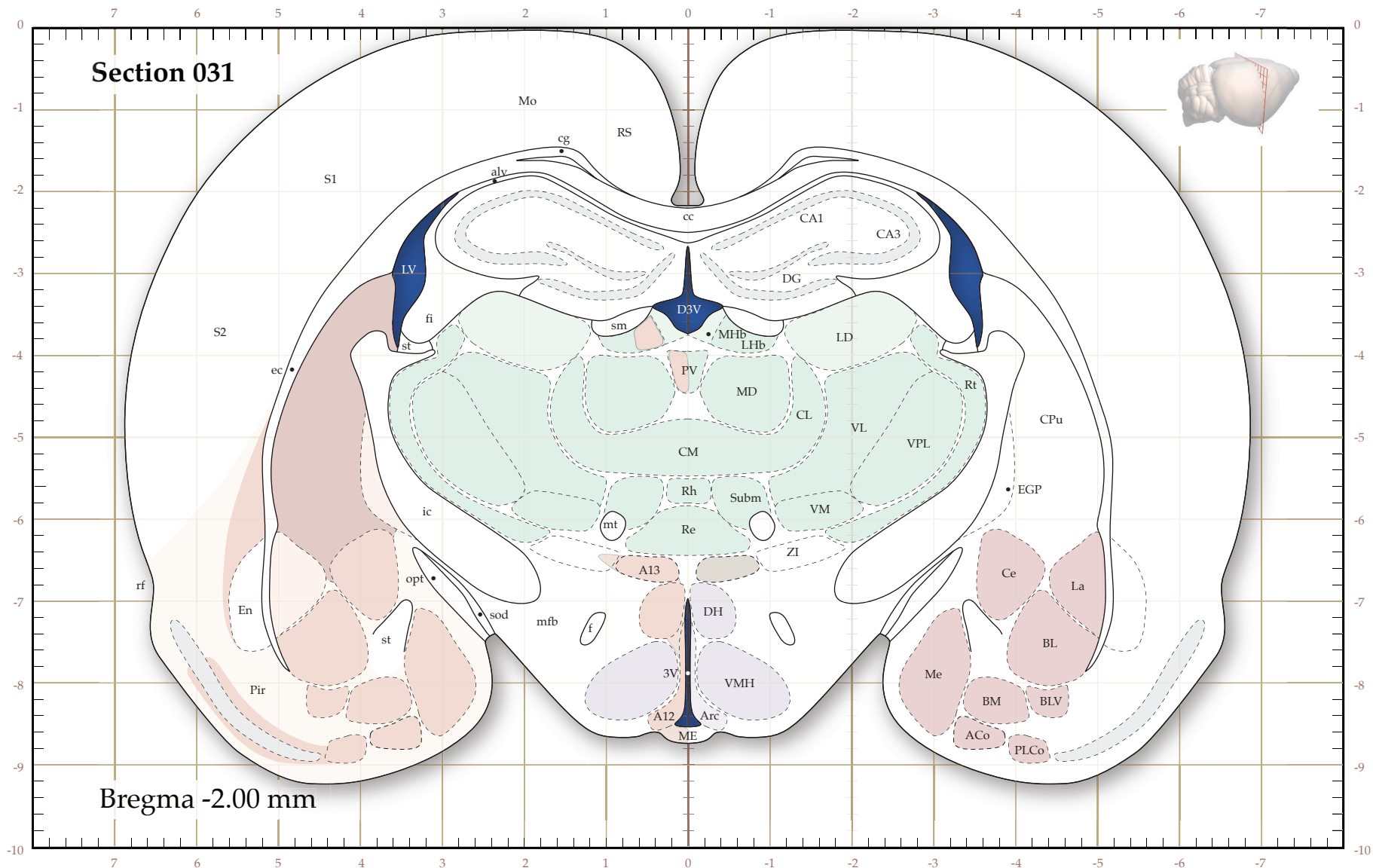
Re
Rh
sm
Subm
VPL
VL
VM

3V
D3V

lateral ventricle
 zona incerta

LV
ZI





amygdala

ant cortical amygdaloid nu
basolateral amygdaloid
basolateral amygdaloid nu, vent
basomedial amygdaloid nu
central amygdaloid nu
cortical amyg
lateral amyg nu
medial amyg nu
posterolat cortical amygdaloid nu

ACo
BL
BLV
BM
Ce
Co
La
Me
PLCo

corpus callosum

alveus hippocampus
cingulum
external capsule
cortex
2ary somatosensory cortex
motor cortex
piriform cortex
primary somatosensory cortex
retrosple cortex

cc

alv
cg
ec
S2
Mo
Pir
S1
RS

dopamine

A12 dopamine cell gr
A13 dopamine cell gr
endopiriform nu
external globus pallidus
fornix
hippocampus
fimbria hippocampus
CA1 field
CA2 field

A12
A13
En
EGP
f
fi
CA1
CA2

CA3 field

dentate gyrus
hypothalamus
arcuate nu
dorsal hy area
median eminence
ventromedial hypoth nu
int capsule
medial forebrain bundle

CA3

DG
Arc
DH
ME
VMH
ic
mfb

optic
 optic tract
 supraoptic decussation

rhinal fissure
 stria terminalis

striatum
 caudate putamen

thalamus
 centrolateral thal nu
 centrolmedial thal nu

opt
sod
rf
st

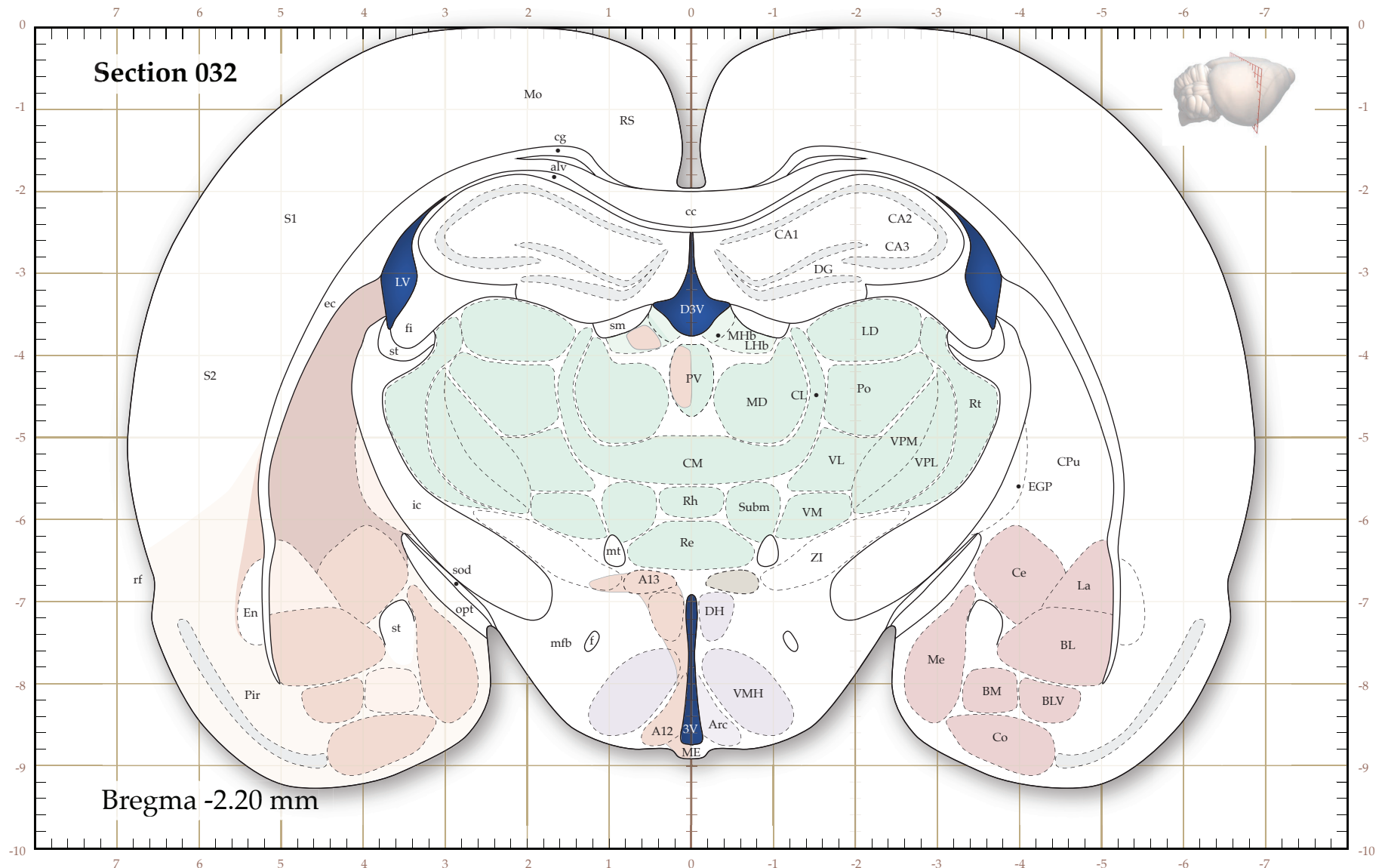
CPu

CL
CM
 lat habenular nu
 laterodorsal thal nu
 mammillothalamic tract
 med habenular nu
 mediodorsal thal nu
 paraventricular thal nu
 post thalamic nu
 reticular thal nu
 reuniens th nu
 rhomboid thal nu
 stria medullaris thal

LHb
LD
mt
MHb
MD
PV
Po
Rt
Re
Rh
sm
 submedius th nu
 ventral posterolat thal nu
 ventrolateral thal nu
 ventromedial thal nu
 ventral posteromed thal nu
 ventricle
 3rd ventricle
 dorsal third ventricle
 lateral ventricle
 zona incerta

Subm
VPL
VL
VM
VPM

3V
D3V
LV
ZI



[illegible]

Arc
DH
MCLH
ME
VMH
ic
mfb

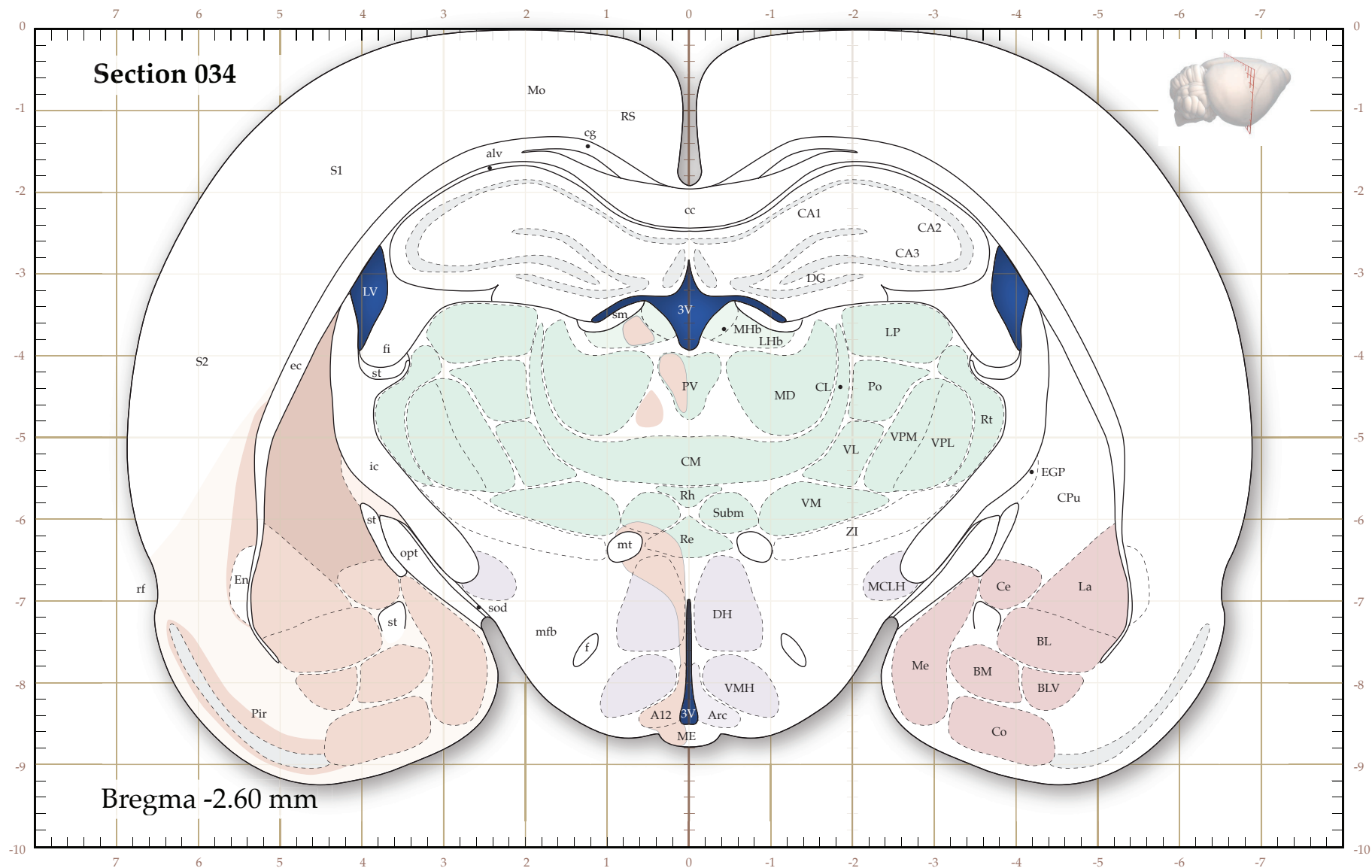
opt

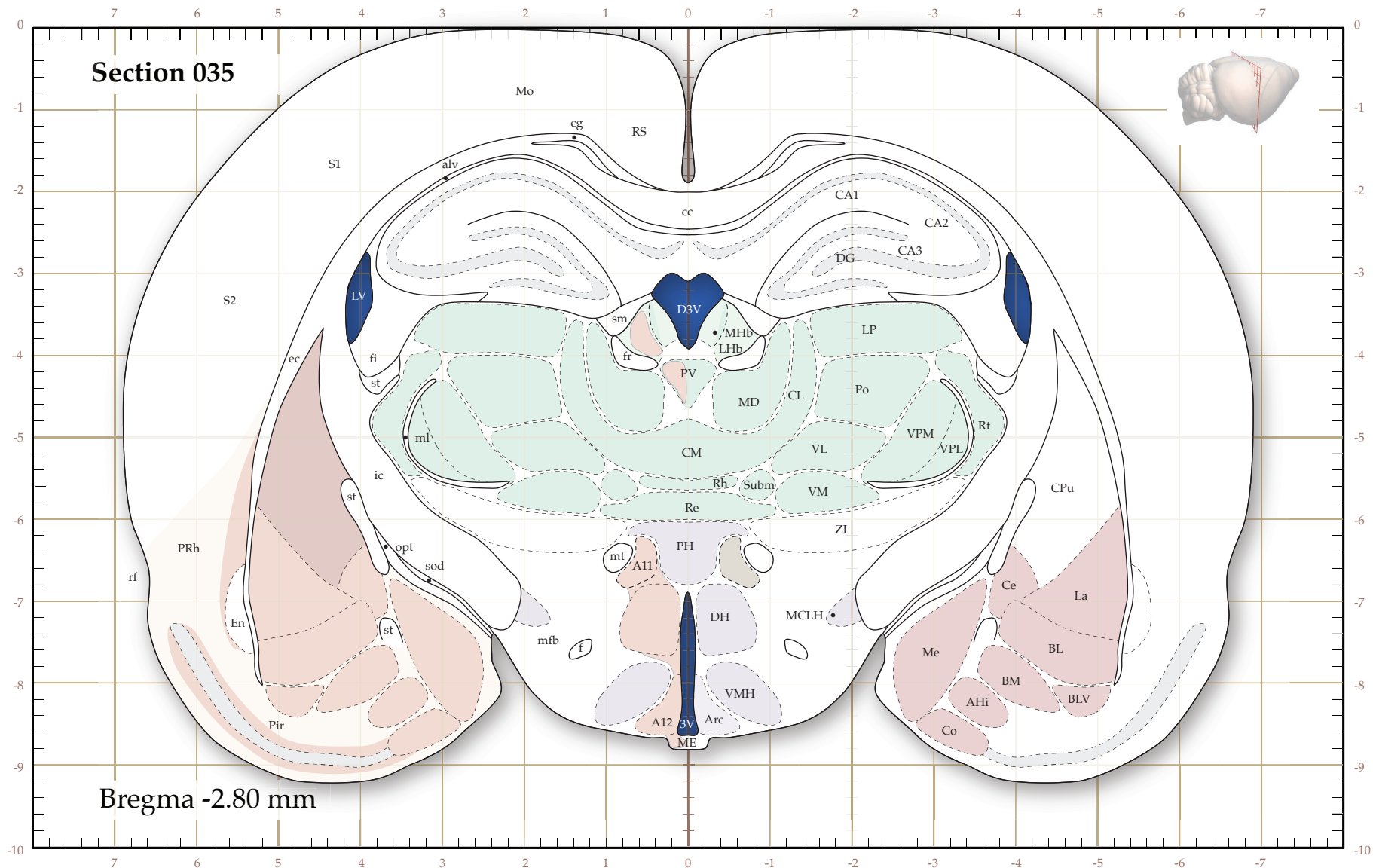
supraoptic decussation
rhinal fissure
stria terminalis
striatum
caudate putamen
thalamus
centrallateral thal nu
centralmedial thal nu
lat habenular nu
lateral posterior thal nu

sod laterodorsal thal nu
rf mammillothalamic tract
st med habenular nu
CPu mediodorsal thal nu
CL paraventricular thal nu
CM post thalamic nu
LHb reticular thal nu
LP reuniens th nu
rhomboid thal nu
stria medullaris thal
submedius th nu

LD ventral posterolat thal nu
mt ventrolateral thal nu
MHb ventromedial thal nu
MD ventral posteromed thal nu
PV
Po *ventricle*
Rt 3rd ventricle
Re lateral ventricle
Rh zona incerta
sm
Subm

VPL
VL
VM
VPM
3V
LV
ZI





amygdala

amygdalohip are
basolateral amygdaloid
basolateral amygdaloid nu, vent
basomedial amygdaloid nu
central amygdaloid nu
cortical amyg
lateral amyg nu
medial amyg nu

AHi
BL
BLV
BM
Ce
Co
La
Me

corpus callosum

alveus hippocampus
cingulum
external capsule

cortex

2ary somatosensory cortex
motor cortex
parietal cortex
perirhinal cx
piriform cortex
primary somatosensory cortex

cc
alv
cg
ec
S2
Mo
Par
PRh
Pir
S1

retrosple cortex

dopamine
A11 dopamine cell gr
A12 dopamine cell gr
endopiriform nu
fasciculus retroflexus
fornix
geniculate nu
dorsal lateral geniculate nu

RS
A11
A12
En
fr
f
DLG

hippocampus

fimbria hippocampus
CA1 field
CA2 field
CA3 field
dentate gyrus

hypothalamus

arcuate nu
dorsal hy area
dorsomedial hypothalamic nu
magnocell lat hy

fi
CA1
CA2
CA3
DG

Arc
DH
DM
MCLH

median eminence
posterior hypoth area
ventromedial hypoth nu

int capsule

lemniscus

medial lemniscus

medial forebrain bundle

optic

optic tract

supraoptic decussation

ME

PH

VMH

ic

ml

mfb

opt

sod

rhinal fissure

stria terminalis

striatum

caudate putamen

subthalamic nu

thalamus

centrallateral thal nu

centralmedial thal nu

lat habenular nu

lateral posterior thal nu

rf

st

CPu

STh

CL

CM

LHb

LP

mammillothalamic tract

med habenular nu

mediodorsal thal nu

paraventricular thal nu

post thalamic nu

reticular thal nu

reuniens th nu

rhomboid thal nu

stria medullaris thal

submedius th nu

ventral posterolat thal nu

mt

MHb

MD

PV

Po

Rt

Re

Rh

sm

Subm

VPL

ventrolateral thal nu

ventromedial thal nu

ventral posteromed thal nu

ventricle

3rd ventricle

dorsal third ventricle

lateral ventricle

zona incerta

VL

VM

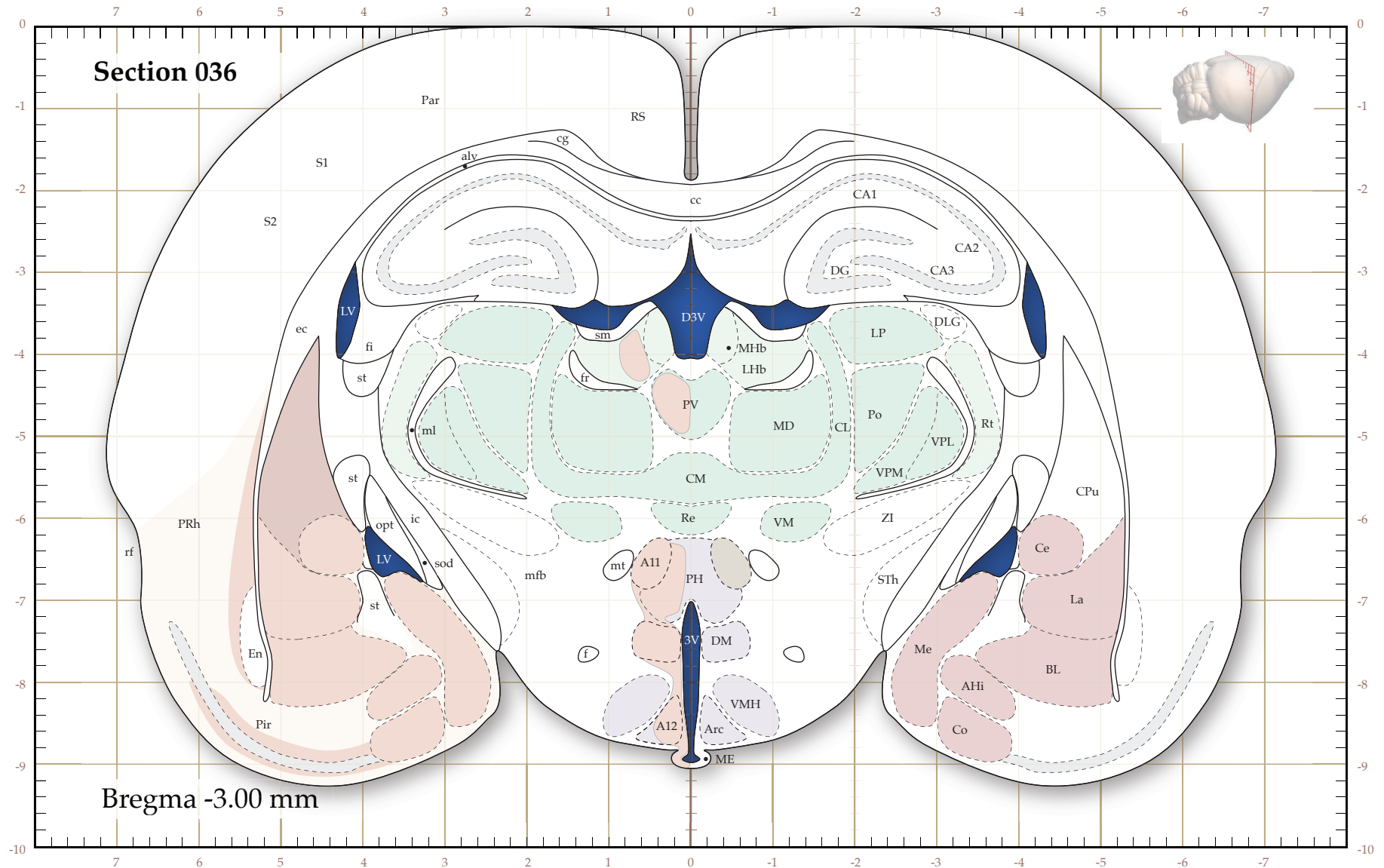
VPM

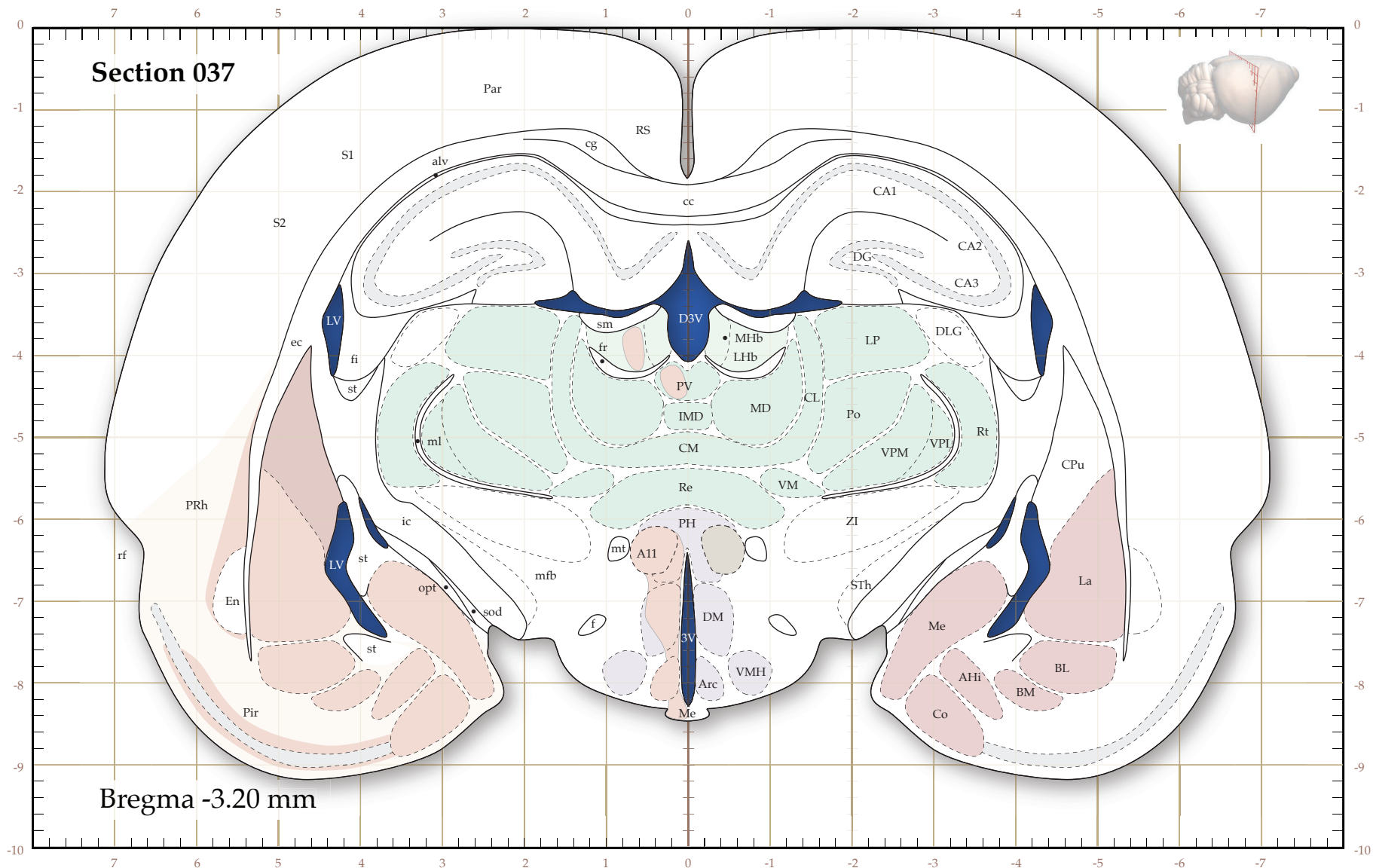
3V

D3V

LV

ZI



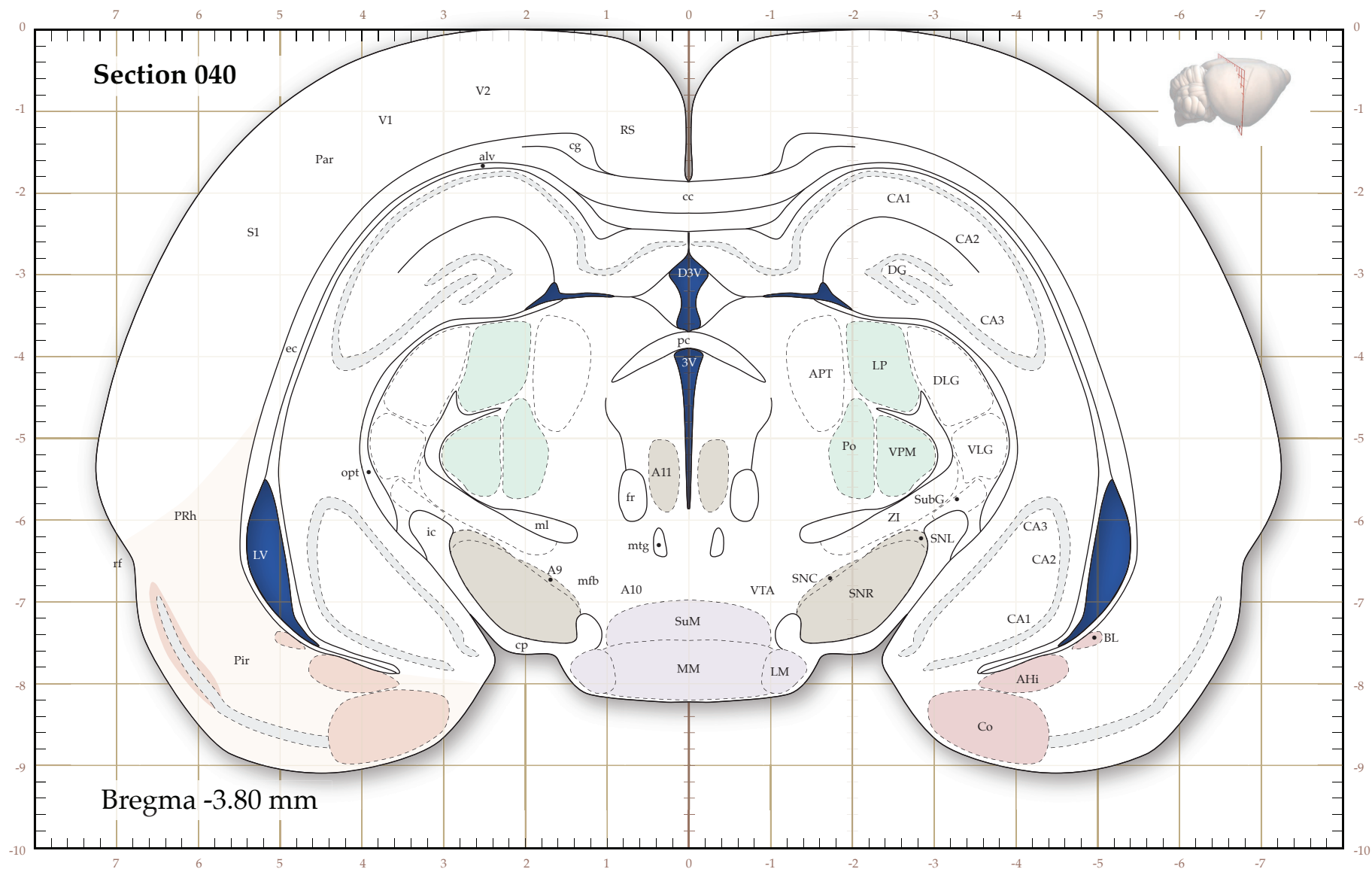


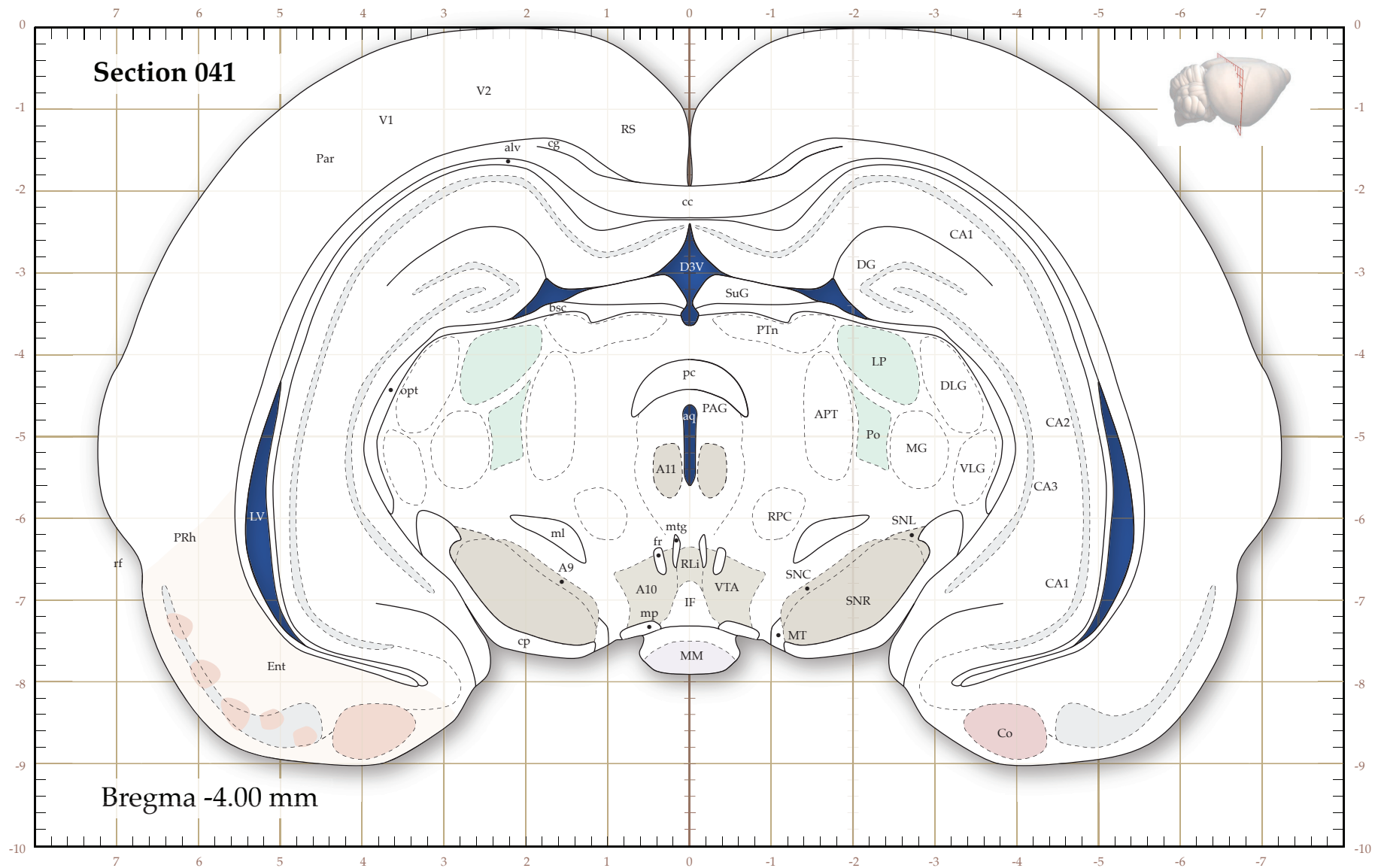
<i>amygdala</i>		<i>cortex</i>		<i>geniculate nu</i>		<i>hypothalamus</i>	
amygdalohip are	AHi	2ary somatosensory cortex	S2	dorsal lateral geniculate nu	DLG	arcuate nu	Arc
basolateral amygdaloid	BL	parietal cortex	Par	fasciculus retroflexus	fr	dorsomedial hypothalamic nu	DM
basomedial amygdaloid nu	BM	perirhinal cx	PRh	fornix	f	median eminence	ME
cortical amyg	Co	piriform cortex	Pir	<i>hippocampus</i>		posterior hypoth area	PH
lateral amyg nu	La	primary somatosensory cortex		fimbria hippocampus		ventromedial hypoth nu	VMH
medial amyg nu	Me	retrosple cortex	RS	CA1 field		int capsule	ic
<i>corpus callosum</i>	cc	<i>dopamine</i>		CA2 field		<i>lemniscus</i>	
alveus hippocampus	alv	A11 dopamine cell gr	A11	CA3 field		medial lemniscus	ml
cingulum	cg	endopiriform nu	En	dentate gyrus	DG	medial forebrain bundle	mfb
external capsule	ec						

opt	centralmedial thal nu	CM	stria medullaris thal	sm
sod	intermediadors nu	IMD	ventral posterolat thal nu	VPL
rf	lat habenular nu	LHb	ventromedial thal nu	VM
st	lateral posterior thal nu	LP	ventral posteromed thal nu	VPM
	mammillothalamic tract	mt		
	med habenular nu	MHb	<i>ventricle</i>	
	mediodorsal thal nu	MD	3rd ventricle	3V
CPu	paraventricular thal nu	PV	dorsal third ventricle	D3V
STh	post thalamic nu	Po	lateral ventricle	LV
	reticular thal nu	Rt	zona incerta	ZI
CL	reuniens th nu	Re		



dentate gyrus	DG	medial forebrain bundle	mfb	centrallateral thal nu	CL		
<i>hypothalamus</i>		<i>optic</i>		lat habenular nu	LHb	<i>ventricle</i>	
lat mammid nu	LM	optic tract	opt	lateral posterior thal nu	LP	3rd ventricle	3V
mammilloleg tract	mtg	supraoptic decussation	sod	mammillothalamic tract	mt	dorsal third ventricle	D3V
med mamm nu	MM	rhinal fissure	rf	med habenular nu	MHb	lateral ventricle	LV
posterior hypoth area	PH	<i>striatum</i>		parafascic th nu	PF	mamm recess 3V	MRe
supramamm	SuM	caudate putamen	CPu	post thalamic nu	Po		
int capsule	ic	subthalamic nu	STh	stria medullaris thal	sm	zona incerta	ZI
<i>lemniscus</i>		<i>thalamus</i>		ventral posterolat thal nu	VPL		
medial lemniscus	ml			ventral posteromed thal nu	VPM		





amygdala
cortical amygdala
ant pretecal
cerebral peduncle
corpus callosum
alveus hippocampus
cingulum
forceps major
cortex
entorhinal cortex

Co
APT
cp
cc
alv
cg
fmj
Ent

parietal cortex
perirhinal cx
primary visual
primary visual 2
retrosple cortex
dopamine
A9 dopamine cell gr
A10 dopamine cell gr
A11 dopamine cell gr
rost linear raphe
subst nigra compacta

Par
PRh
V1
V2
RS
A9
A10
A11
RLi
SNC

subst nigra lat
subst nigra retic
ventral tegmental area
fasciculus retroflexus
geniculate nu
dorsal lateral geniculate nu
medial geniculate nu
vent lat geniculate nu
interfascicular nu
interstit nu Cajal

SNL
SNR
VTA
fr
DLG
MG
VLG
IF
InC

hippocampus
CA1 field
CA2 field
CA3 field
dentate gyrus
hypothalamus
mammillary ped
mammilloteg tr
med mamm nu

CA1
CA2
CA3
DG
mp
mtg
MM

lemniscus
 medial lemniscus
 med terminal nu
 olivary preect nu
optic
 nu of optic tract
 optic tract
 periaqueduct gray
 posterior commissure

ml
MT
OPT

OTn
opt
PAG
pc
 pretectal nu
 red nu
 red nu parvicell
 rhinal fissure
superior colliculus
 brachium sup coll
 commissure sup col
 superficial gray layer
thalamus
 lateral posterior thal nu

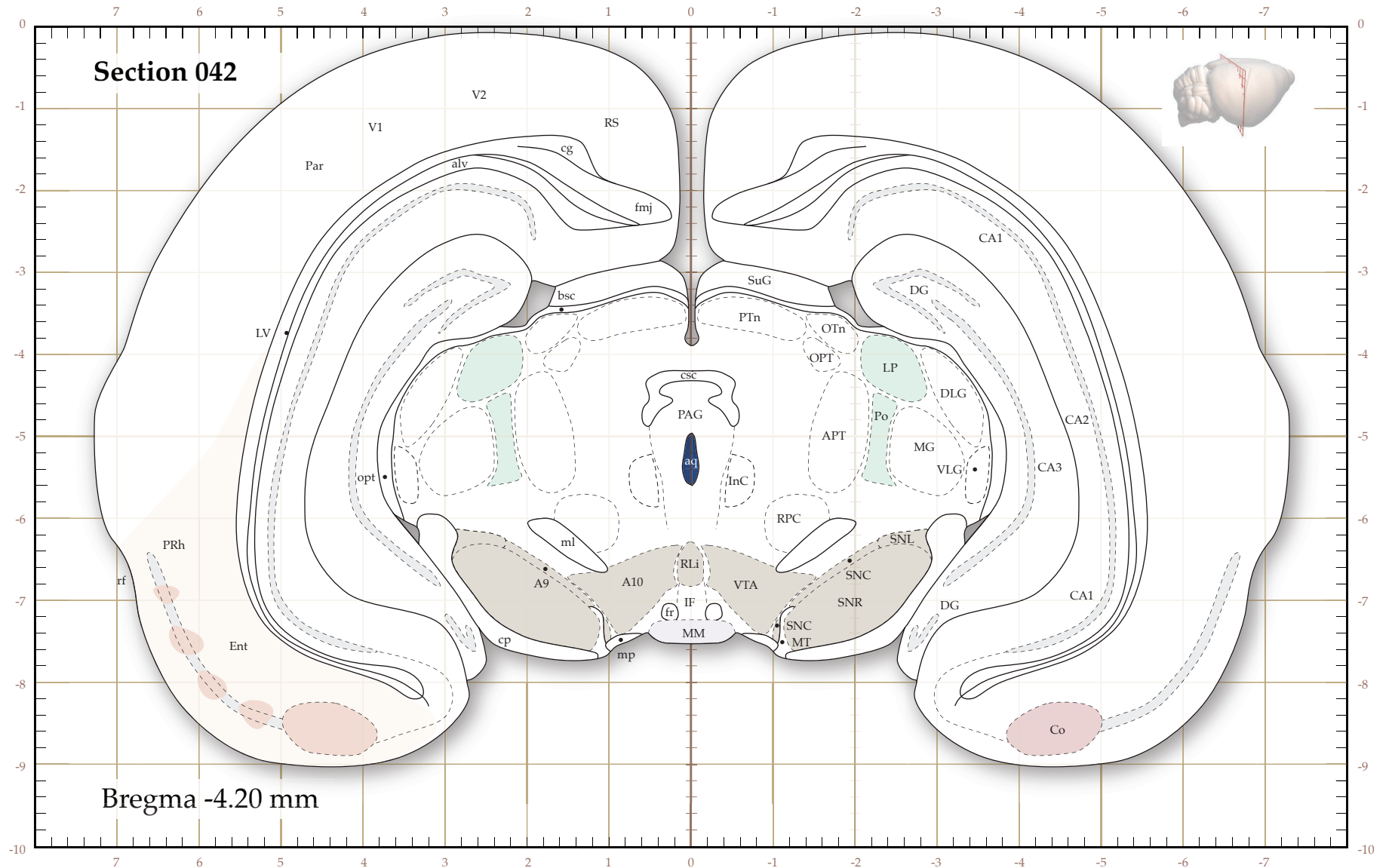
PTn
RPC
rf

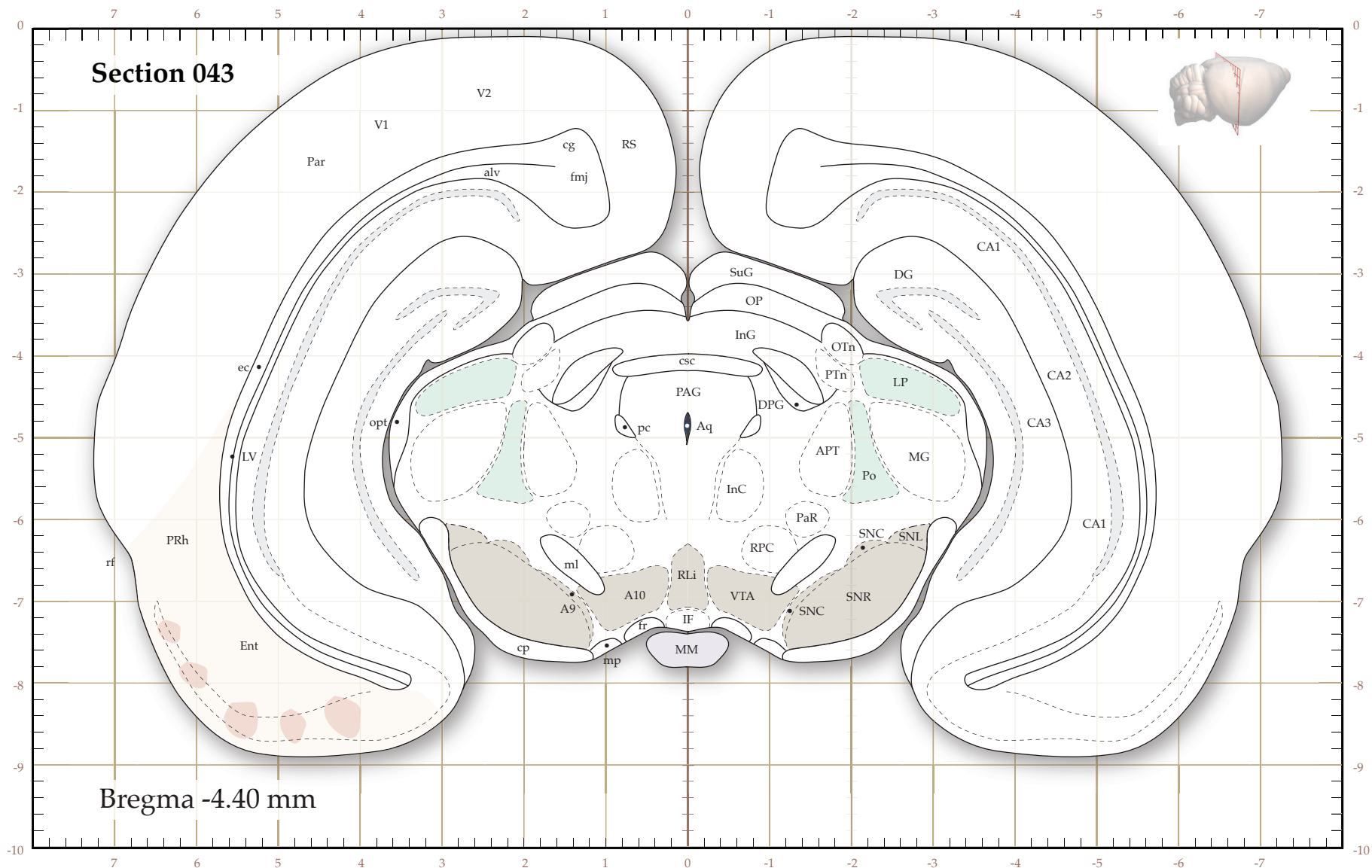
bsc
csc
SuG

LP
 post thalamic nu
 ventricle
 aqueduct
 dorsal third ventricle
 lateral ventricle

Po

aq
D3V
LV





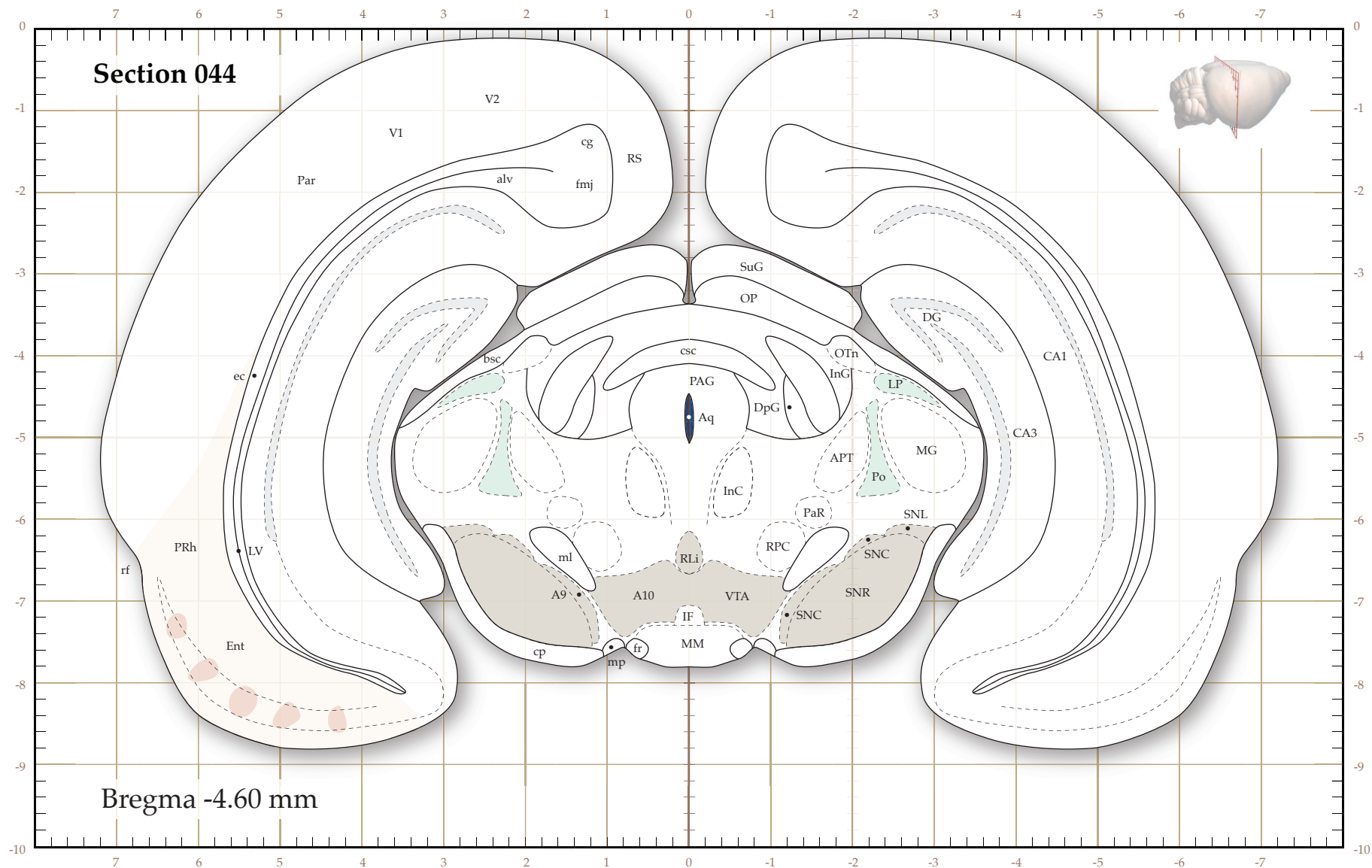
ant pretectal	APT	perirhinal cx	PRh	subst nigra retic	SNR	CA2 field	CA2
cerebral peduncle	cp	primary visual	V1	ventral tegmental area	VTA	CA3 field	CA3
corpus callosum		primary visual 2	V2	fasciculus retroflexus	fr	dentate gyrus	DG
alveus hippocampus	alv	retrosple cortex	RS	geniculate nu		hypothalamus	
cingulum	cg	dopamine		medial geniculate nu	MG	mammillary ped	mp
external capsule	ec	A9 dopamine cell gr	A9	interfascicular nu	IF	med mamm nu	MM
forceps major	fmj	A10 dopamine cell gr	A10	interstit nu Cajal	InC	lemniscus	
cortex		rost linear raphe	RLi	hippocampus		medial lemniscus	ml
entorhinal cortex	Ent	subst nigra compacta	SNC	CA1 field	CA1		
parietal cortex	Par	subst nigra lat	SNL				

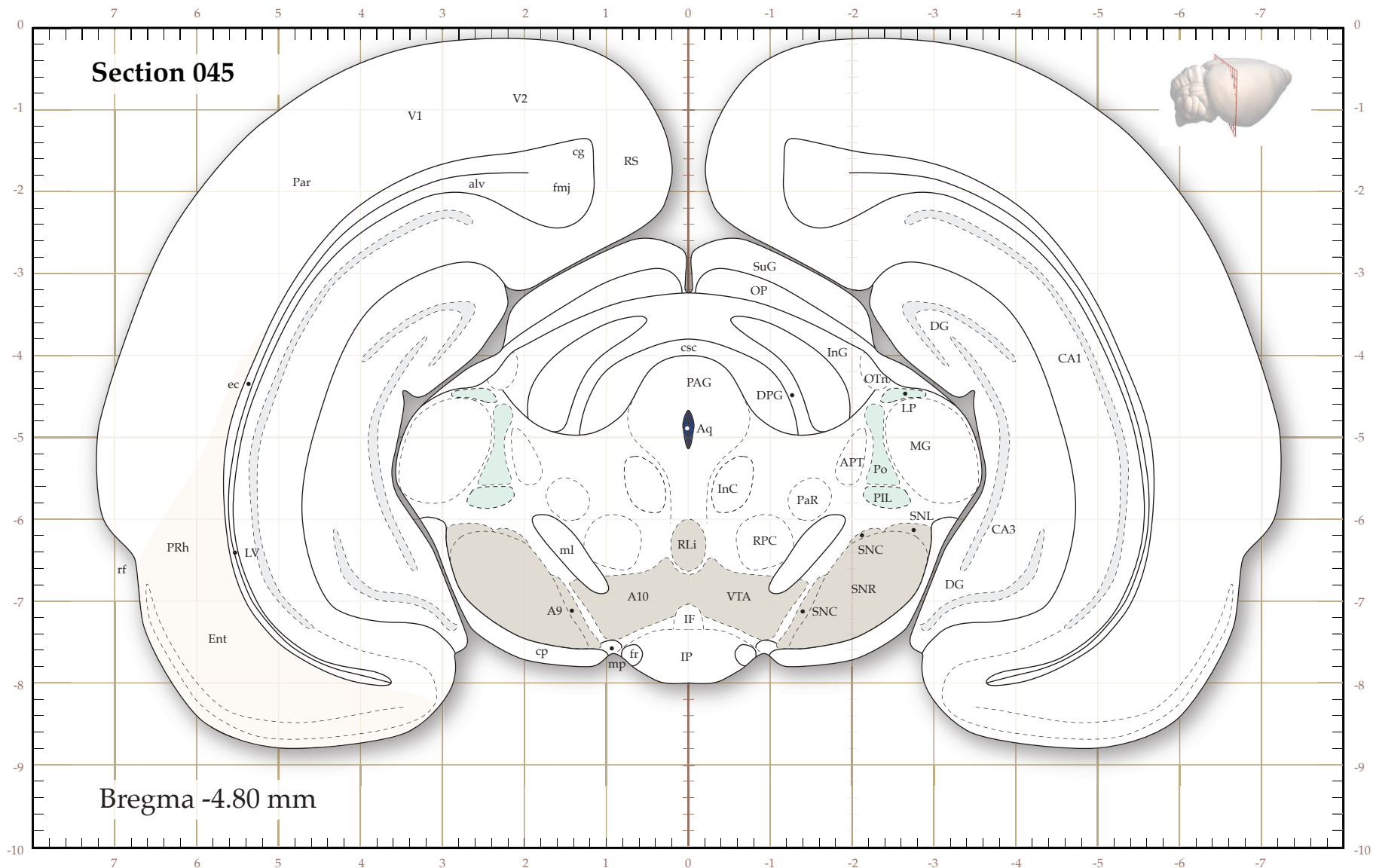
optic
 nu of optic tract
 optic tract
 periaqueduct gray
 posterior commissure
 pretectal nu
red nu
 parabrual nu
 red nu parvicell

OTn
 opt
 PAG
 pc
 PTn
 PaR
 RPC
 rhinal fissure
superior colliculus
 brachium sup coll
 commissure of sup colliculus
 deep gray
 intermediate gray layer
 optic n layer
 superficial gray layer
thalamus
 lateral posterior thal nu

rf
 bsc
 csc
 DpG
 InG
 OP
 SuG
 LP
 post thalamic nu
 ventricle
 aqueduct
 lateral ventricle

Po
 aq
 LV



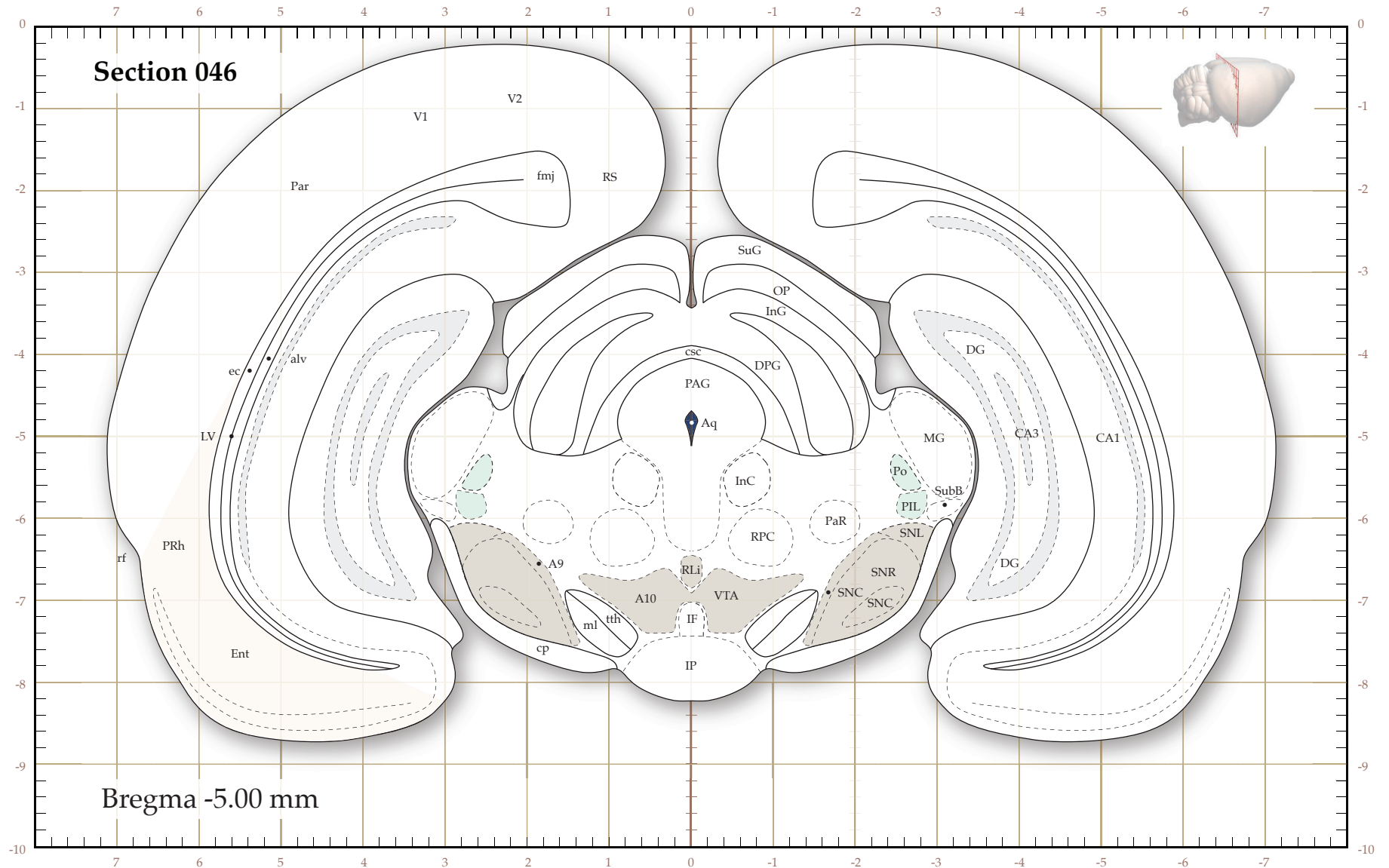


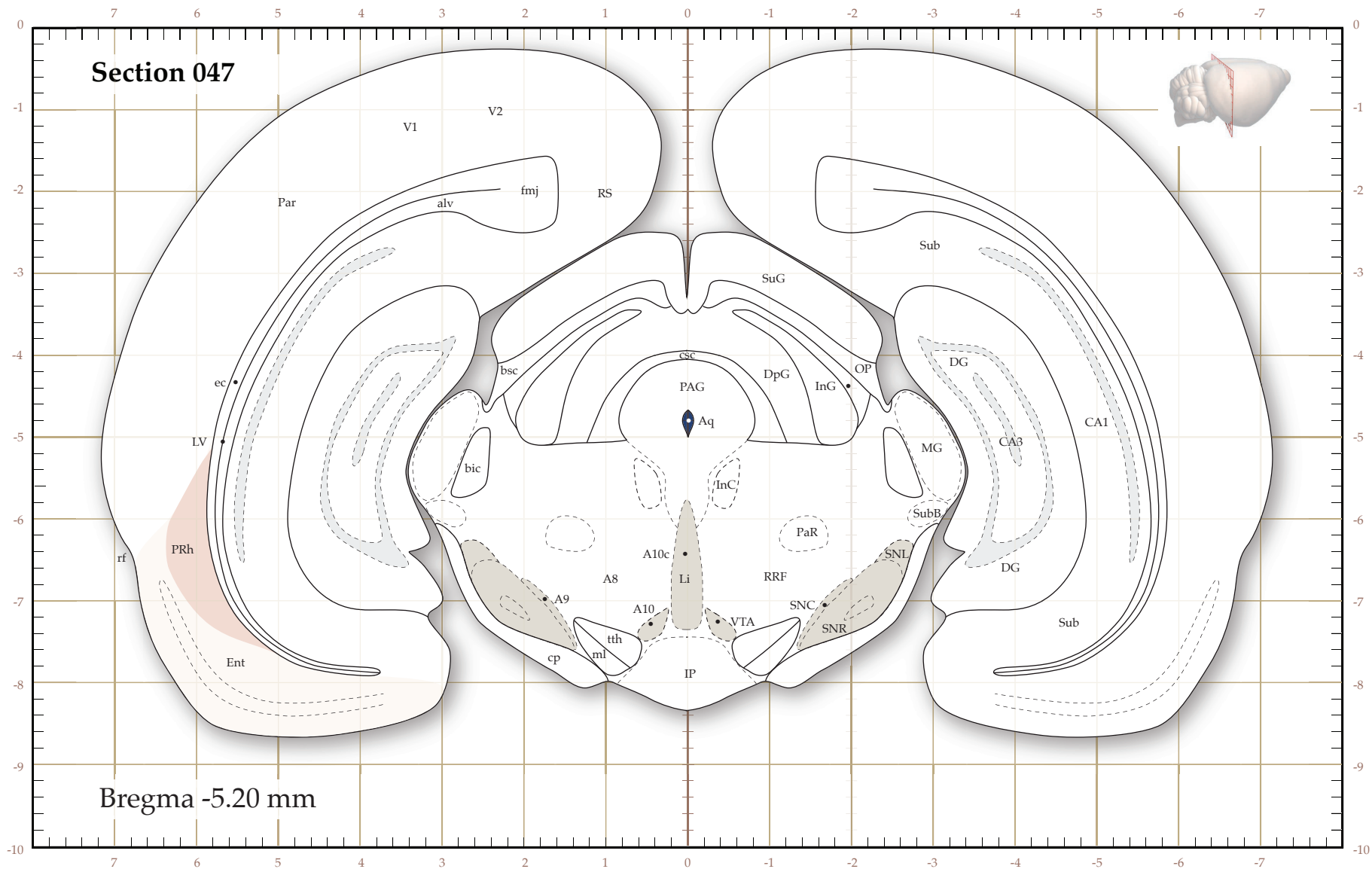
ant pretectal	APT	perirhinal cx	PRh	ventral tegmental area	VTA	CA3 field	CA3
cerebral peduncle	cp	primary visual	V1	fasciculus retroflexus	fr	dentate gyrus	DG
corpus callosum		primary visual 2	V2	geniculate nu		hypothalamus	
alveus hippocampus	alv	retrosple cortex	RS	medial geniculate nu	MG	mammillary ped	mp
cingulum	cg	dopamine		interfascicular nu	IF	lemniscus	
external capsule	ec	A9 dopamine cell gr	A9	interstit nu Cajal	InC	medial lemniscus	ml
forceps major	fmj	A10 dopamine cell gr	A10	interpeduncular nu	IP	optic	
cortex		rost linear raphe	RLi	hippocampus		nu of optic tract	OTn
entorhinal cortex	Ent	subst nigra compacta	SNC	CA1 field	CA1	periaqueduct gray	PAG
parietal cortex	Par	subst nigra lat	SNL				
		subst nigra retic	SNR				

red nu
 parabrual nu
 red nu parvicell
 rhinal fissure
 subbrachial nu
 superior colliculus
 commissure of sup colliculus
 deep gray
 intermediate gray layer
 optic n layer

PaR
 RPC
 rf
 SubB
 csc
 DpG
 InG
 OP
 superficial gray layer
 thalamus
 lateral posterior thal nu
 post intralam thal nu
 post thalamic nu
 trigeminothal tr
 ventricle
 aqueduct
 lateral ventricle

SuG
 LP
 PIL
 Po
 tth
 aq
 LV





cerebral peduncle
corpus callosum
 alveus hippocampus
 external capsule
 forceps major
cortex
 entorhinal cortex
 parietal cortex
 perirhinal cx

cp primary visual
alv primary visual 2
ec retrosple cortex
fmj *dopamine*
 A8 dopamine cell gr
 A9 dopamine cell gr
 A10 dopamine cell gr
Ent caudal A10 dopamine cell gr
Par linear raphe
PRh

V1 subst nigra compacta
V2 subst nigra lat
RS subst nigra retic
 ventral tegmental area
A8 *geniculate nu*
A9 medial geniculate nu
A10 *inferior colliculus*
A10c brachium inf coll
Li interstit nu Cajal
 interpeduncular nu

SNC *hippocampus*
SNL CA1 field
SNR CA3 field
VTA dentate gyrus

MG *lemniscus*
 medial lemniscus

bic periaqueduct gray
InC *red nu*
 pararubral nu
IP red nu magnocell

CA1
CA3
DG

ml
PAG

PaR
RMC

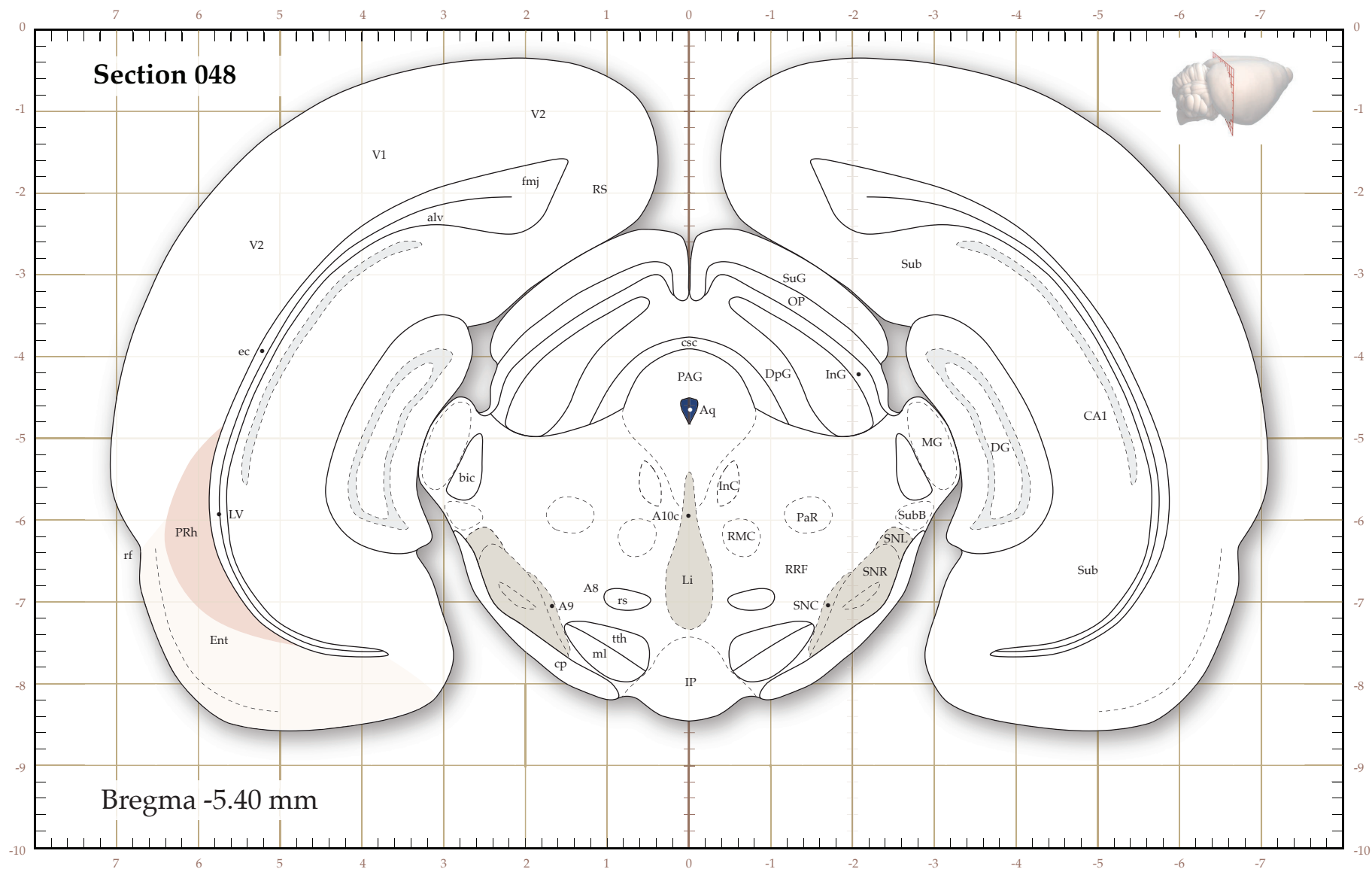
retrorubral field
 rubro spinal tract
 rhinal fissure
 subbrachial nu
 subiculum
superior colliculus
 brachium sup coll
 commissure of sup colliculus
 deep gray
 intermediate gray layer

RRF optic n layer
rs superficial gray layer
rf trigeminothal tr
SubB *ventricle*
Sub aqueduct
 lateral ventricle

OP
SuG
tth

aq
LV

bsc
csc
DpG
InG

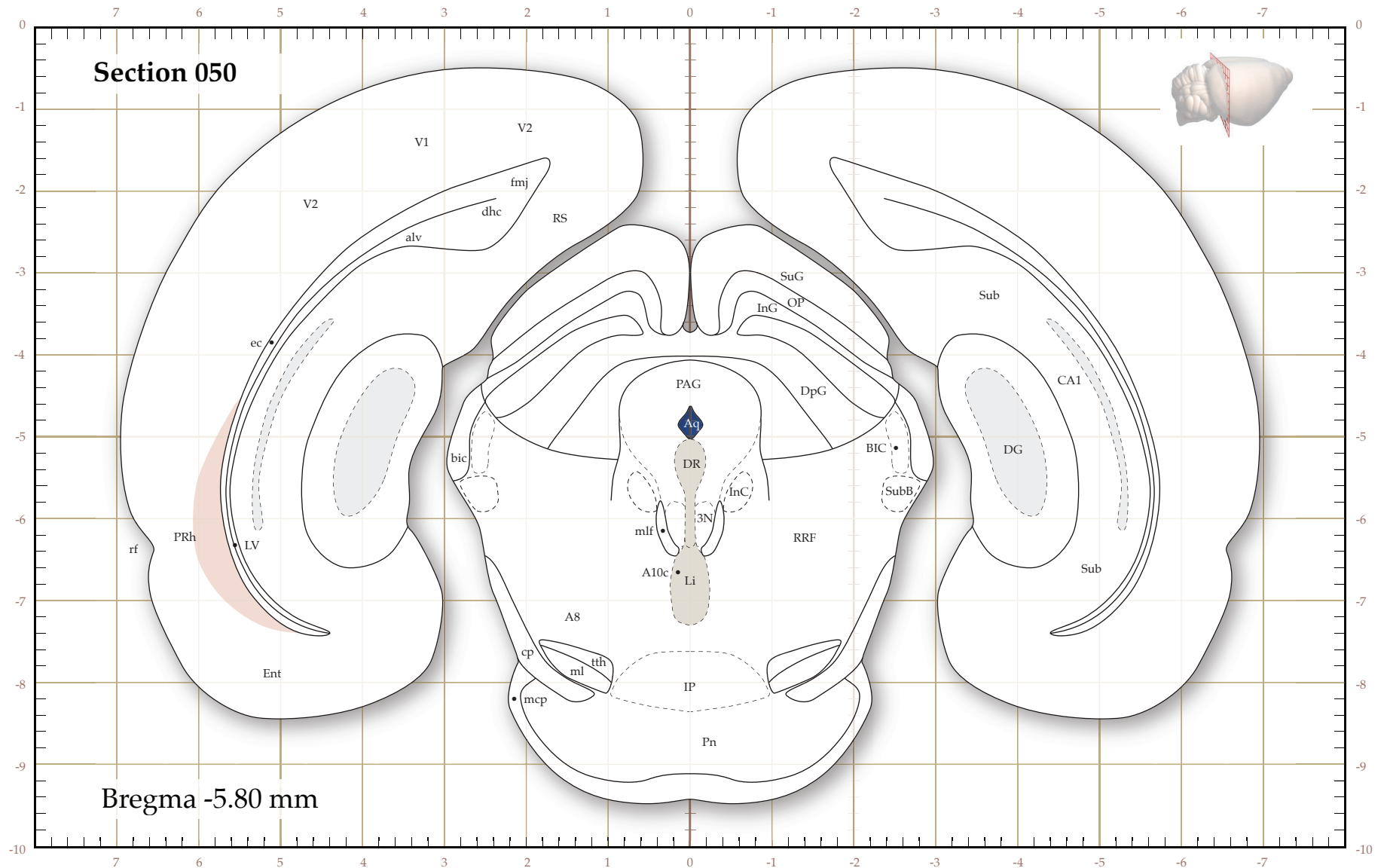


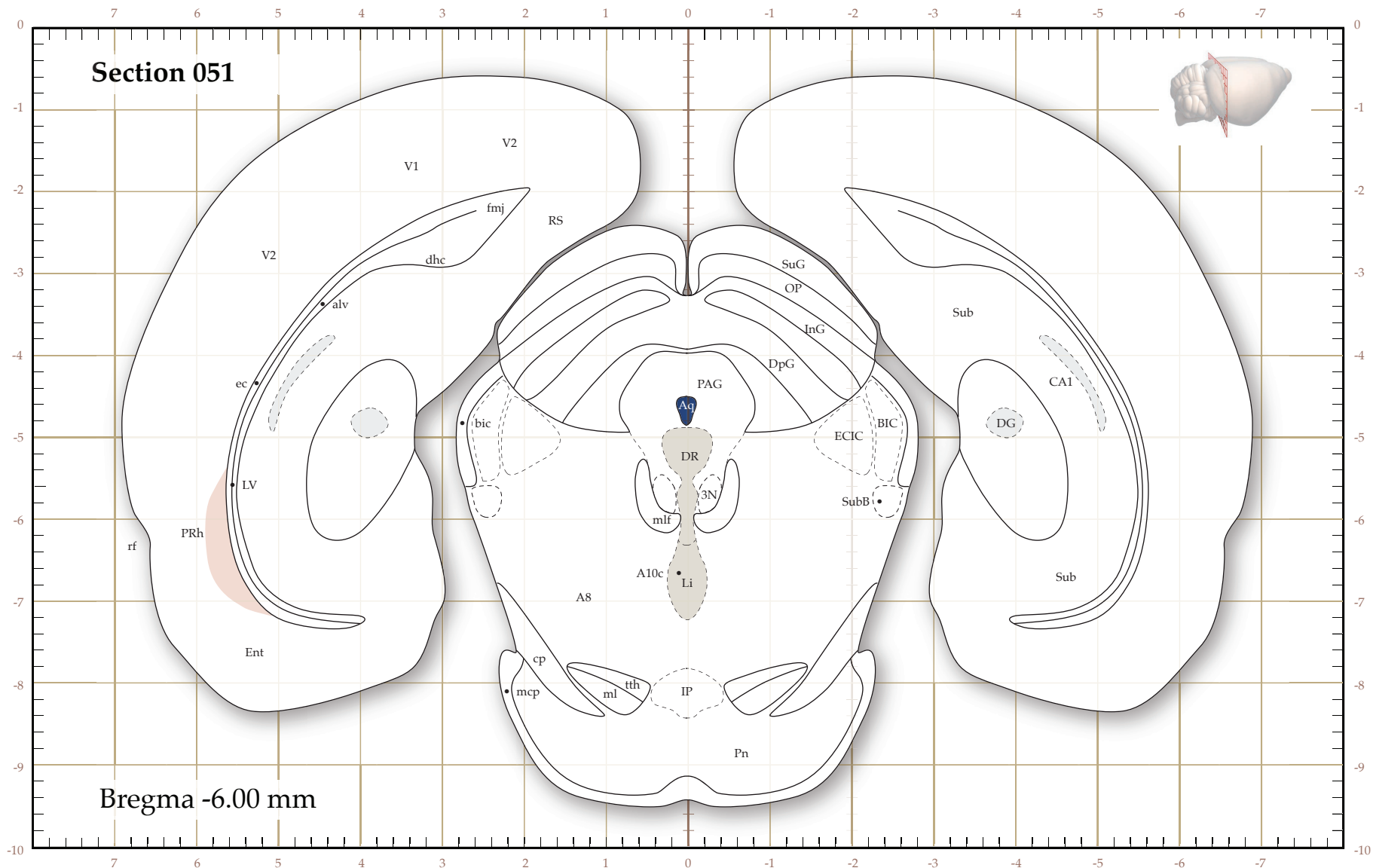
red nu
retrotrubral field
rubro spinal tract
rhinal fissure
subbrachial nu
subiculum
superior colliculus
deep gray
intermediate gray layer

RRF optic n layer
rs superficial gray layer
rf trigeminothal tr
SubB *ventricle*
Sub aqueduct
DpG lateral ventricle
InG

OP
SuG
tth

aq
LV





cerebral peduncle

corpus callosum

alveus hippocampus
dorsal hipp comm
external capsule
forceps major

cortex

entorhinal cortex
perirhinal cx
primary visual

cp

alv
dhc
ec
fmj

Ent
PRh
V1

primary visual 2
retrosple cortex

dopamine

A8 dopamine cell gr
caudal A10 dopamine cell gr
dorsal raphe nu
linear raphe

inferior colliculus

brachium inf coll
ext ctx inf coll

V2

RS

A8
A10c
DR
Li

bic
ECIC

nu brachium inf coll

interpeduncular nu

hippocampus

CA1 field
dentate gyrus

lemniscus

medial lemniscus

med long fasc

mid cerebellar ped

BIC

IP

CA1
DG

ml
mlf
mcp

motor root of trig nerve

oculomotor nu

pedunculopontine tegmental nu

periaqueduct gray

pontine nuclei

rhinal fissure

subbrachial nu

subiculum

m5

3N

PPT

PAG

Pn

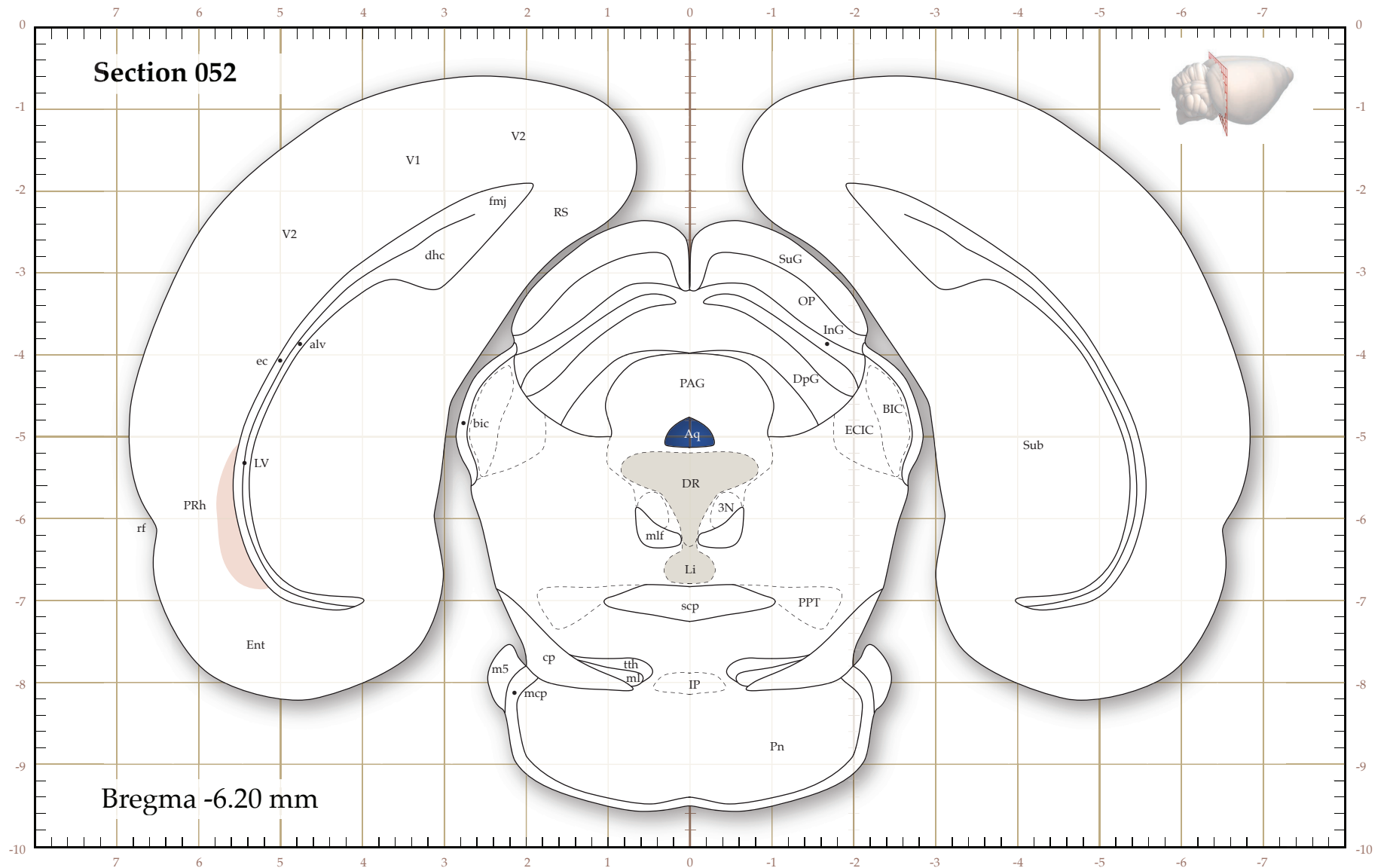
rf

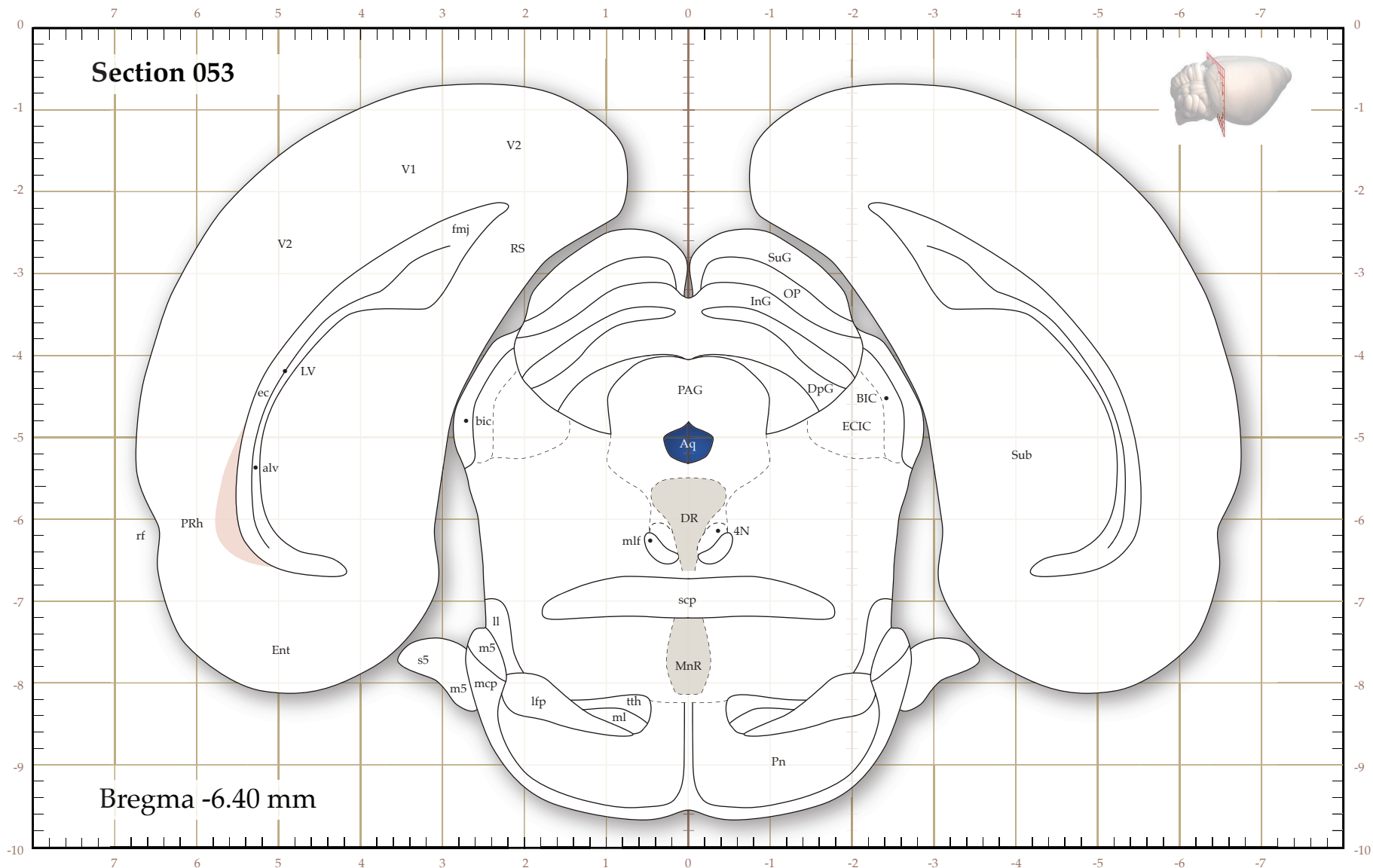
SubB

Sub

superior colliculus
 deep gray
 intermediate gray layer
 optic n layer
 sup coll peduncle
 superficial gray layer
trigeminothal tr
ventricle
 aqueduct
 lateral ventricle

DpG
 InG
 OP
 scp
 SuG
 tth
 aq
 LV





corpus callosum
 alveus hippocampus
 dorsal hipp comm
 external capsule
 forceps major

cortex
 entorhinal cortex
 perirhinal cx
 primary visual
 primary visual 2
 retrosple cortex

alv
dhc
ec
fmj

Ent
PRh
V1
V2
RS

dopamine
 dorsal raphe nu
 median raphe nu
inferior colliculus
 brachium inf coll
 central nu
 comm of inf coll
 ext ctx inf coll
 nu brachium inf coll

DR
MnR

bic
CIC
cic
ECIC
BIC

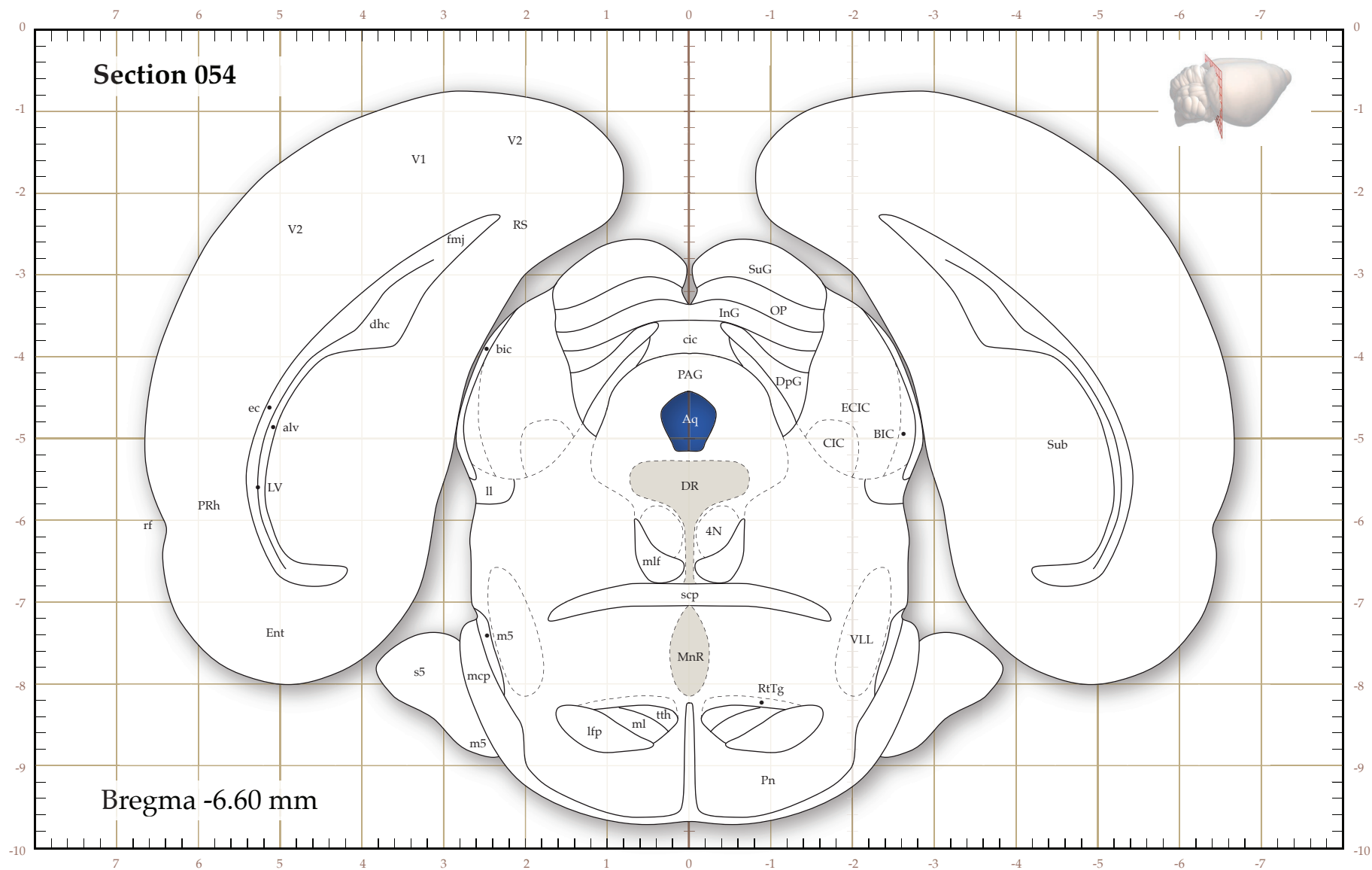
lemniscus
 lat lemniscus
 medial lemniscus
 ventral nu lat lemniscus
 long fasc pons
 med long fasc
 mid cerebellar ped
 motor root of trig nerve
 periaqueduct gray

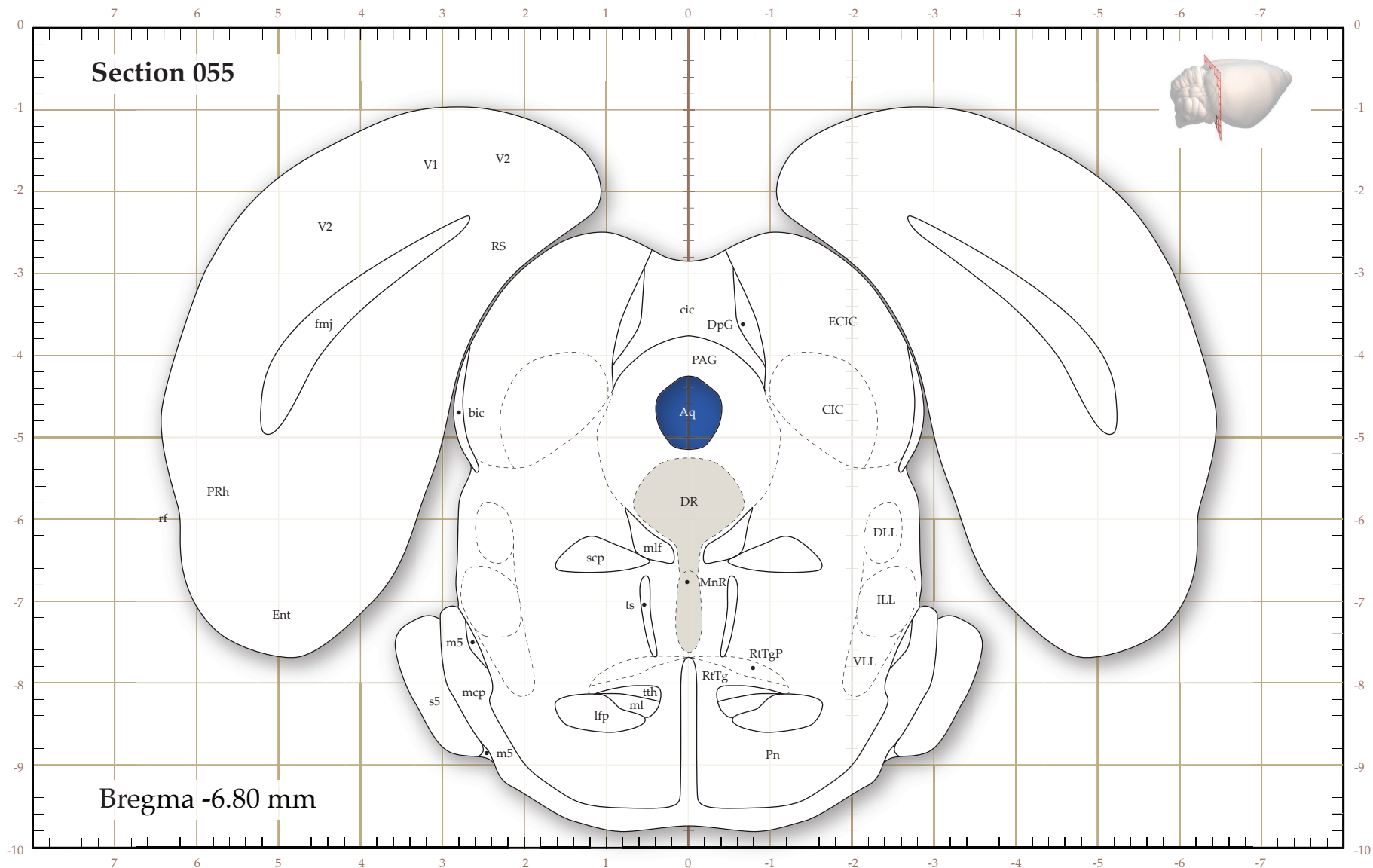
ll
ml
VLL
lfp
mlf
mcp
m5
PAG

pontine nuclei
 reticulotegmental
 reticulotegmental
 rhinal fissure
 sensory root of trig nerve
 subiculum
superior colliculus
 deep gray
 intermediate gray layer

Pn
RtTg
rf
s5
Sub
DpG
InG

optic n layer	OP
sup coll peduncle	scp
superficial gray layer	SuG
trigeminothal tr	tth
trochlear nu	4N
<i>ventricle</i>	
aqueduct	aq
lateral ventricle	LV





corpus callosum
forceps major

cortex
entorhinal cortex
perirhinal cx
primary visual
primary visual 2
retrosple cortex

fmj

Ent
PRh
V1
V2
RS

dopamine

A7 noradr cell gr
dorsal raphe nu
median raphe nu
inferior colliculus
brachium inf coll
central nu
comm of inf coll
dorsal ctx inf coll
ext ctx inf coll

A7
DR
MnR

bic
CIC
cic
DCIC
ECIC

lemniscus

dorsal nu lat lemn
intermediate nu lat lemn
medial lemniscus
ventral nu lat lemniscus
long fasc pons
med long fasc
mid cerebellar ped
motor root of trig nerve

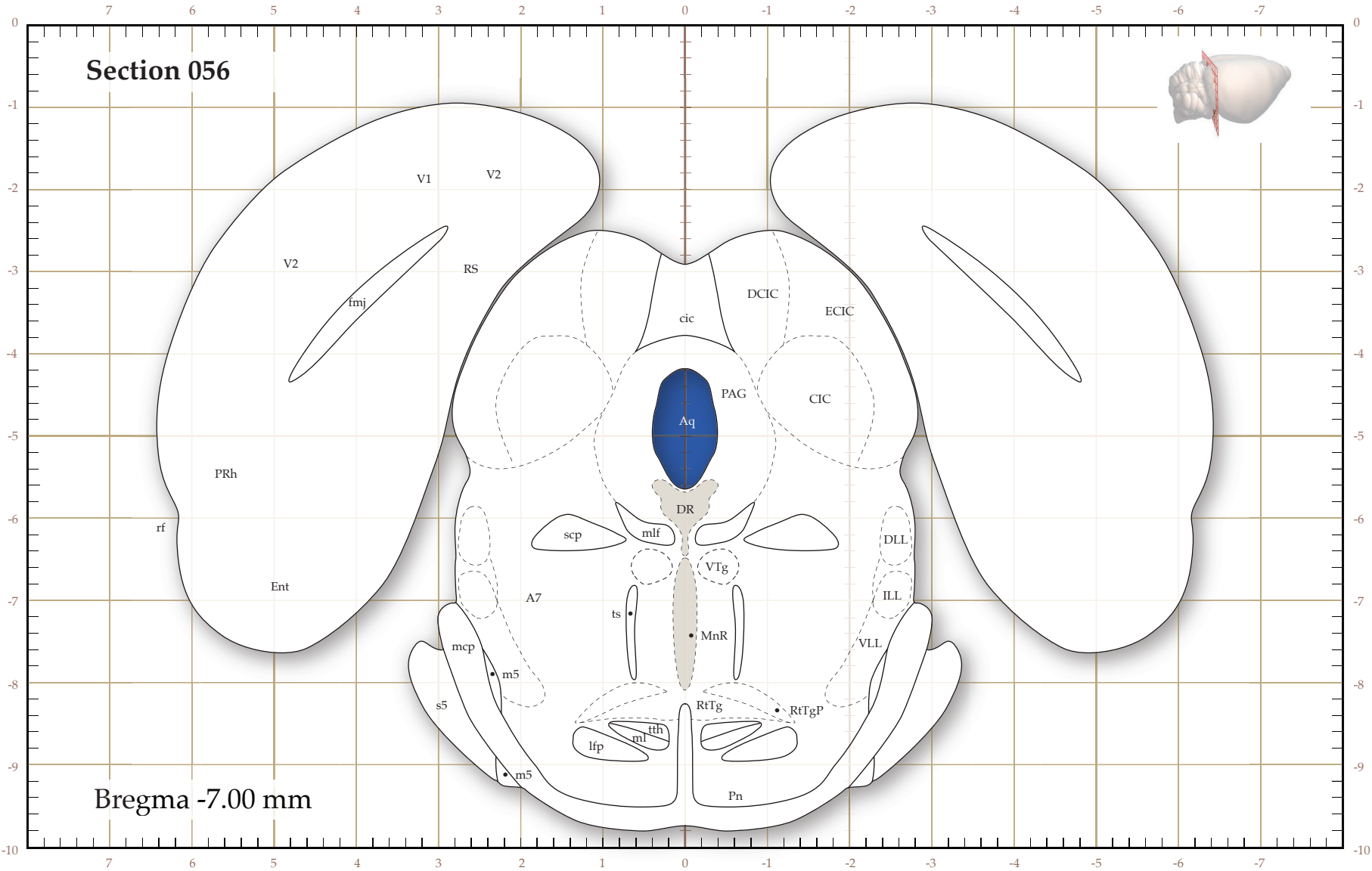
DLL
ILL
ml
VLL
lfp
mlf
mcp
m5

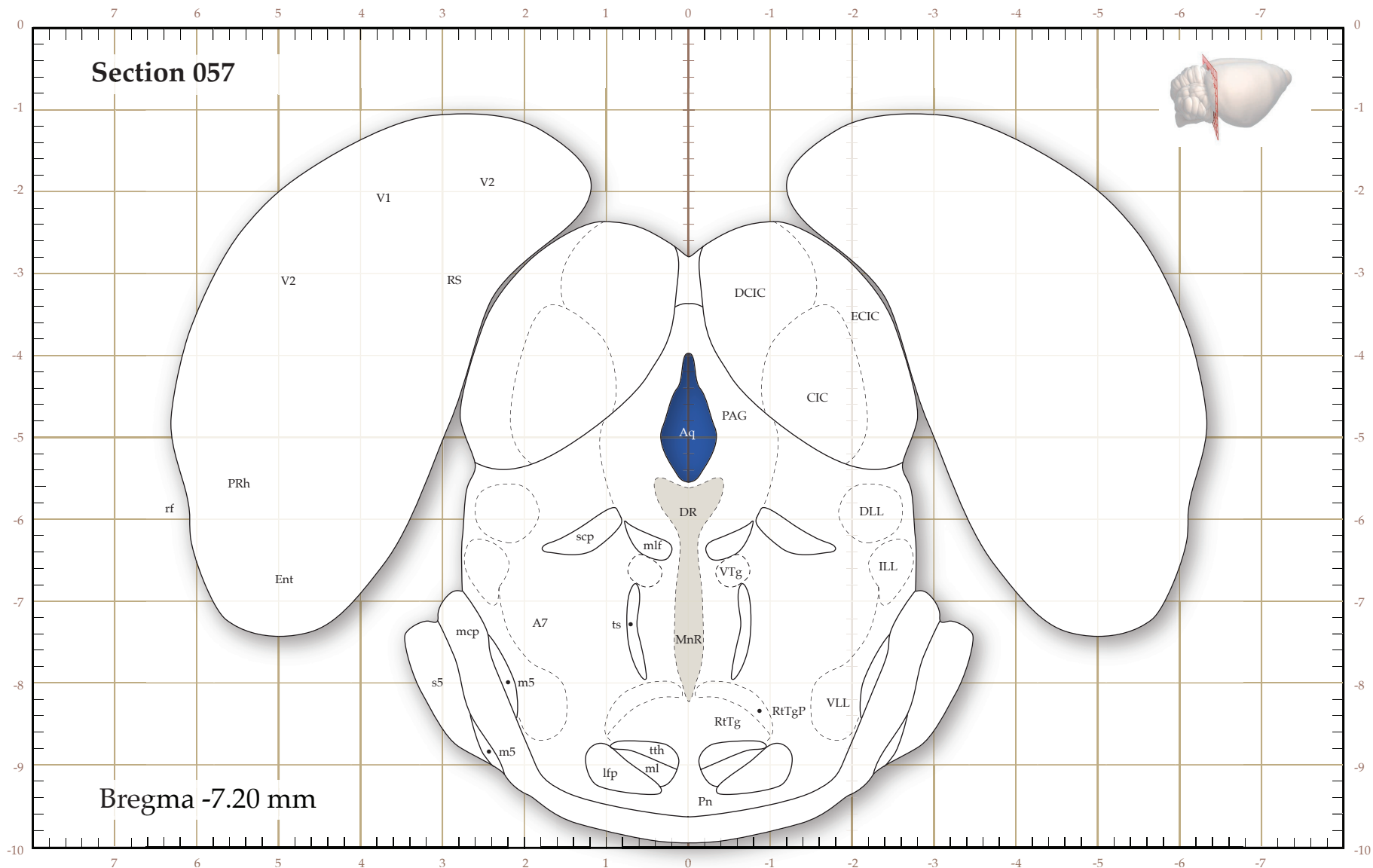
periaqueduct gray
pontine nuclei
reticulotegmental
reticulotegmental
reticulotegmental pericen
rhinal fissure
sensory root of trig nerve
superior colliculus
deep gray
sup coll peduncle

PAG
Pn
RtTg
RtTgP
rf
s5
DpG
scp

tectospinal tract
trigeminothal tr
ventral tegm nu
ventricle
aqueduct

ts
tth
VTg
aq





cortex

entorhinal cortex
perirhinal cx
primary visual
primary visual 2
retrosple cortex

dopamine

A7 noradr cell gr
dorsal raphe nu
median raphe nu

Ent

PRh

V1

V2

RS

A7

DR

MnR

inferior colliculus

central nu
dorsal ctx inf coll
ext ctx inf coll

lemniscus

dorsal nu lat lemn
intermediate nu lat lemn
medial lemniscus
ventral nu lat lemniscus
long fasc pons

CIC

DCIC

ECIC

DLL

ILL

ml

VLL

lfp

med long fasc

mid cerebellar ped

motor root of trig nerve

periaqueduct gray

pontine nuclei

reticulotegmental

reticulotegmental

reticulotegmental pericen

rhinal fissure

mlf

mcp

m5

PAG

Pn

RtTg

RtTgP

rf

sensory root of trig nerve

superior colliculus

sup coll peduncle

tectospinal tract

trigeminothal tr

ventral tegm nu

ventricle

aqueduct

s5

scp

ts

tth

VTg

aq

cortex

entorhinal cortex
perirhinal cx
primary visual
primary visual 2
retrosple cortex

dopamine

A7 noradr cell gr
dorsal raphe nu
median raphe nu

Ent
PRh
V1
V2
RS

A7
DR
MnR

dorsal tegm nu
inferior colliculus
central nu
dorsal ctx inf coll
ext ctx inf coll
lemniscus
dorsal nu lat lemn
intermediate nu lat lemn
medial lemniscus
ventral nu lat lemniscus

DTg

CIC
DCIC
ECIC

DLL
ILL
ml
VLL

long fasc pons
med long fasc
mid cerebellar ped
motor root of trig nerve
periaqueduct gray
pontine nuclei
reticulotegmental
reticulotegmental
reticulotegmental pericen

lfP
mlf
mcp
m5
PAG
Pn

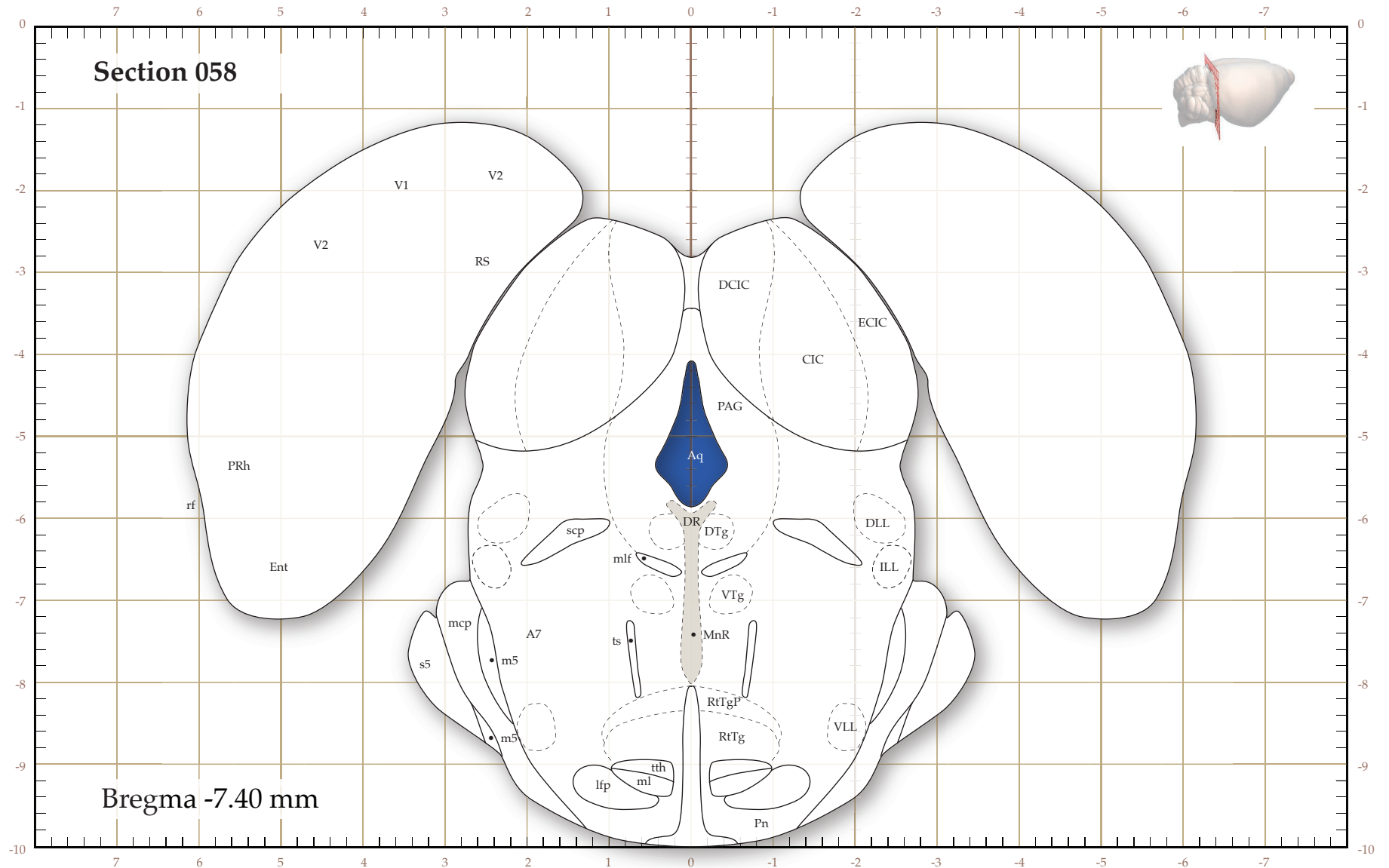
RtTg
RtTgP

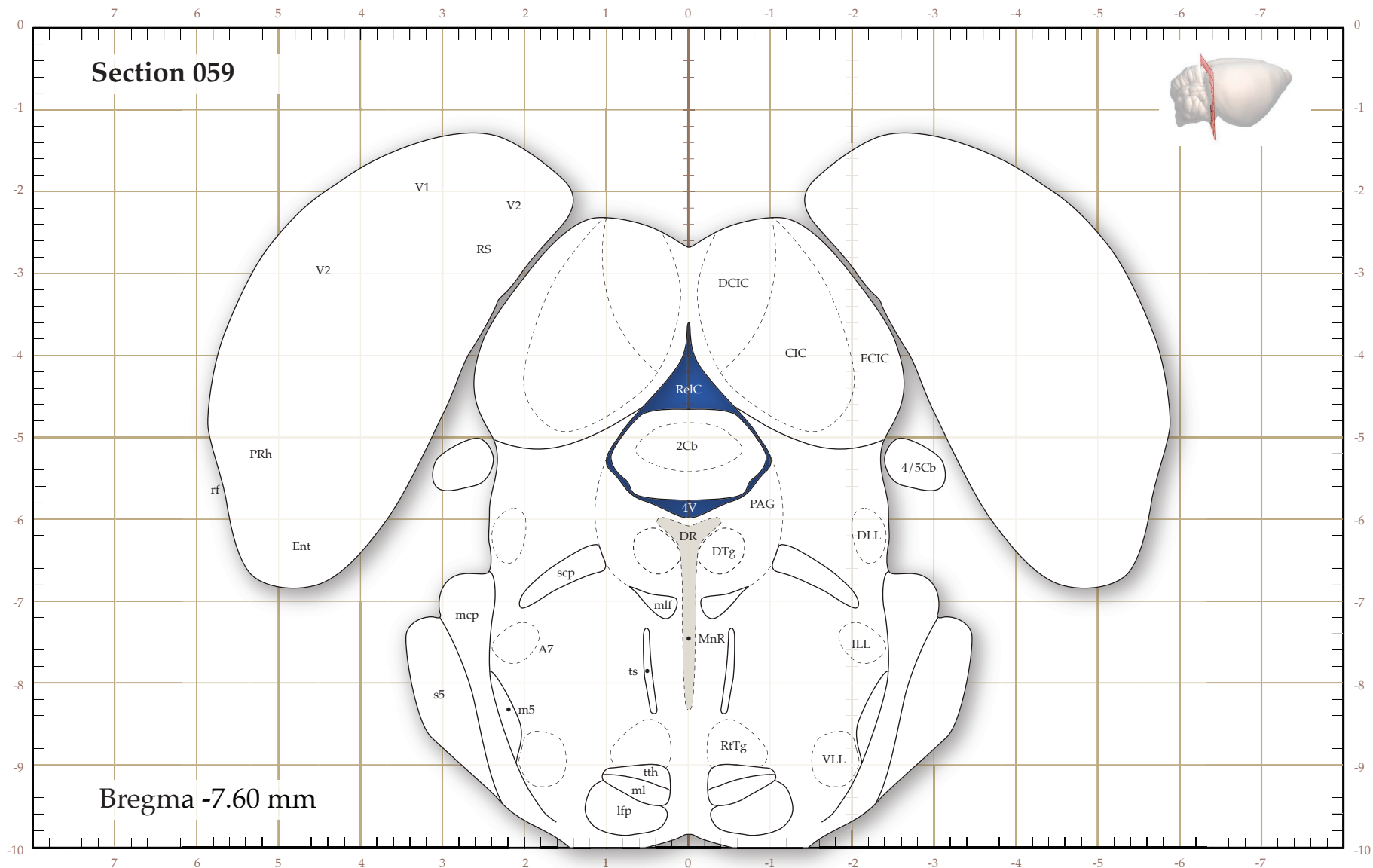
rhinal fissure
sensory root of trig nerve
superior colliculus
sup coll peduncle
tectospinal tract
trigeminothal tr
ventral tegm nu
ventricle
aqueduct

rf
s5

scp
ts
tth
VTg

aq





cerebellar lobes
 2nd Cb lobs
 4th & 5th Cb lobs

cortex
 entorhinal cortex
 perirhinal cx
 primary visual
 primary visual 2
 retrosple cortex

dopamine
 A7 noradr cell gr

2Cb
4/5Cb

Ent
PRh
V1
V2
RS

A7

dorsal raphe nu
 median raphe nu

dorsal tegm nu

inferior colliculus
 central nu
 dorsal ctx inf coll
 ext ctx inf coll

lemniscus
 dorsal nu lat lemn
 intermediate nu lat lemn

DR
MnR
DTg

CIC
DCIC
ECIC

DLL
ILL

medial lemniscus
 ventral nu lat lemniscus

long fasc pons
 med long fasc

mid cerebellar ped
 motor root of trig nerve
 periaqueduct gray
reticulotegmental
 reticulotegmental

ml
VLL
lfp
mlf
mcp
m5
PAG
RtTg

rhinal fissure
 sensory root of trig nerve

superior colliculus
 sup coll peduncle

tectospinal tract
 trigeminothal tr

ventricle
 4th ventricle
 recess of inf coll

rf
s5
scp
ts
tth

4V
RelC

cerebellar lobes
 2nd Cb lob
 2nd & 3rd Cb lob
 3rd Cb lob
 4th & 5th Cb lob

cortex
 entorhinal cortex
 perirhinal cx
 primary visual
 primary visual 2
 retrosple cortex

2Cb
2/3Cb
3Cb
4/5Cb

Ent
PRh
V1
V2
RS

dopamine
 dorsal raphe nu
 dorsal tegm nu
inferior colliculus
 central nu
 dorsal ctx inf coll
 ext ctx inf coll
lemniscus
 medial lemniscus
 long fasc pons

DR
DTg

CIC
DCIC
ECIC

ml
lfp

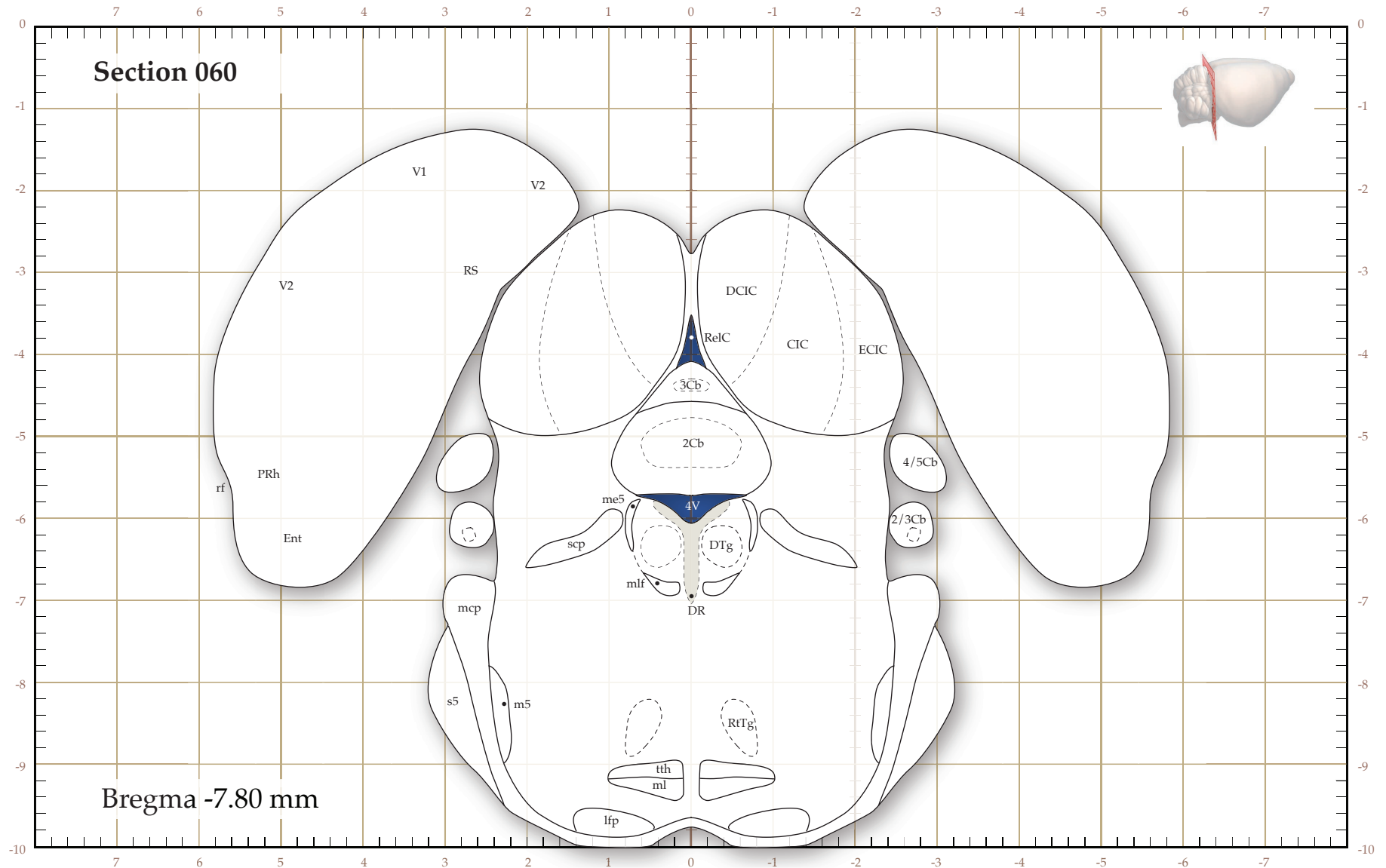
mesencephalic trigeminal tract
 med long fasc
 mid cerebellar ped
 motor root of trig nerve
reticulotegmental
 reticulotegmental
 rhinal fissure
 sensory root of trig nerve

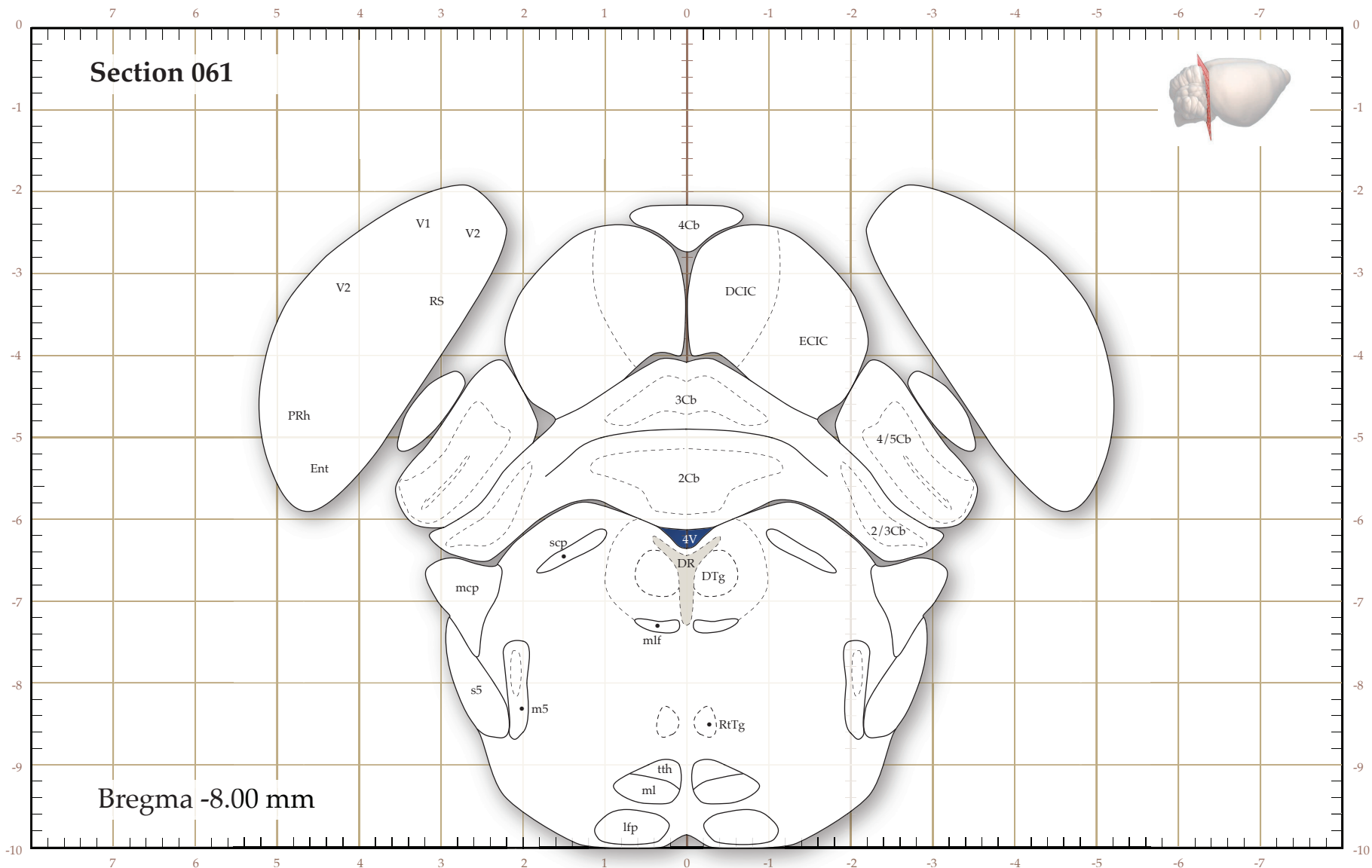
me5
mlf
mcp
m5

RtTg
rf
s5

superior colliculus
 sup coll peduncle
 trigeminothal tr
ventricle
 4th ventricle
 recess of inf coll

scp
tth
4V
RelC





cerebellar lobes

2nd Cb lob
2nd & 3rd Cb lob
3rd Cb lob
4th Cb lob
4th & 5th Cb lob

cortex

entorhinal cortex
perirhinal cx
primary visual
primary visual 2

2Cb
2/3Cb
3Cb
4Cb
4/5Cb

Ent
PRh
V1
V2

retrosple cortex

dopamine
dorsal raphe nu
dorsal tegm nu
inferior colliculus
dorsal ctx inf coll
ext ctx inf coll
lemniscus
medial lemniscus
long fasc pons

RS

DR
DTg

DCIC
ECIC

ml
lfp

med long fasc
mid cerebellar ped
motor root of trig nerve
reticulotegmental
reticulotegmental
sensory root of trig nerve
superior colliculus
sup coll peduncle
trigeminothal tr

mlf

mcp

m5

RtTg

s5

scp

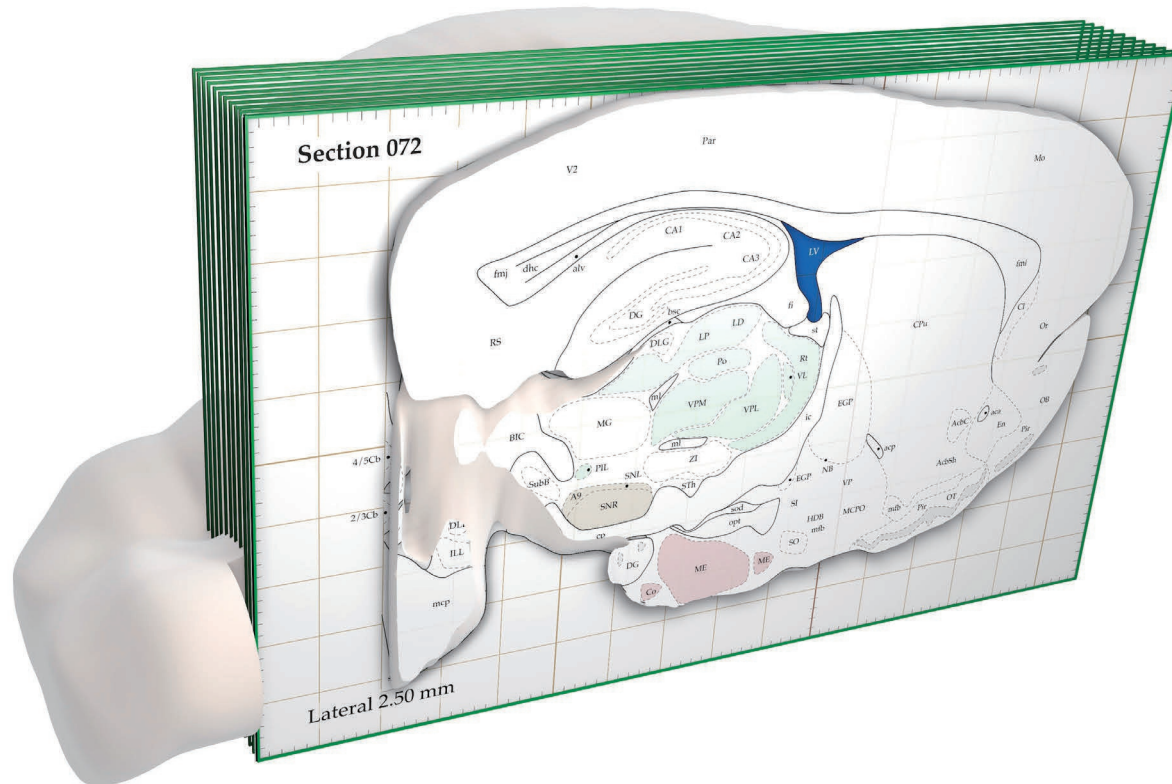
tth

ventricle

4th ventricle

4V

Sagittal sections



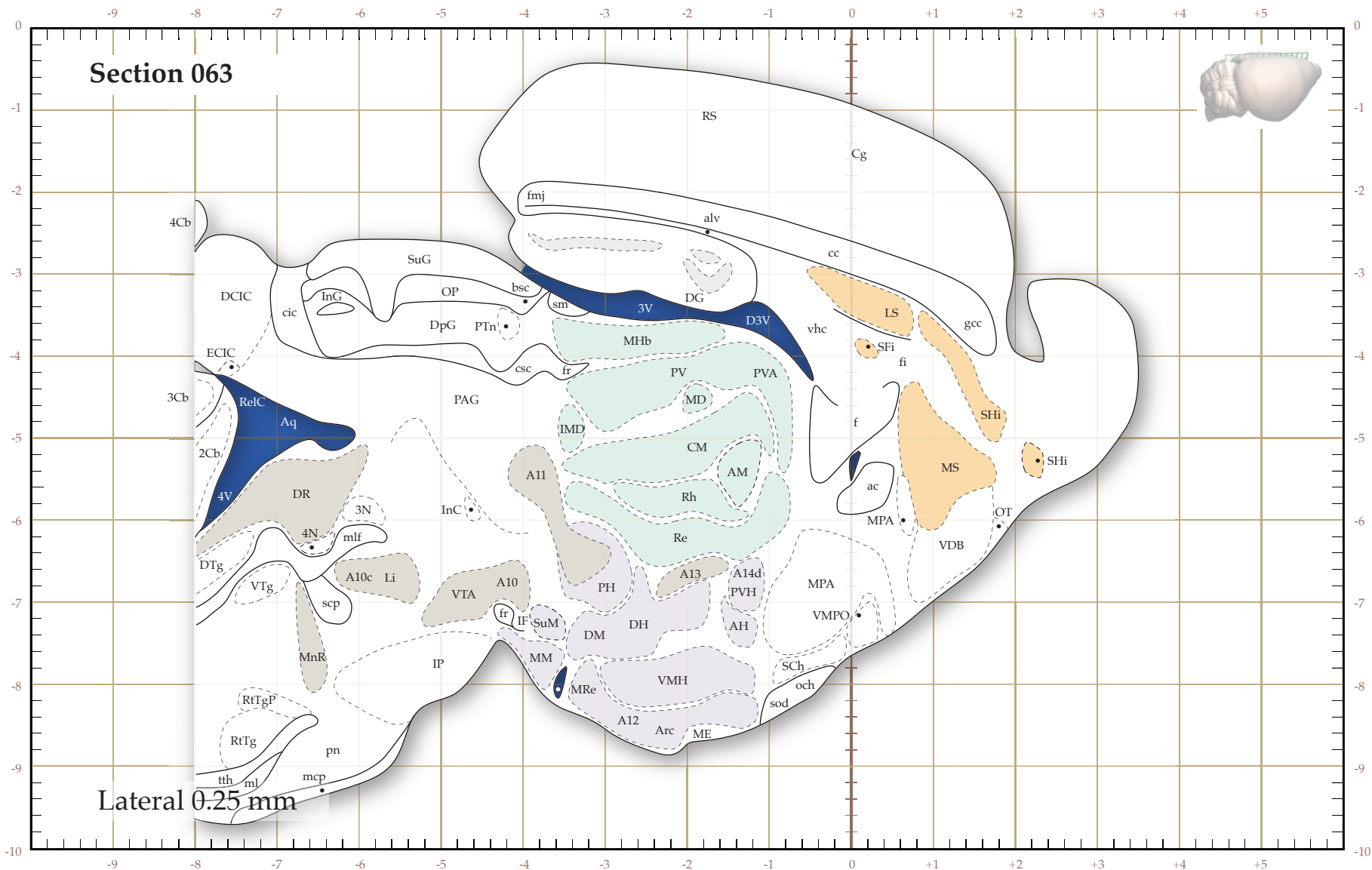
olfactory tubercle
 periaqueduct gray
preoptic area
 medial preoptic area
 ventromed preopt area
 pretectal nu
 pontine nuclei
 posterior commissure
reticulotegmental
 reticulotegmental
 reticulotegmental pericen

OT septum
PAG lateral septum
 medial septum
 septofimbrial nu
MPA septohipp nu
VMPO subfornical organ
PTn suprachiasmatic nu
Pn *superior colliculus*
pc brachium sup coll
 commissure of sup colliculus
RtTg deep gray
RtTgP intermediate gray layer

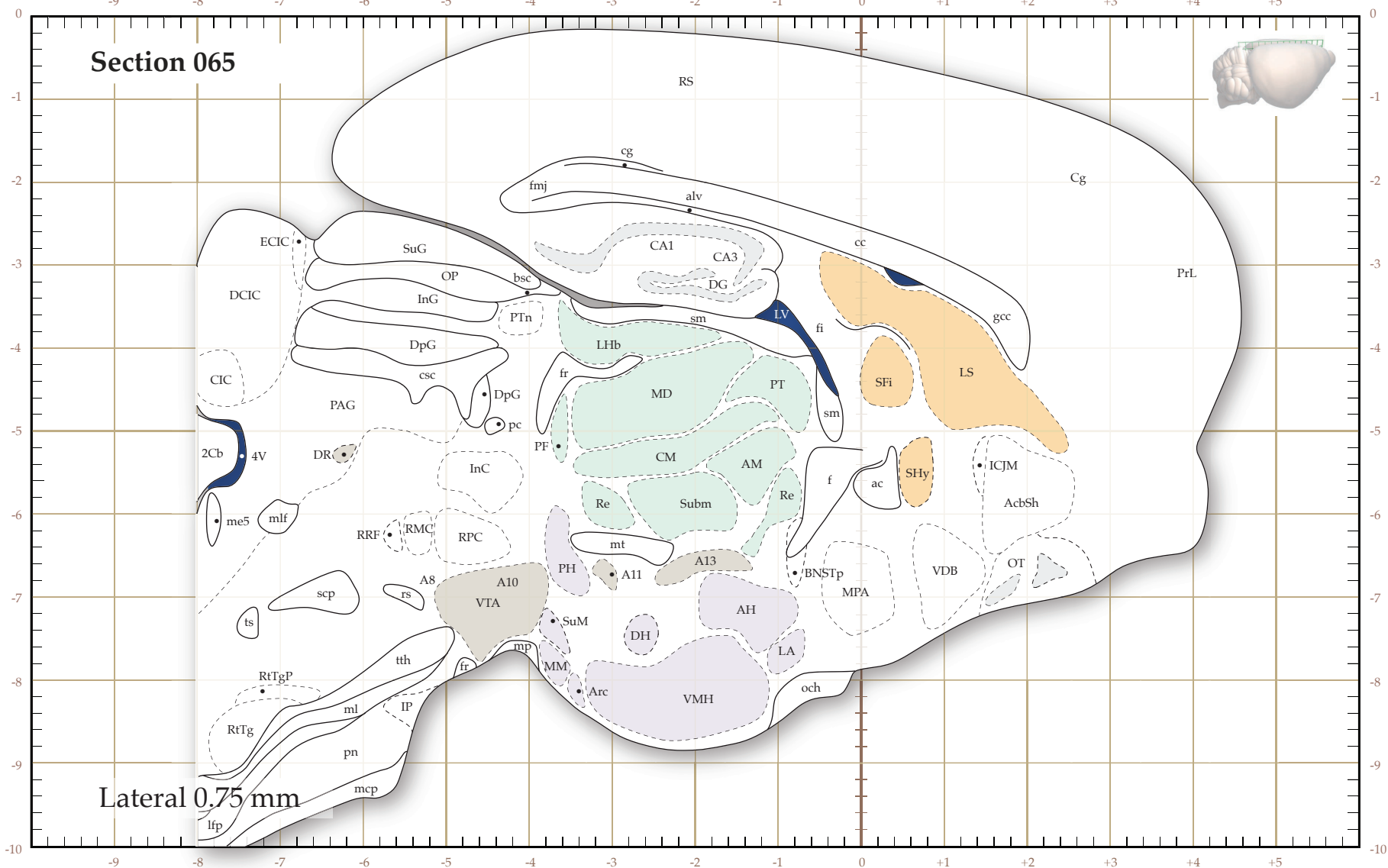
LS optic n layer
MS sup coll peduncle
SFi superficial gray layer
thalamus
SHi anteromedial thal nu
SFO centralmedial thal nu
SCh intermediodors nu
 med habenular nu
 mediodorsal thal nu
 paraventricular thal nu
 paraventricular thal nu ant
 reunions th nu

OP rhomboid thal nu
scp stria medullaris thal
SuG trigeminothal tr
 trochlear nu
ventricle
AM aqueduct
CM 3rd ventricle
IMD 4th ventricle
MHb dorsal third ventricle
MD mamm recess 3V
PV recess of inf coll
PVA
Re

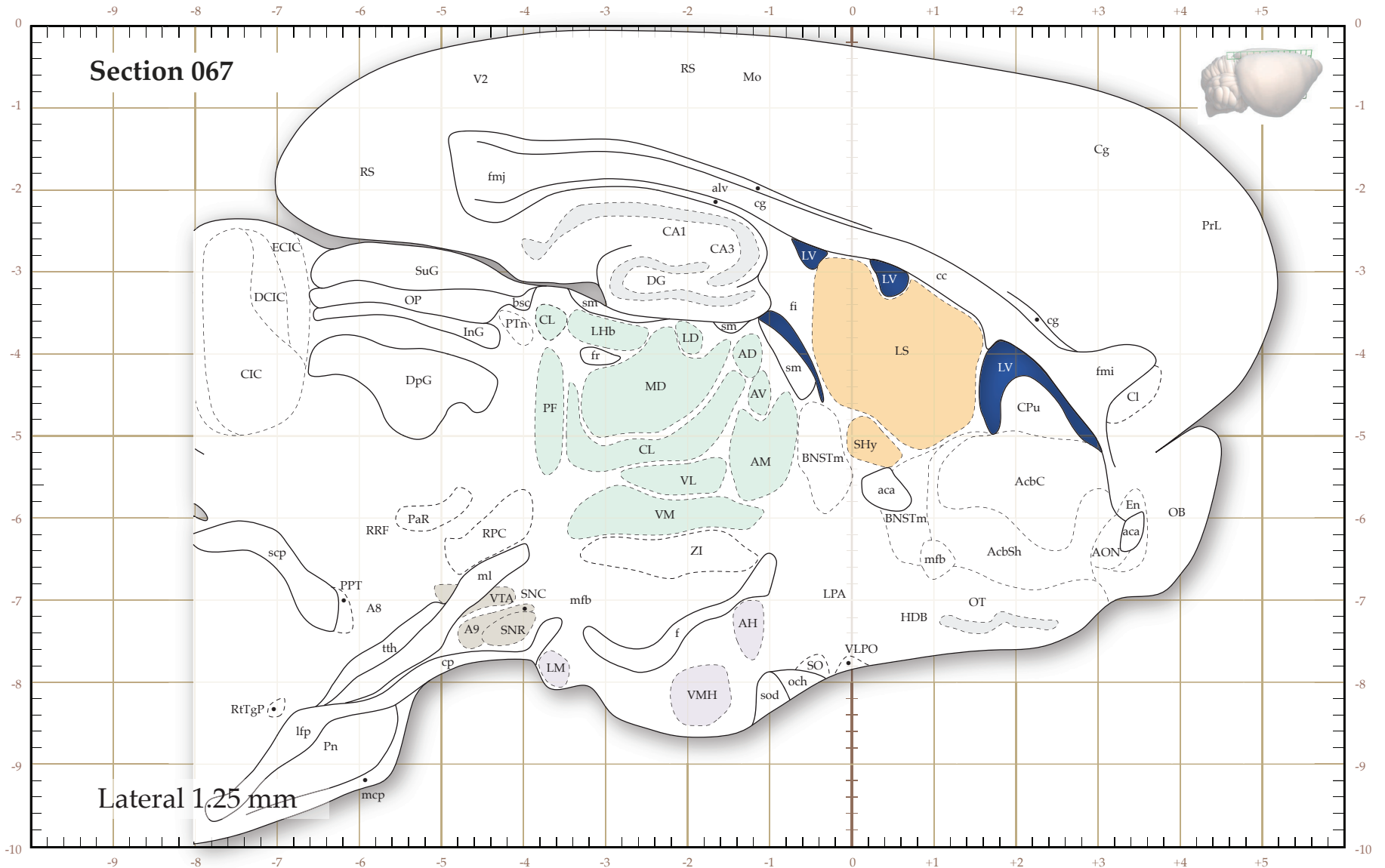
Rh
sm
tth
4N
aq
3V
4V
D3V
MRe
RelC

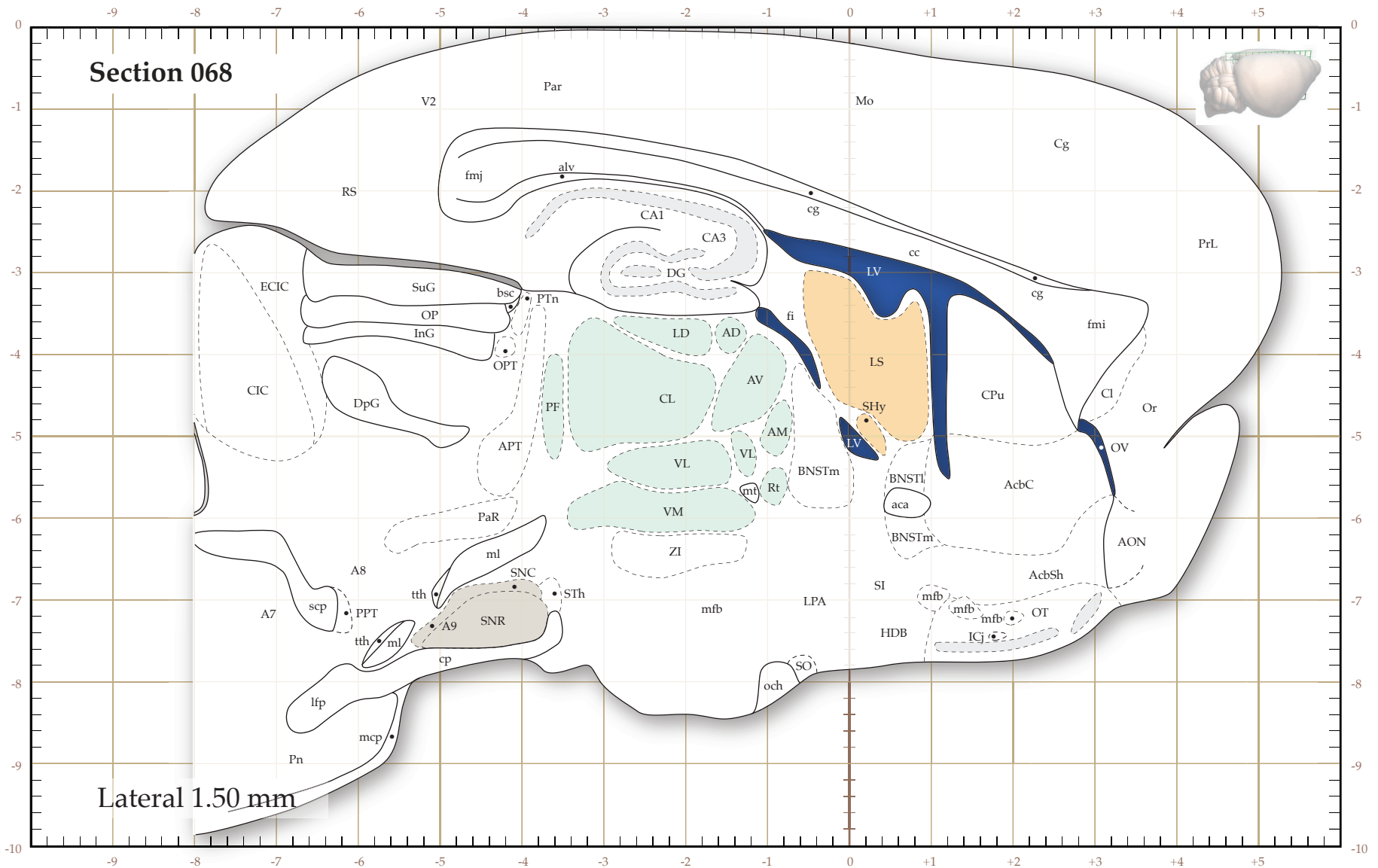


long fasc pons	lfp	pretectal nu	PTn	<i>septum</i>		superficial gray layer	SuG	rhomboid thal nu	Rh
mesencephalic trigeminal tract	me5	pontine nuclei	Pn	lateral septum	LS	tectospinal tract	ts	stria medullaris thal	sm
med long fasc	mlf	posterior commissure	pc	paralambdoid septal nu	PLD	<i>thalamus</i>		submedius th nu	Subm
mid cerebellar ped	mcp	<i>red nu</i>		septofimbrial nu	SFi	anteriomedial thal nu	AM	trigeminothal tr	tth
<i>optic</i>		red nu magnocell	RMC	<i>striatum</i>	BNSTp	centralmedial thal nu	CM	trochlear nu	4N
optic chiasm	och	red nu parvicell	RPC	bed nu of ST post		lat habenular nu	LHb		
olfactory tubercle	OT	retrotrubral field	RRF	<i>superior colliculus</i>	bsc	mammillothalamic tract	mt	<i>ventricle</i>	
periaqueduct gray	PAG	rubro spinal tract	rs	brachium sup coll	csc	med habenular nu	MHb	3rd ventricle	3V
<i>preoptic area</i>		<i>reticulotegmental</i>		commissure of sup colliculus	DpG	mediodorsal thal nu	MD	4th ventricle	4V
medial preoptic area	MPA	reticulotegmental pericen	RtTg	deep gray	InG	parafasc th nu	PF	lateral ventricle	LV
ventromed preopt area	VMPO		RtTgP	intermediate gray layer	OP	paratenial th nu	PT	mamm recess 3V	MRe
				optic n layer	scp	reuniens th nu	Re	recess of inf coll	RelC



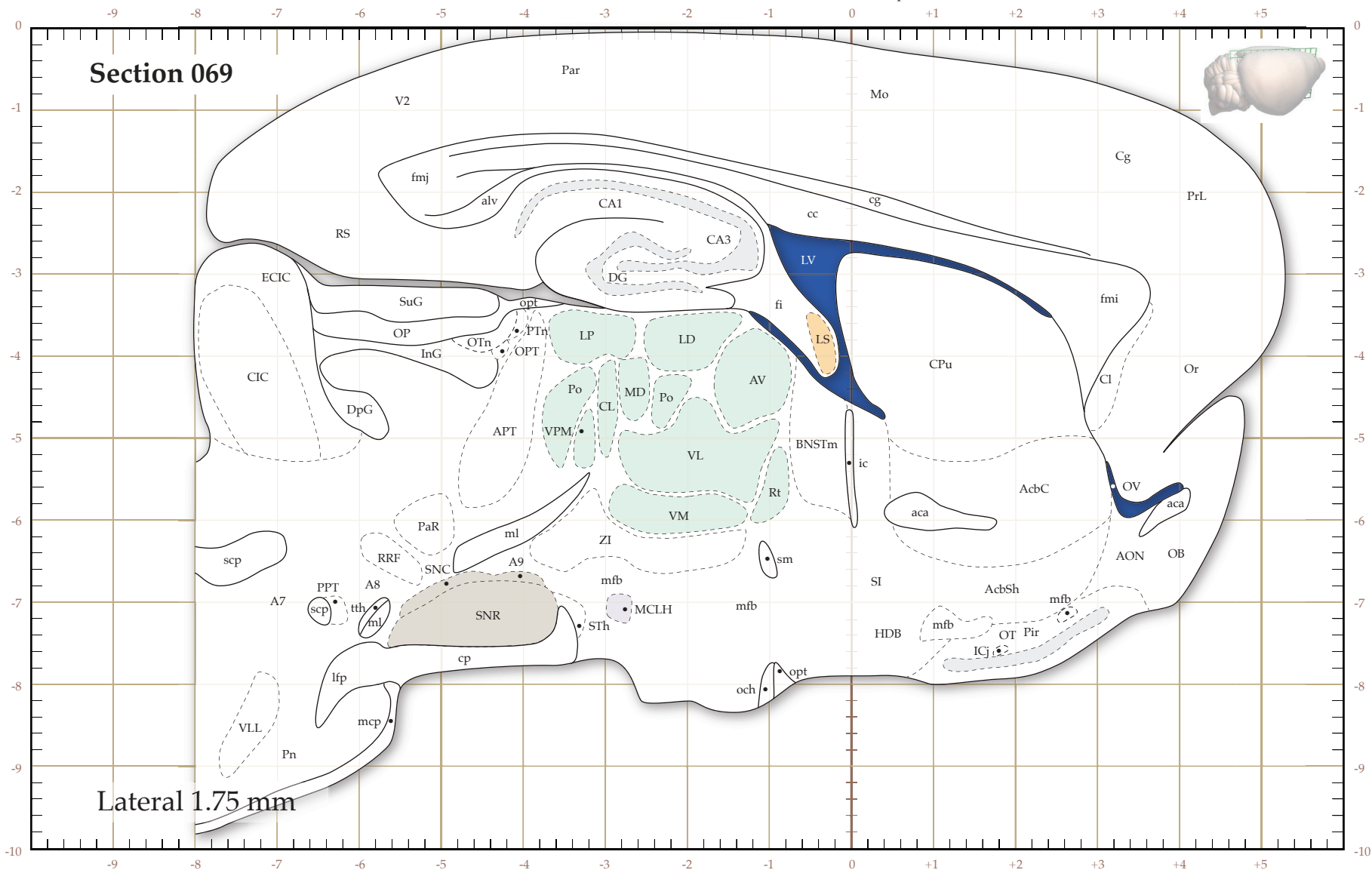
<i>optic</i>		<i>red nu</i>		<i>striatum</i>		<i>superficial gray layer</i>		<i>paratenial th nu</i>	PT
optic chiasm	och	pararubral nu	PaR	bed nu of ST med	BNSTm	<i>thalamus</i>	SuG	reuniens th nu	Re
supraoptic decussation	sod	red nu parvicell	RPC	bed nu of ST post	BNSTp	anteriordors th nu	AD	stria medullaris thal	sm
olfactory tubercle	OT	retrosubthal field	RRF	caudate putamen	CPu	anteriomedial thal nu	AM	submedius th nu	Subm
pedunculopontine tegmental nu	PPT	rubro spinal tract	rs	supraoptic nu	SO	anteriovent th nu	AV	ventrolateral thal nu	VL
periaqueduct gray	PAG	<i>reticulotegmental</i>		<i>superior colliculus</i>		centrallateral thal nu	CL	ventromedial thal nu	VM
<i>preoptic area</i>		reticulotegmental	RtTg	brachium sup coll	bsc	centralmedial thal nu	CM	trigeminothal tr	tth
lateral preoptic area	LPA	reticulotegmental pericen	RtTgP	commissure of sup colliculus	csc	lat habenular nu	LHb	<i>ventricle</i>	
ventrolat preopt	VLPO	<i>septum</i>		deep gray	DpG	laterodorsal thal nu	LD	lateral ventricle	LV
pretectal nu	PTn	lateral septum	LS	intermediate gray layer	InG	mammillothalamic tract	mt	zona incerta	ZI
pontine nuclei	Pn	septofimbrial nu	SFi	optic n layer	OP	mediodorsal thal nu	MD		
		septohipothal nu	SHy	sup coll peduncle	scp	parafascic th nu	PF		

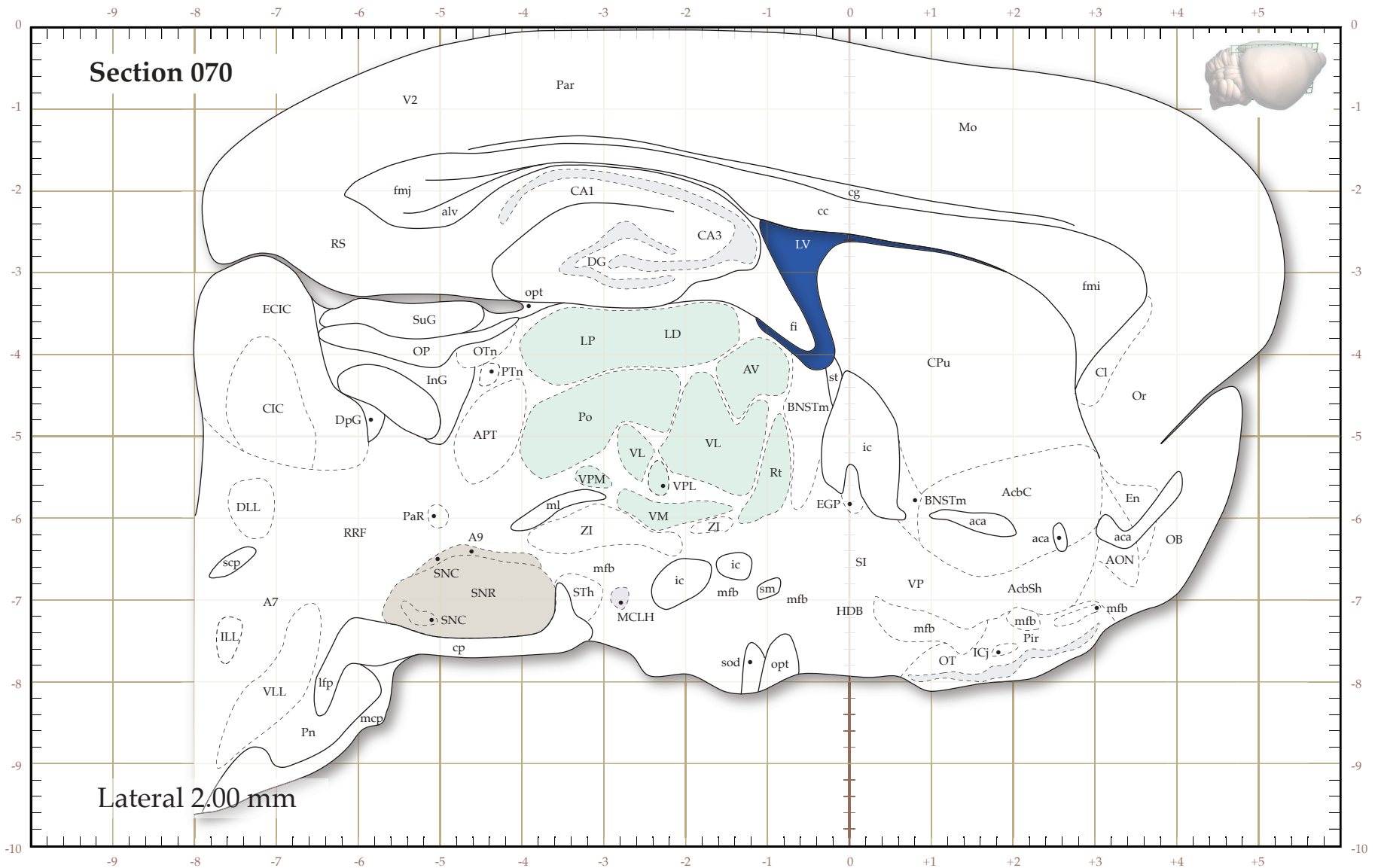




<i>accumbens</i> accumbens nu, core accumbens nu, shell	AcbC AcbSh	cingulum forceps major forceps minor	cg fmj fmi	primary visual 2 retrosple cortex	V2 RS	<i>hippocampus</i> fimbria hippocampus CA1 field CA3 field dentate gyrus	fi CA1 CA3 DG	ext ctx inf coll int capsule island of Calleja	ECIC ic ICj
ant pretecal	APT	<i>cortex</i> cingulate cortex motor cortex orbital cortex	Cg Mo Or	<i>diagonal band</i> horizontal limb diagonal band	HDB	<i>hypothalamus</i> magnocell lat hy	MCLH	long fasc pons	lfp
<i>anterior commissure</i> anterior commissure, anterior	aca	piriform cortex prelimbic cortex	Par Pir PrL	<i>dopamine</i> A7 noradr cell gr A8 dopamine cell gr A9 dopamine cell gr subst nigra compacta subst nigra retic	A7 A8 A9 SNC SNR	<i>inferior colliculus</i> central nu	CIC	medial forebrain bundle mid cerebellar ped olivary pretecal nu	ml VLL OPT
cerebral peduncle	cp								
claustrum	Cl								
<i>corpus callosum</i> alveus hippocampus	cc alv								

<i>olfactory bulb</i>	OB	pontine nuclei	Pn	subthalamic nu	STh	anteriorvent th nu	AV	trigeminothal tr	tth
anterior olf nucleus	AON	<i>red nu</i>		supraoptic nu	SO	centrallateral thal nu	CL	<i>ventricle</i>	
<i>optic</i>		parabrual nu	PaR	<i>superior colliculus</i>		lateral posterior thal nu	LP	lateral ventricle	LV
nu of optic tract	OTn	retrobulbar field	RRF	brachium sup coll	bsc	laterodorsal thal nu	LD	olfactory ventricle	OV
optic chiasm	och	<i>septum</i>		deep gray	DpG	mammillothalamic tract	mt		
optic tract	opt	lateral septum	LS	intermediate gray layer	InG	mediodorsal thal nu	MD		
olfactory tubercle	OT	septohipothal nu	SHy	optic n layer	OP	parafascic th nu	PF		
pedunclopontine tegmental nu	PPT	<i>striatum</i>		sup coll peduncle	scp	post thalamic nu	Po		
<i>preoptic area</i>		bed nu of ST lat	BNSTl	superficial gray layer	SuG	reticular thal nu	Rt		
lateral preoptic area	LPA	bed nu of ST med	BNSTm	<i>thalamus</i>		stria medullaris thal	sm		
pretectal nu	PTn	caudate putamen	CPu	anterior dors th nu	AD	ventrolateral thal nu	VL		
		subst innominata	SI	anteriomedial thal nu	AM	ventromedial thal nu	VM		
						ventral posteromed thal nu	VPM		





accumbens
 accumbens nu, core
 accumbens nu, shell
 ant pretecal
anterior commissure
 anterior commissure, anterior
 cerebral peduncle
 claustrum
corpus callosum
 alveus hippocampus
 cingulum

AcbC forceps major
AcbSh forceps minor
APT cortex
aca motor cortex
cp orbital cortex
Cl parietal cortex
CIC piriform cortex
ECIC primary visual 2
 retrosple cortex
diagonal band
 horizontal limb diagonal band

fmj
fmi
Mo
Or
Par
Pir
V2
RS
HDB

dopamine
 A7 noradr cell gr
 A9 dopamine cell gr
 subst nigra compacta
 subst nigra retic
 endopiriform nu
 external globus pallidus
geniculate nu
 medial geniculate nu

A7
A9
SNC
SNR
En
EGP
MG

hippocampus
 fimbria hippocampus
fi CA1 field
CA1 CA2 field
CA2 CA3 field
CA3 dentate gyrus
hypothalamus
 magnocell lat hy
inferior colliculus
 brachium inf coll
 central nu
 ext ctx inf coll

nu brachium inf coll
int capsule
island of Calleja
lemniscus
 dorsal nu lat lem
 intermediate nu lat lem
 lat lemniscus
 medial lemniscus
 ventral nu lat lemniscus
long fasc pons
medial forebrain bundle

BIC
ic
ICj
DLL
ILL
ll
ml
VLL
lfp
mfb

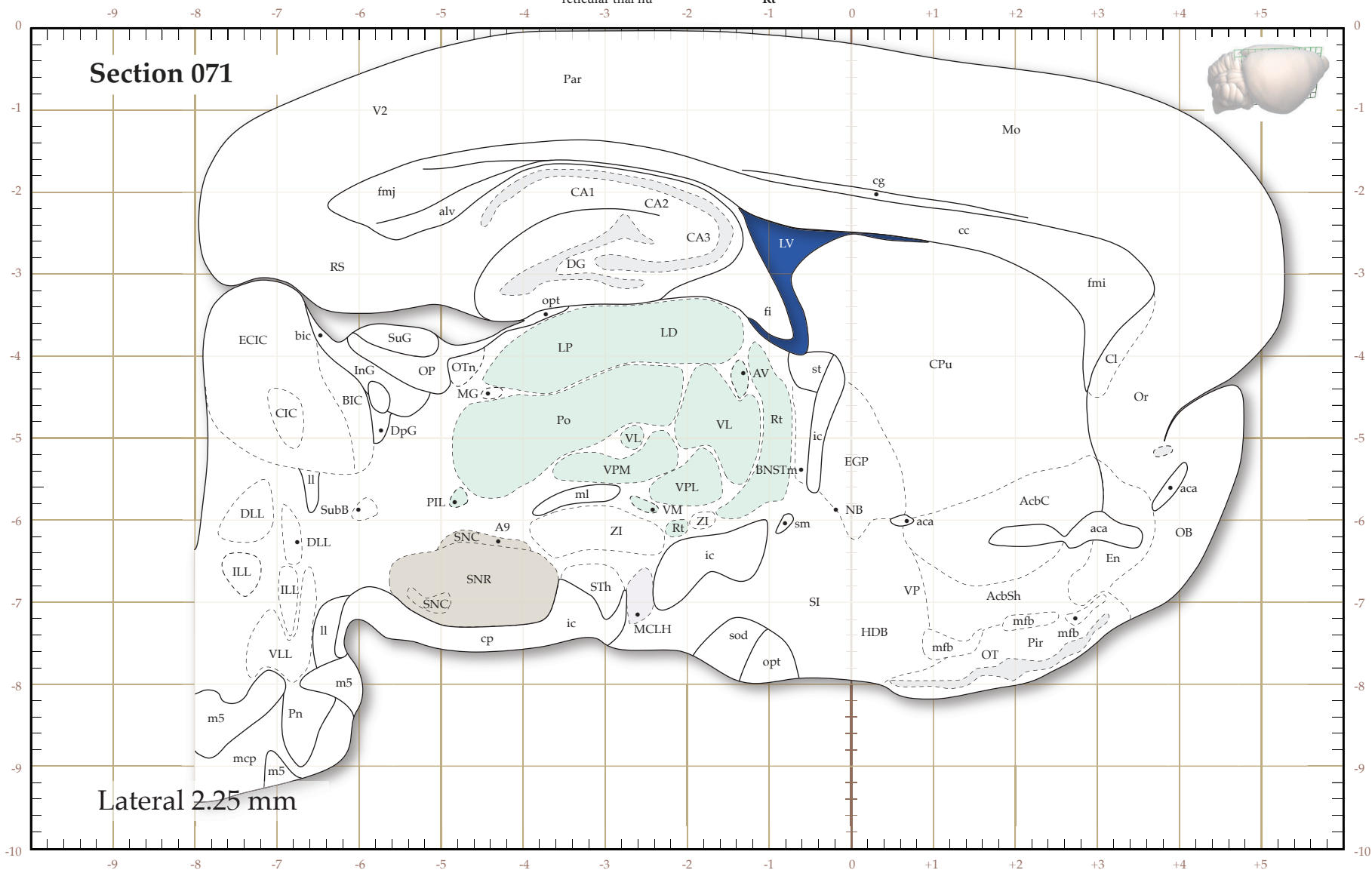
mid cerebellar ped
motor root of trig nerve
nu basalis
olfactory bulb
anterior olf nucleus
optic
nu of optic tract
optic tract
supraoptic decussation
olfactory tubercle
pretectal nu

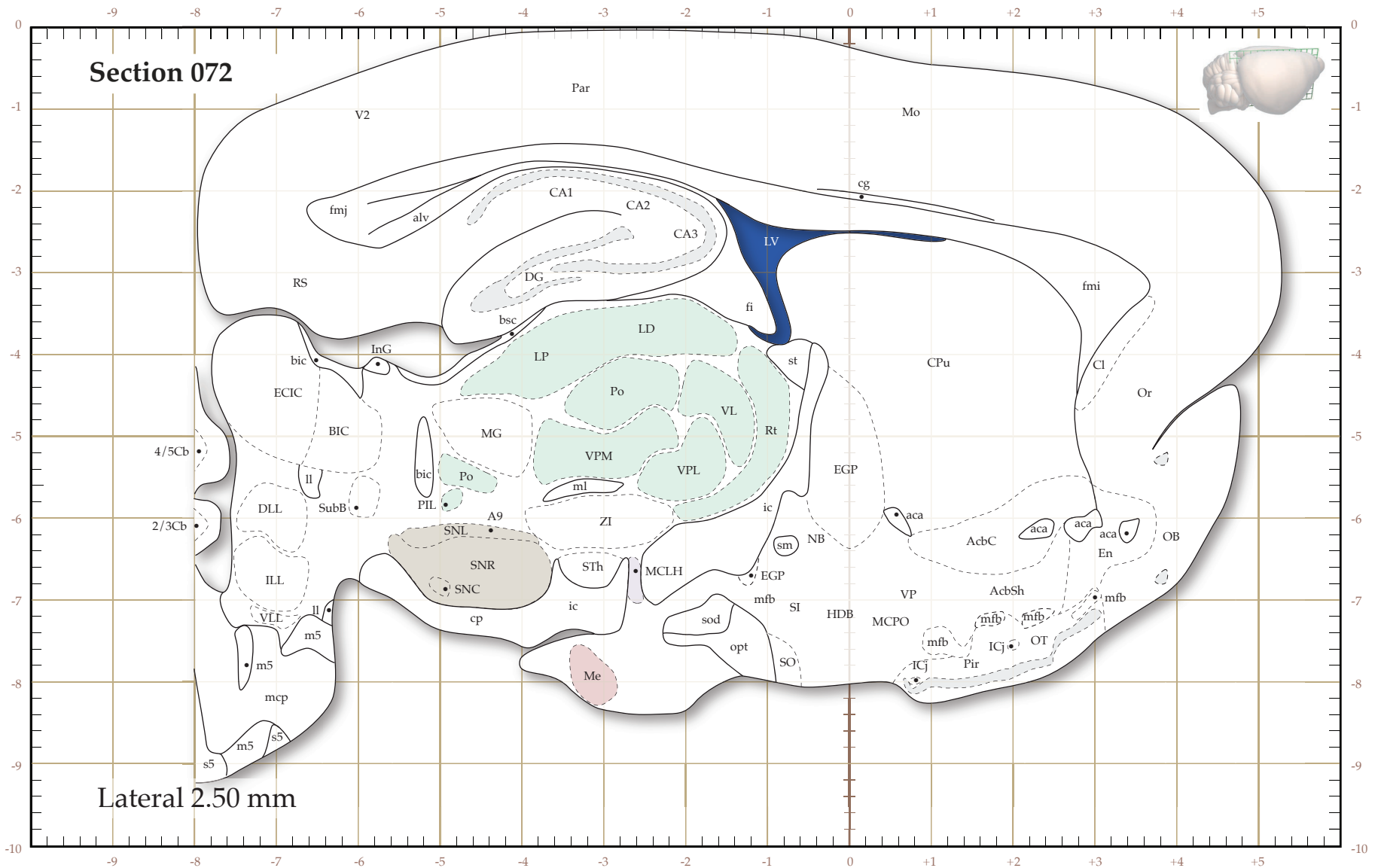
mcp pontine nuclei
m5 red nu
NB parabrual nu
OB retrorubral field
AON stria terminalis
striatum
OTn bed nu of ST med
opt caudate putamen
sod subst innominata
OT subbrachial nu
PTn subthalamic nu

Pn superior colliculus
PaR deep gray
RRF intermediate gray layer
st optic n layer
BNSTm sup coll peduncle
CPu superficial gray layer
SI thalamus
SubB anteriorvent th nu
STh lateral posterior thal nu
laterodorsal thal nu
post intralam thal nu
post thalamic nu
reticular thal nu

DpG stria medullaris thal
InG ventrolateral thal nu
OP ventromedial thal nu
scp ventral posteromed thal nu
SuG ventral posterolat thal nu
ventral pallidum
ventricle
AV lateral ventricle
LP
LD
PIL zona incerta
Po
Rt

sm
VL
VM
VPM
VPL
VP
LV
ZI





<i>accumbens</i>	<i>cerebellar lobes</i>	<i>cortex</i>	<i>subst nigra lat</i>	SNL	<i>CA3 field</i>	CA3
accumbens nu, core	2nd & 3rd Cb lob	motor cortex	subst nigra retic	SNR	dentate gyrus	DG
accumbens nu, shell	4th & 5th Cb lob	orbital cortex	endopiriform nu	En	<i>hypothalamus</i>	
<i>amygdala</i>	claustrum	parietal cortex	external globus pallidus	EGP	magnocell lat hy	MCLH
cortical amyg	<i>corpus callosum</i>	piriform cortex	<i>geniculate nu</i>		<i>inferior colliculus</i>	
medial amyg nu	alveus hippocampus	primary visual 2	dorsal lateral geniculate nu	DLG	brachium inf coll	bic
<i>anterior commissure</i>	cingulum	retrosple cortex	medial geniculate nu	MG	ext ctx inf coll	ECIC
anterior commissure, anterior	dorsal hipp comm	<i>diagonal band</i>	<i>hippocampus</i>	fi	nu brachium inf coll	BIC
anterior commissure, posterior	forceps major	horizontal limb diagonal band	fimbria hippocampus	CA1	int capsule	ic
cerebral peduncle	forceps minor	<i>dopamine</i>	CA1 field	CA2	island of Calleja	ICj
		A9 dopamine cell gr	CA2 field			
		subst nigra compacta				

lemniscus

dorsal nu lat lem
intermediate nu lat lem
lat lemniscus
medial lemniscus
ventral nu lat lemniscus

magnocell preoptic

medial forebrain bundle

mid cerebellar ped

motor root of trig nerve

nu basalis

DLL

ILL

ll

ml

VLL

MCPO

mfb

mcp

m5

NB

olfactory bulb

optic

optic tract
supraoptic decussation

olfactory tubercle

sensory root of trig nerve

stria terminalis

striatum

caudate putamen
subst innominata

subbrachial nu

OB

opt

sod

OT

s5

st

CPu

SI

SubB

subthalamic nu

superior colliculus

brachium sup coll
intermediate gray layer

supraoptic nu

thalamus

lateral posterior thal nu
laterodorsal thal nu
post intralam thal nu
post thalamic nu
reticular thal nu
stria medullaris thal

STh

bsc

InG

SO

LP

LD

PIL

Po

Rt

sm

ventrolateral thal nu

ventral posteromed thal nu
ventral posterolat thal nu

ventral pallidum

ventricle

lateral ventricle

zona incerta

VL

VPM

VPL

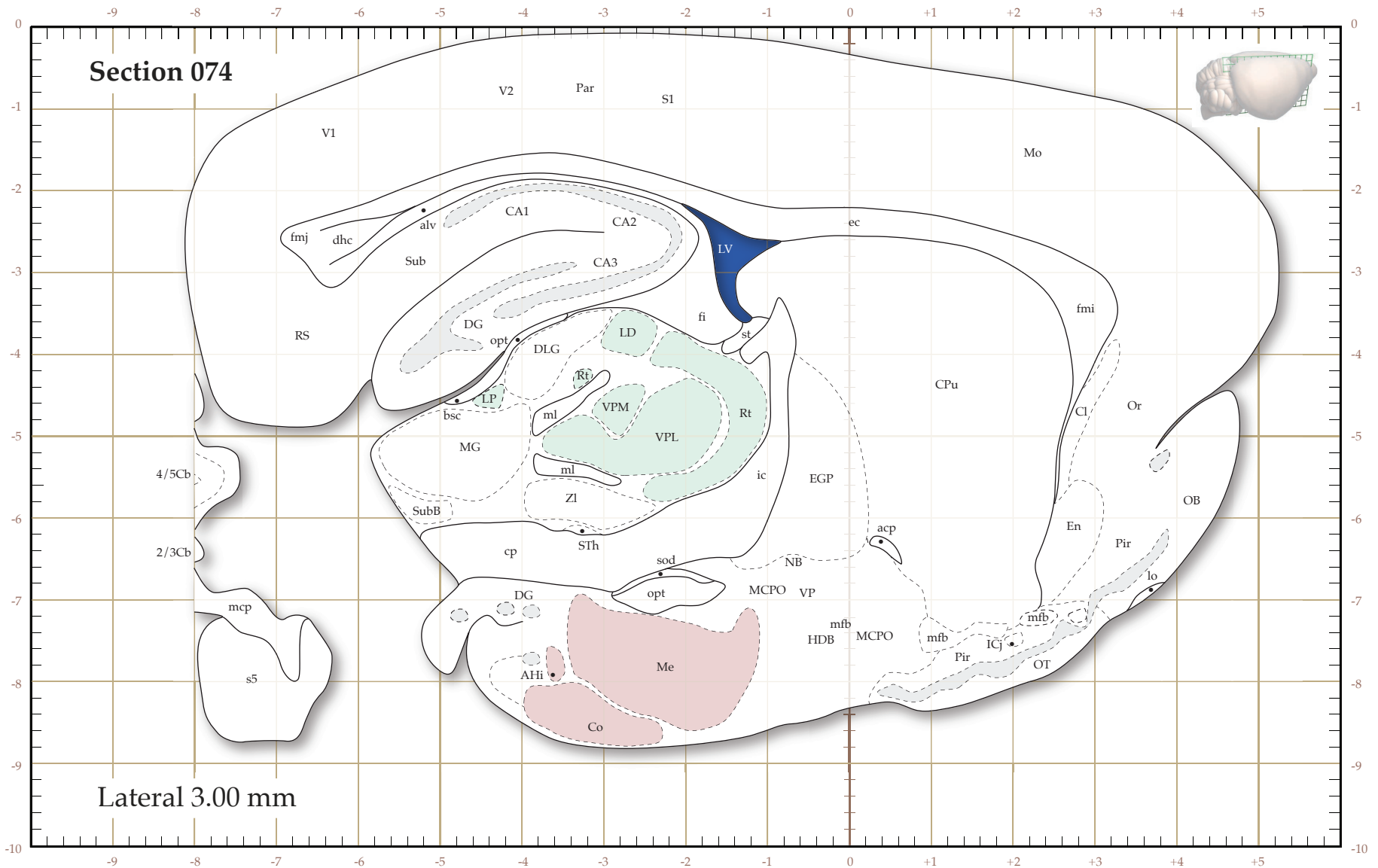
VP

LV

ZI

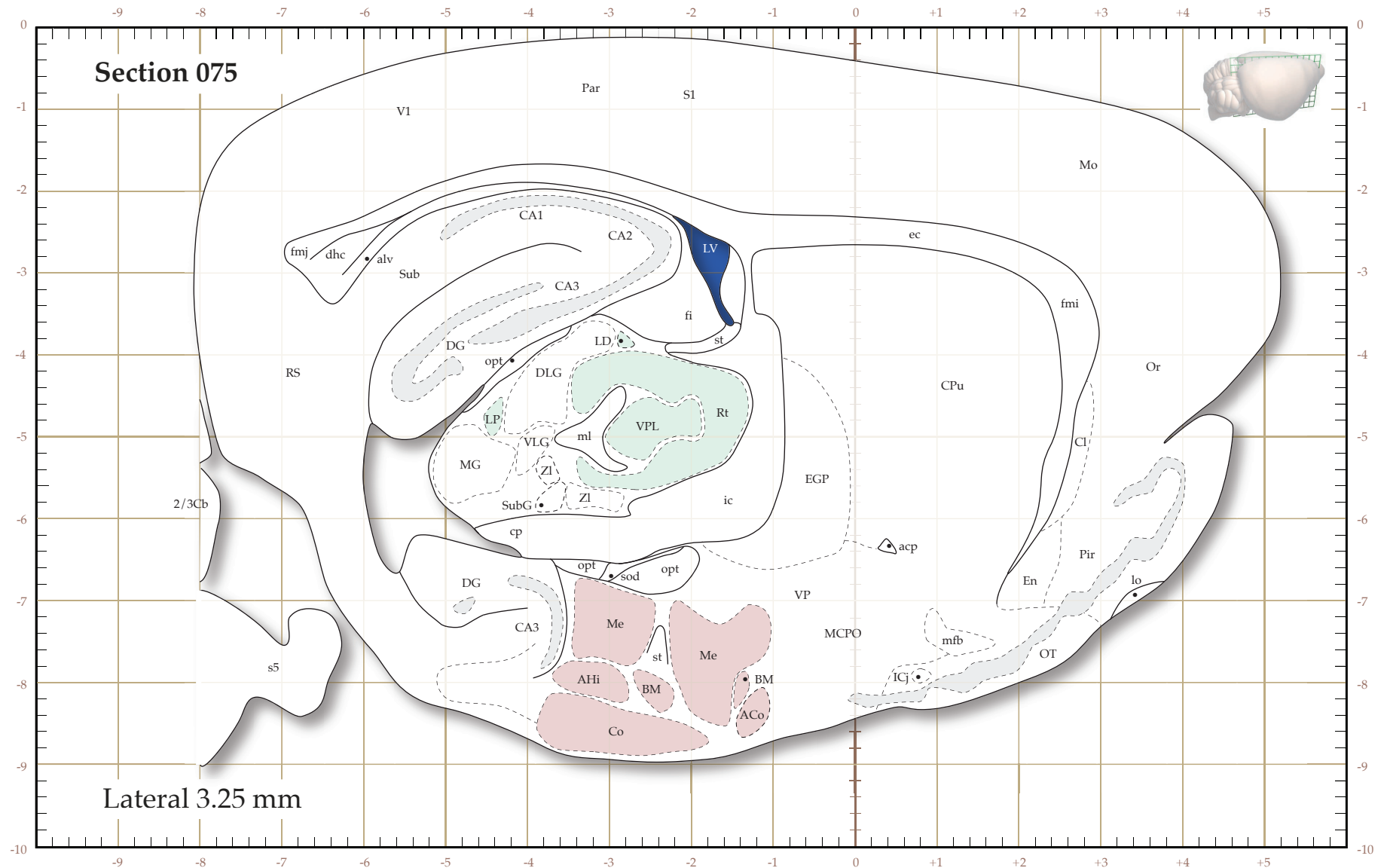
Section 073

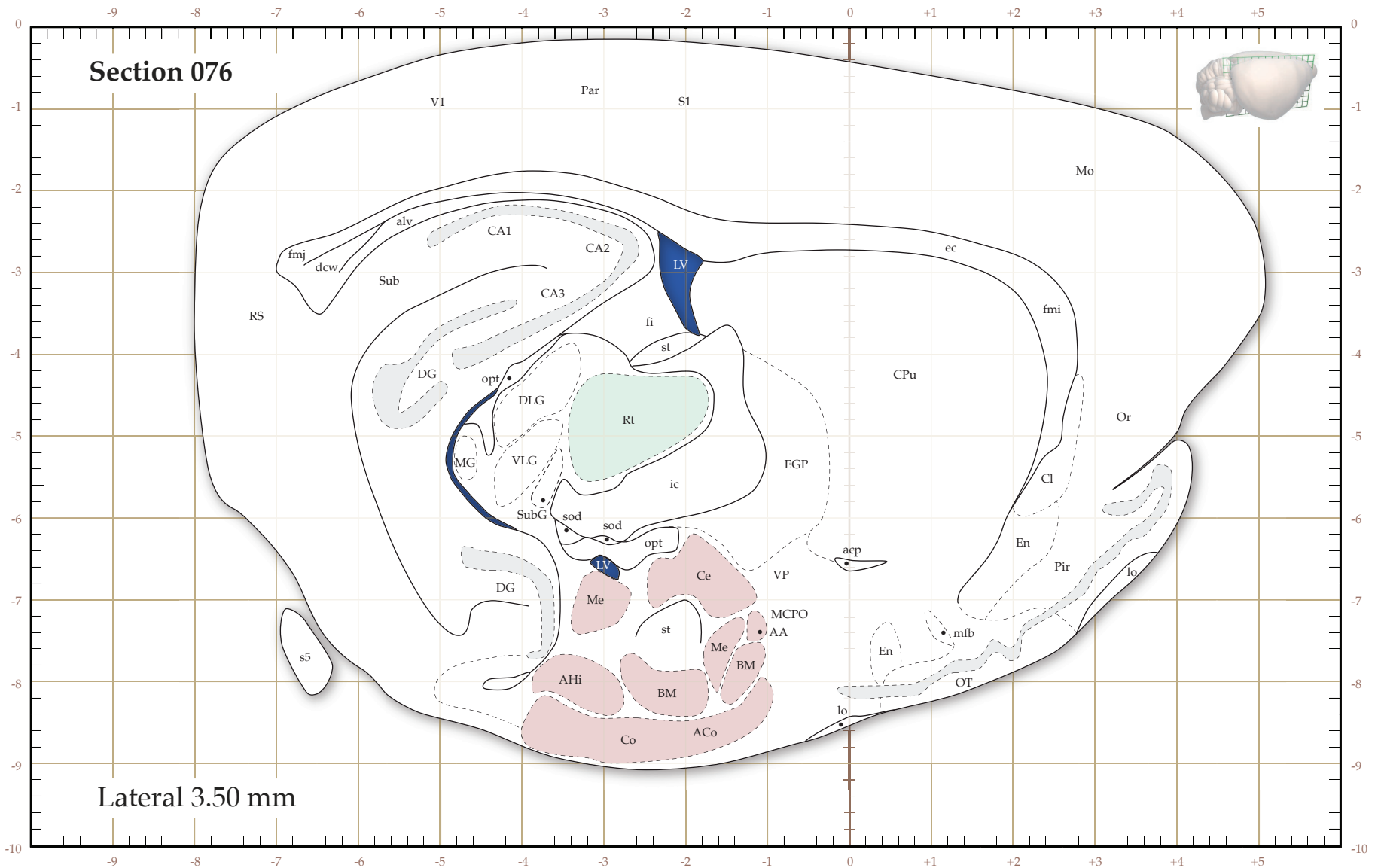
Lateral 2.75 mm



<i>amygdala</i>		<i>cerebellar lobes</i>		<i>cortex</i>		<i>diagonal band</i>	
amygdalohip are	AHi	2nd & 3rd Cb lob	2/3Cb	lateral olfactory tract	lo	horizontal limb diagonal band	HDB
ant cortical amygdaloid nu	ACo	4th & 5th Cb lob	4/5Cb	motor cortex	Mo	endopiriform nu	En
basomedial amygdaloid nu	BM			orbital cortex	Or	external globus pallidus	EGP
cortical amygd	Co	claustrum	Cl	parietal cortex	Par		
medial amygd nu	Me	<i>corpus callosum</i>		piriform cortex	Pir	<i>geniculate nu</i>	
<i>anterior commissure</i>		alveus hippocampus	alv	primary somatosensory cortex	S1	dorsal lateral geniculate nu	DLG
anterior commissure, posterior	acp	dorsal hipp comm	dhc	primary visual	V1	medial geniculate nu	MG
cerebral peduncle	cp	external capsule	ec	primary visual 2	V2	subgeniculate nu	SubG
		forceps major	fmj	retrosple cortex	RS	vent lat geniculate nu	VLG
		forceps minor	fmi				

<i>hippocampus</i>		magnocell preoptic	MCPO	sensory root of trig nerve	s5	<i>thalamus</i>	
fimbria hippocampus	fi	medial forebrain bundle	mfb	stria terminalis	st	lateral posterior thal nu	LP
CA1 field	CA1	mid cerebellar ped	mcp	<i>striatum</i>		laterodorsal thal nu	LD
CA2 field	CA2	nu basalis	NB	caudate putamen	CPu	reticular thal nu	Rt
CA3 field	CA3	nu basalis	OB	subiculum	Sub	ventral posteromed thal nu	VPM
dentate gyrus	DG	<i>olfactory bulb</i>	OT	subbrachial nu	SubB	ventral posterolat thal nu	VPL
int capsule	ic	<i>optic</i>		subthalamic nu	STh	ventral pallidum	VP
island of Calleja	ICj	optic tract	opt	superior colliculus		<i>ventricle</i>	
<i>lemniscus</i>		supraoptic decussation	sod	brachium sup coll	bsc	lateral ventricle	LV
medial lemniscus	ml	olfactory tubercle	OT			zona incerta	ZI





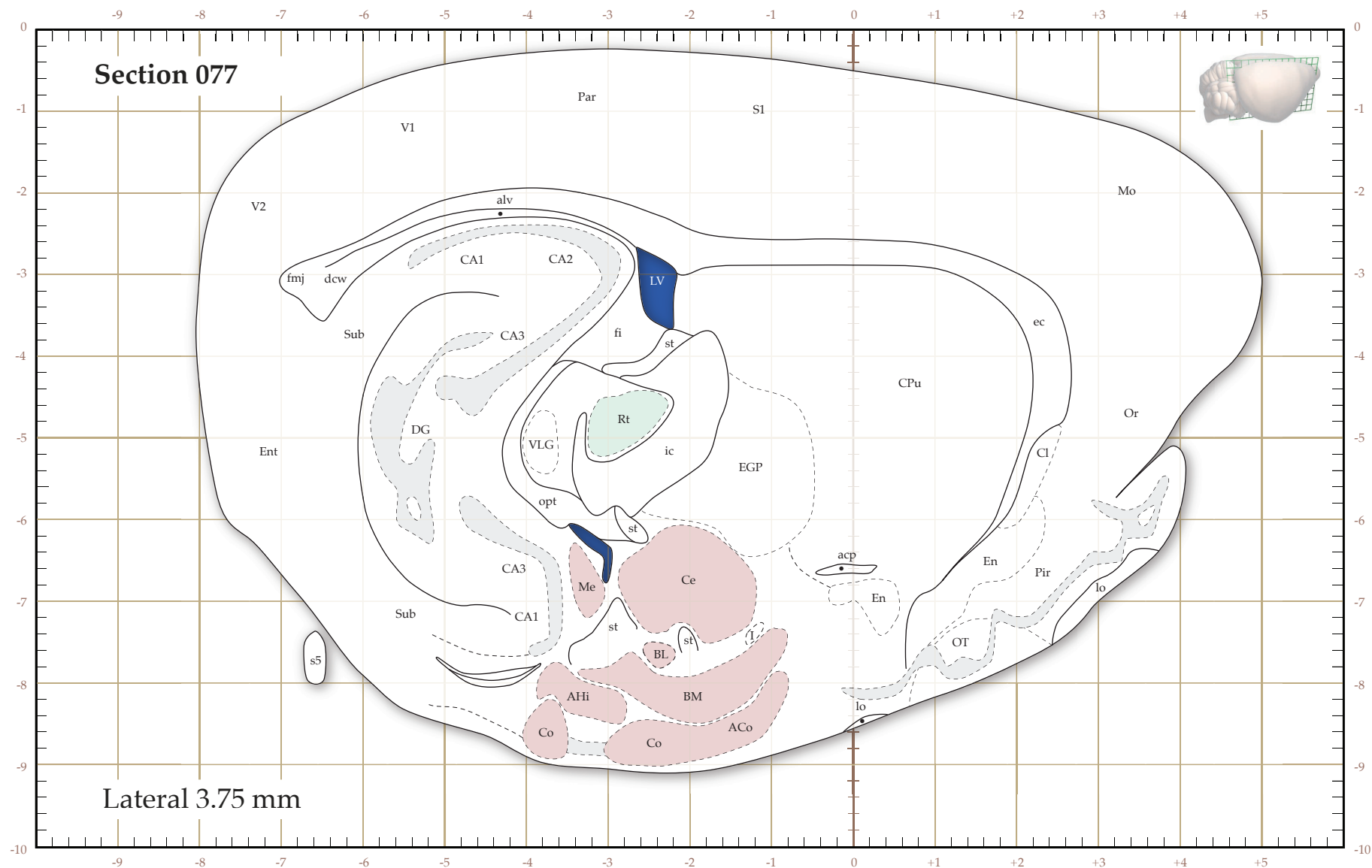
<i>amygdala</i>		<i>anterior commissure</i>		<i>cortex</i>		<i>endopiriform nu</i>	En
amygdalohip are	AHi	anterior commissure, posterior	acp	lateral olfactory tract	lo	external globus pallidus	EGP
ant amygd area	AA	claustrum	Cl	motor cortex	Mo	<i>geniculate nu</i>	
ant cortical amygdaloid nu	ACo	<i>corpus callosum</i>		orbital cortex	Or	dorsal lateral geniculate nu	DLG
basolateral amygdaloid	BL	alveus hippocampus	alv	entorhinal cortex	Ent	medial geniculate nu	MG
basomedial amygdaloid nu	BM	deep cerebr white	dcw	parietal cortex	Par	subgeniulate nu	SubG
central amygdaloid nu	Ce	external capsule	ec	piriform cortex	Pir	vent lat geniculate nu	VLG
cortical amygd	Co	forceps major	fmj	primary visual	S1	<i>hippocampus</i>	
medial amygd nu	Me	forceps minor	fmi	primary visual 2	V1	fimbria hippocampus	fi
				retrosple cortex	V2	CA1 field	CA1
					RS		

CA2 field
CA3 field
dentate gyrus
int capsule
magnocell preoptic
medial forebrain bundle
optic
optic tract
supraoptic decussation

CA2 olfactory tubercle
CA3 sensory root of trig nerve
DG stria terminalis
ic *striatum*
MCPO caudate putamen
mbf subiculum
thalamus
opt reticular thal nu
sod ventral pallidum

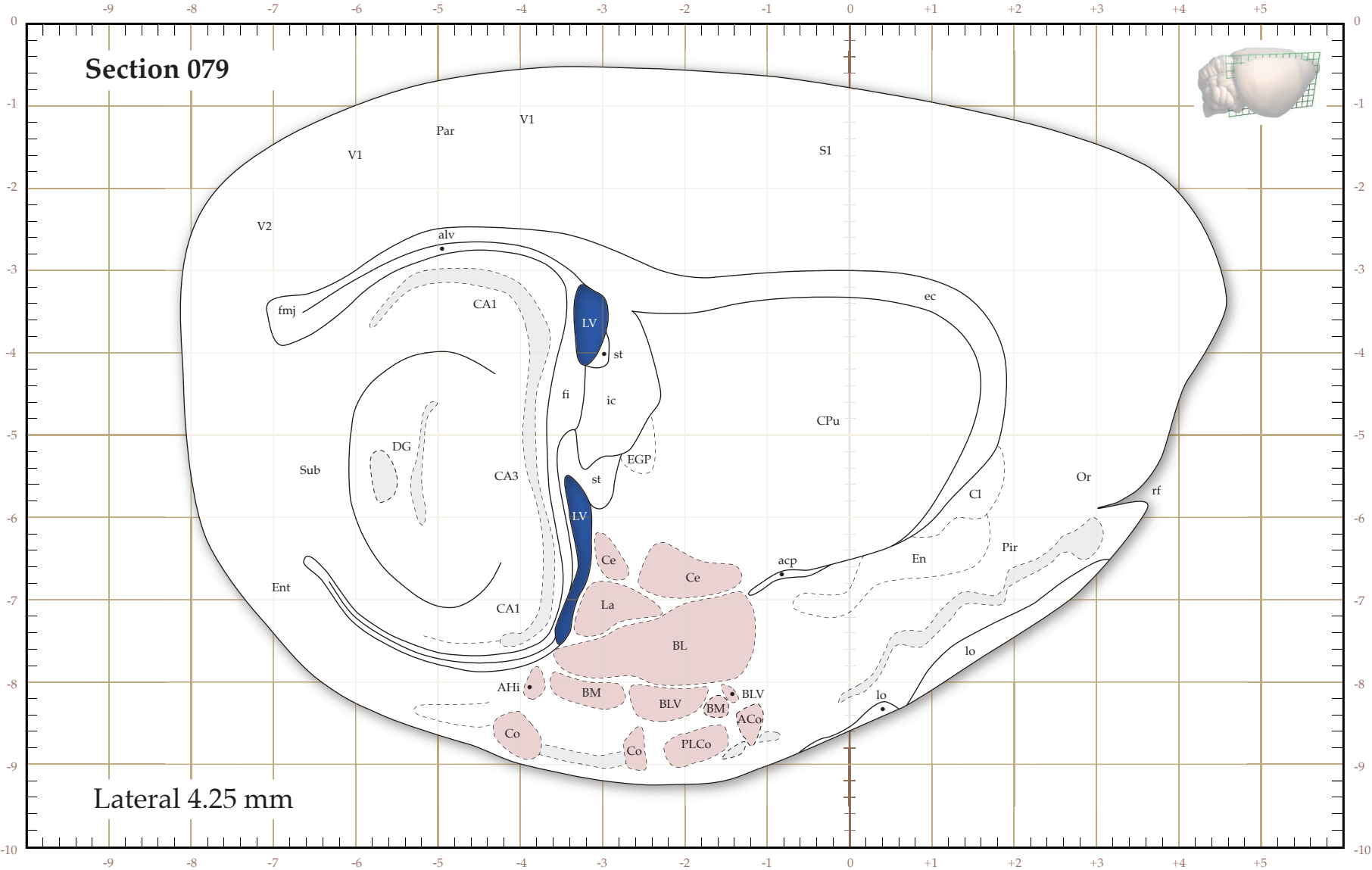
OT *ventricle*
s5 lateral ventricle
st
CPu
Sub
Rt
VP

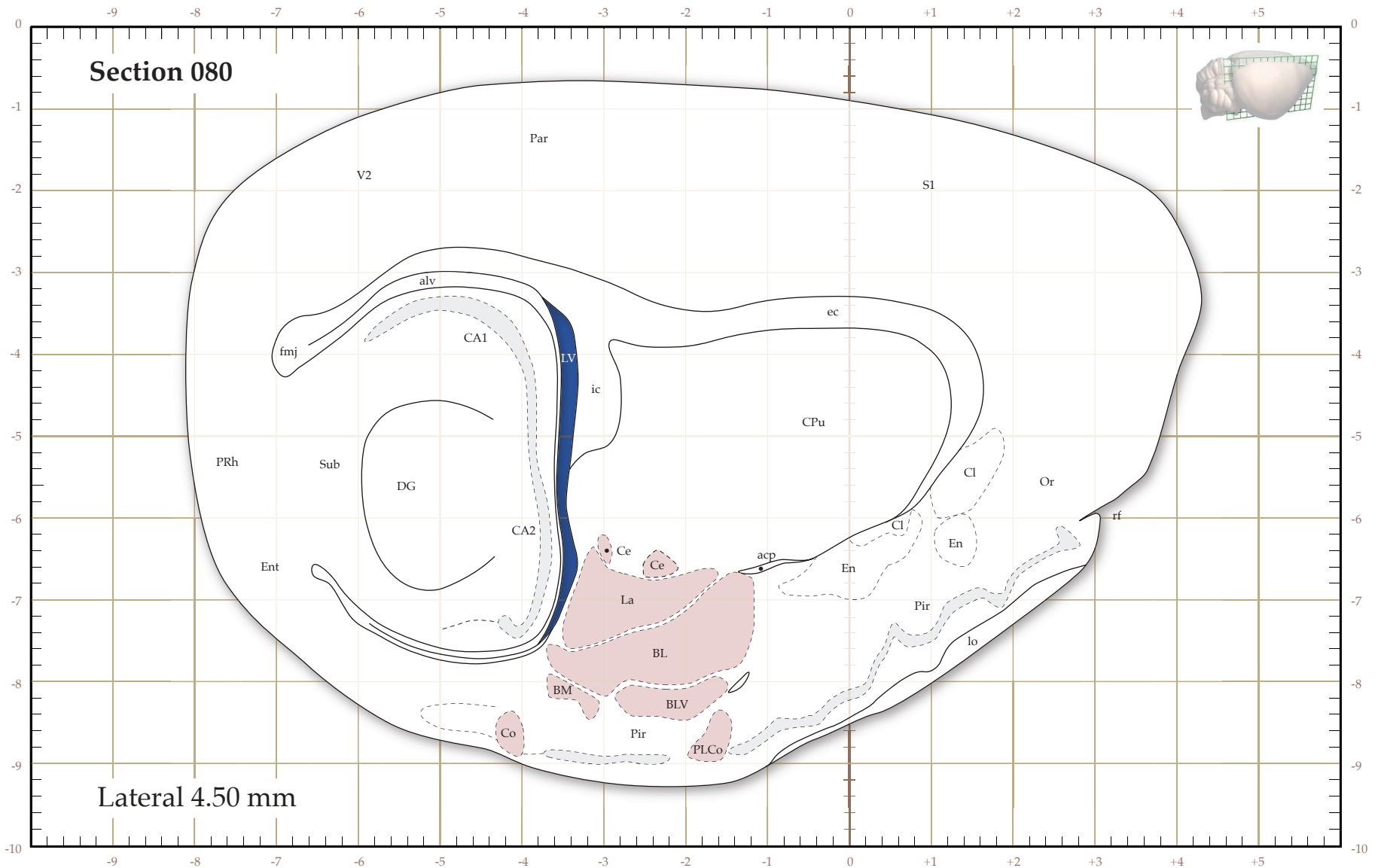
LV



intercalated nu
optic
optic tract
olfactory tubercle
rhinal fissure
stria terminalis
striatum
caudate putamen
subiculum

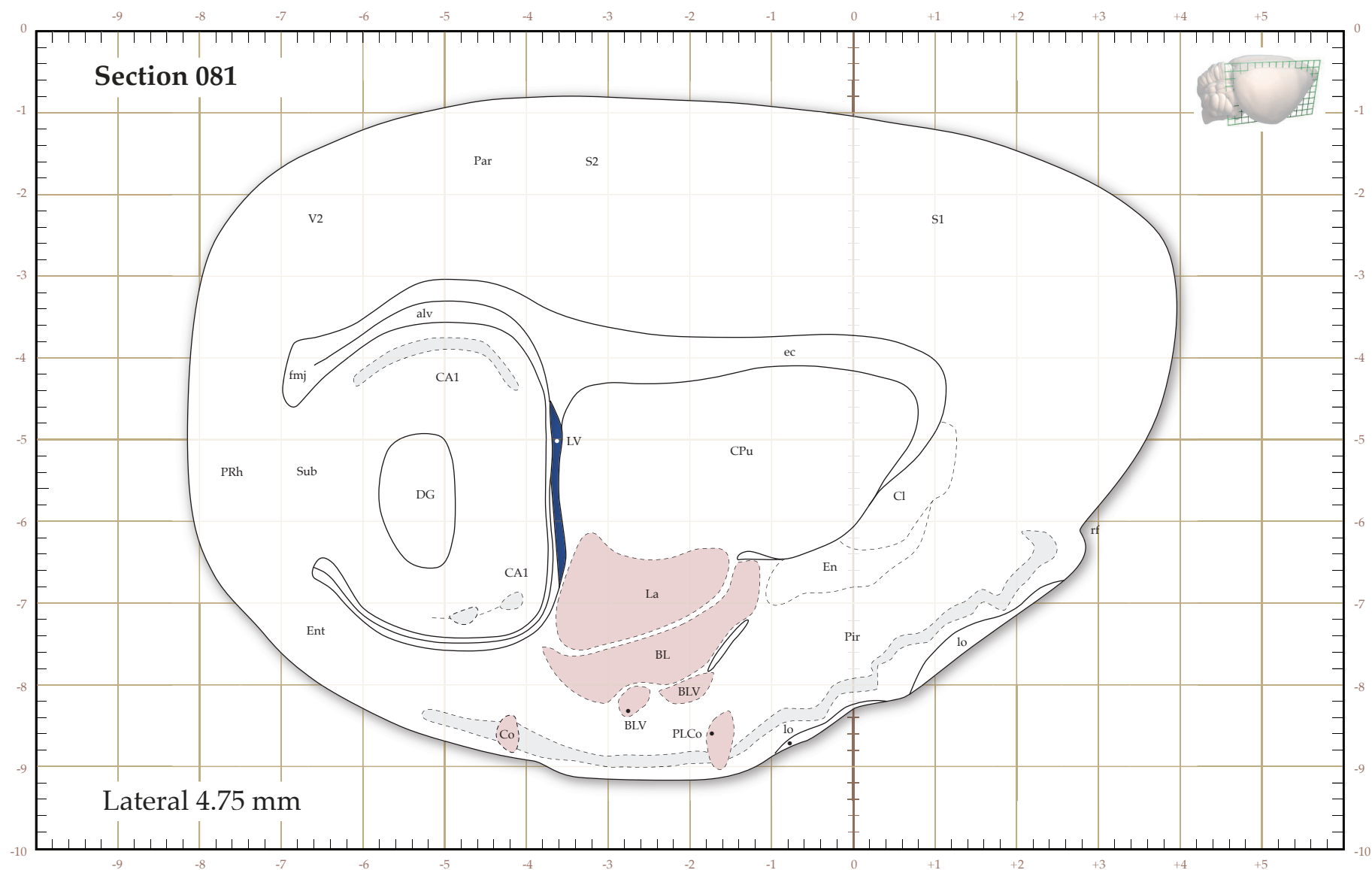
I
ventricle
lateral ventricle
LV
opt
OT
rf
st
CPu
Sub

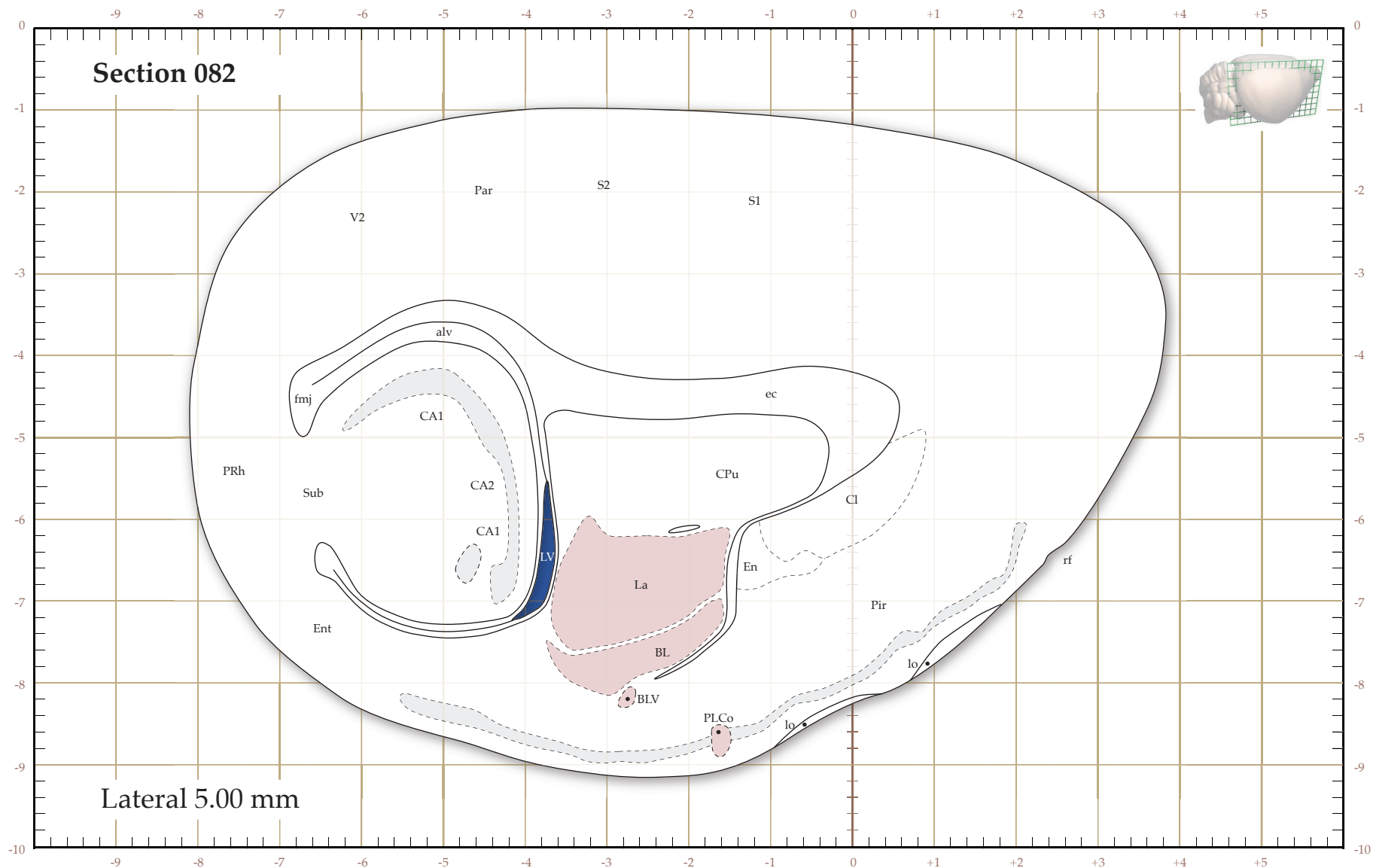




amygdala		claustrum	Cl	perirhinal cx	PRh	rhinal fissure	rf
basolateral amygdaloid	BL	corpus callosum		piriform cortex	Pir	striatum	
basomedial amygdaloid nu	BLV	alveus hippocampus	alv	primary somatosensory cortex	S1	caudate putamen	CPu
central amygdaloid nu	BM	external capsule	ec	primary visual 2	V2	subiculum	Sub
cortical amyg	Ce	forceps major	fmj	endopiriform nu	En	ventricle	
lateral amyg nu	Co	cortex		hippocampus		lateral ventricle	LV
posterolat cortical amygdaloid nu	La	lateral olfactory tract	lo	CA1 field	CA1		
	PLCo	orbital cortex	Or	CA2 field	CA2		
anterior commissure		entorhinal cortex	Ent	dentate gyrus	DG		
anterior commissure, posterior	acp	parietal cortex	Par	int capsule	ic		

<i>amygdala</i>		forceps major	fmj	endopiriform nu	En	<i>ventricle</i>	
basolateral amygdaloid	BL	<i>cortex</i>		<i>hippocampus</i>		lateral ventricle	LV
basolateral amygdaloid nu, vent	BLV	2ary somatosensory cortex	S2	CA1 field	CA1		
cortical amyg	Co	lateral olfactory tract	lo	dentate gyrus	DG		
lateral amyg nu	La	entorhinal cortex	Ent	rhinal fissure	rf		
posterolat cortical amygdaloid nu	PLCo	parietal cortex	Par	<i>striatum</i>			
claustrum	Cl	perirhinal cx	PRh	caudate putamen	CPu		
<i>corpus callosum</i>		piriform cortex	Pir	subiculum	Sub		
alveus hippocampus	alv	primary somatosensory cortex	S1				
external capsule	ec	primary visual 2	V2				





amygdala

basolateral amygdaloid
basolateral amygdaloid nu, vent
lateral amyg nu
posterolat cortical amygdaloid nu

claustrum

corpus callosum

alveus hippocampus
external capsule
forceps major

cortex

BL 2ary somatosensory cortex
BLV lateral olfactory tract
La entorhinal cortex
PLCo parietal cortex
Cl perirhinal cx
piriform cortex
primary somatosensory cortex
V2 primary visual 2
Ent endopiriform nu

hippocampus

S2 CA1 field
lo CA2 field
Ent rhinal fissure
Par
PRh
Pir
S1 subiculum
V2
En lateral ventricle

CA1
CA2
rf
CPu
Sub
LV

- cortex
 - 2ary somatosensory cortex
 - lateral olfactory tract
 - entorhinal cortex
 - parietal cortex
 - perirhinal cx

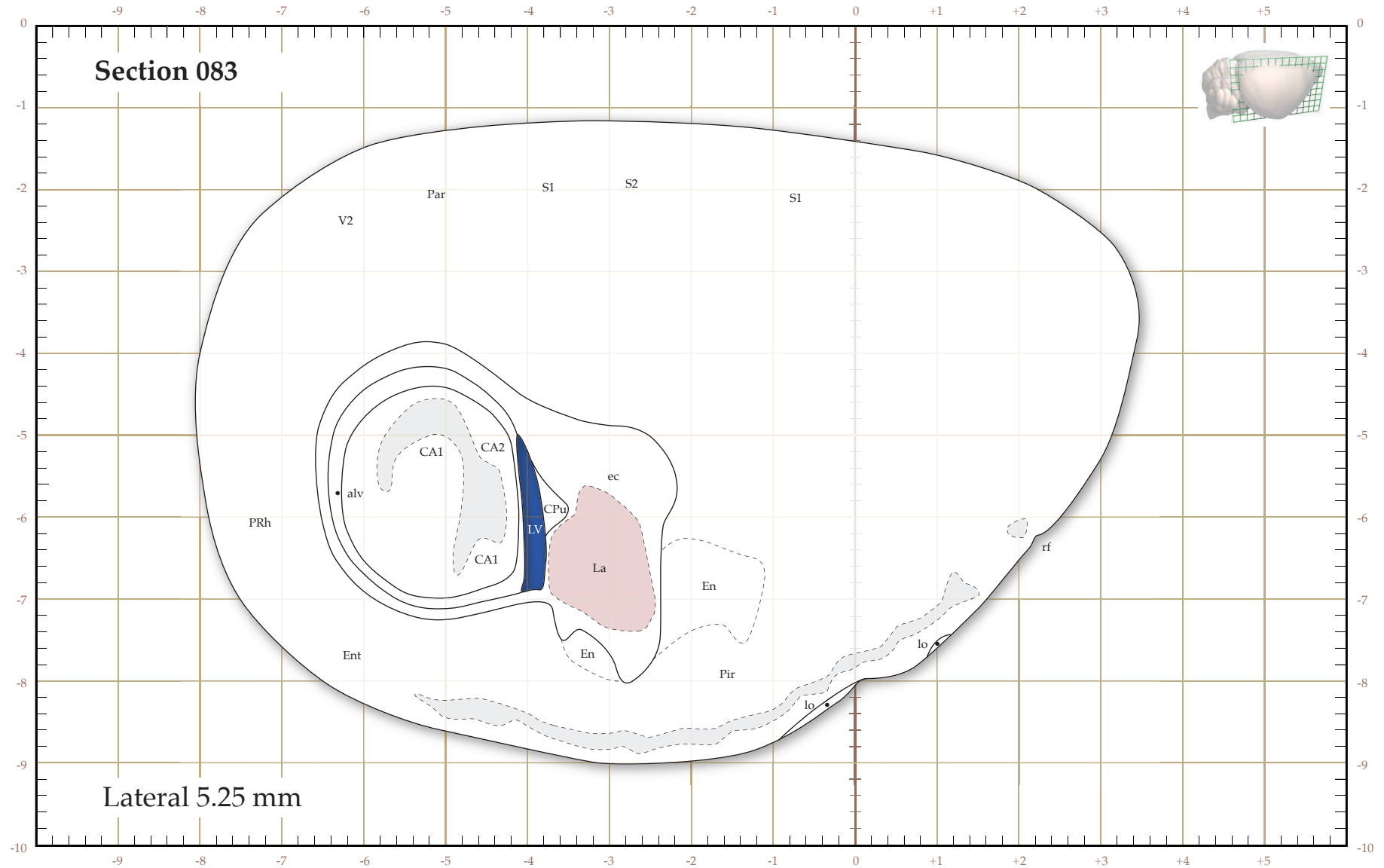
La	piriform cortex primary somatosensory cortex primary visual 2
alv	endopiriform nu
ec	<i>hippocampus</i>
S2	CA1 field
lo	CA2 field
Ent	rhinal fissure
Par	<i>striatum</i>
PRh	caudate putamen

Pir *ventricle*
S1 lateral ventricle
V2
En

CA1
CA2
rf

CPu

LV



corpus callosum

alveus hippocampus

external capsule

cortex

2ary somatosensory cortex

lateral olfactory tract

entorhinal cortex

parietal cortex

perirhinal cx

piriform cortex

primary somatosensory cortex

alv

ec

S2

lo

Ent

Par

PRh

Pir

S1

primary visual 2

endopiriform nu

hippocampus

CA1 field

ventricle

lateral ventricle

V2

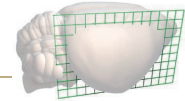
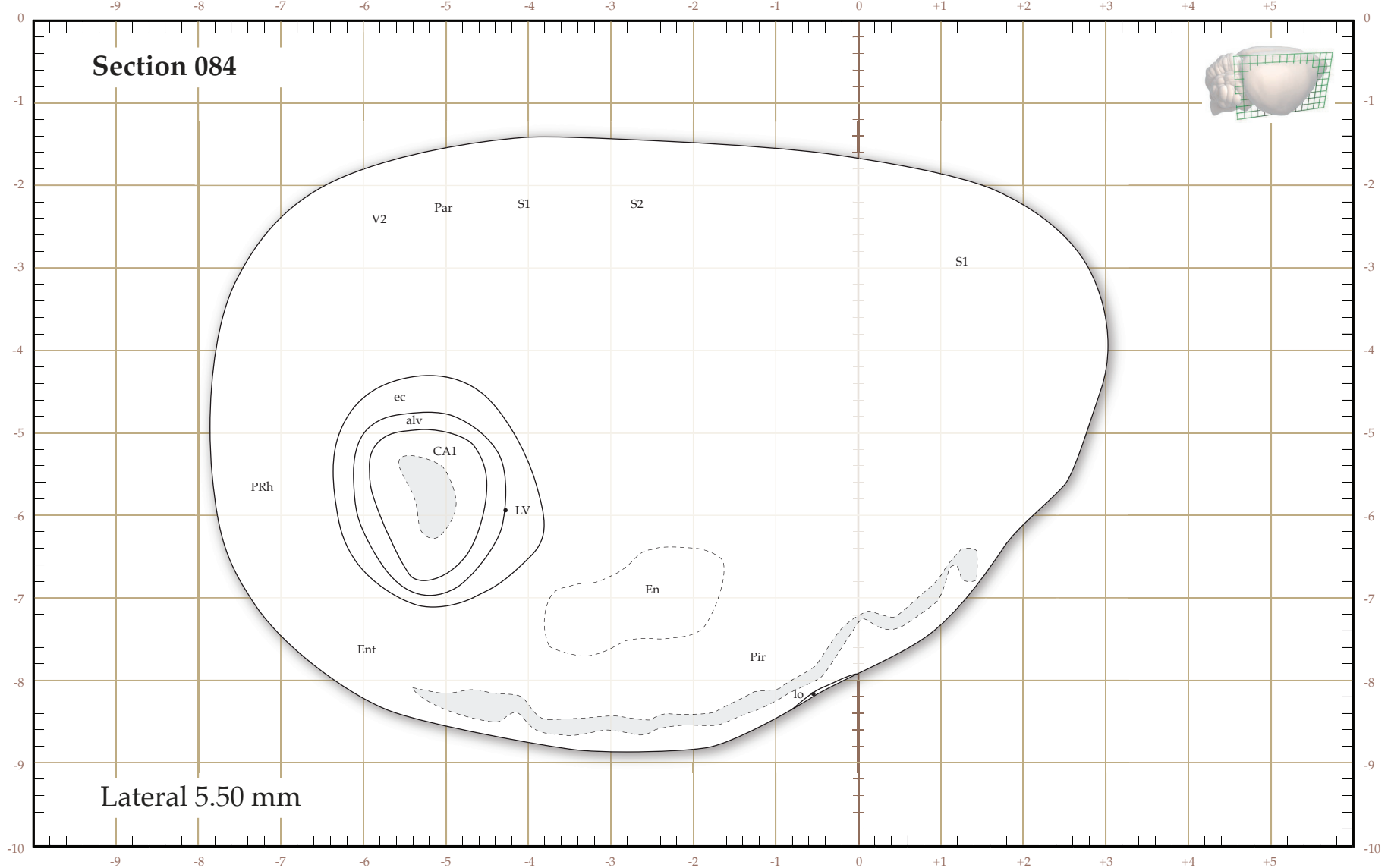
En

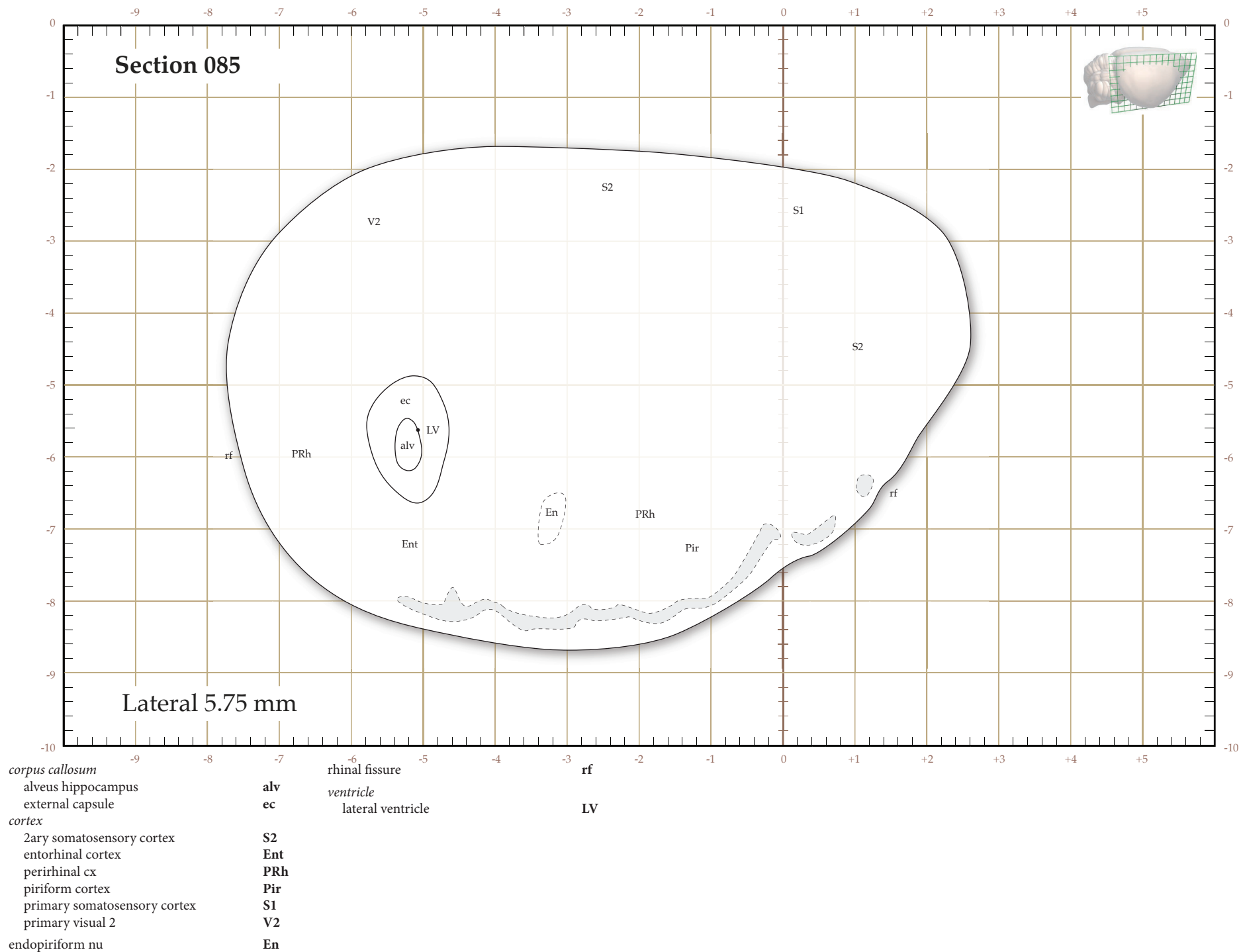
CA1

LV

Section 084

Lateral 5.50 mm





cortex

2ary somatosensory cortex

entorhinal cortex

perirhinal cx

piriform cortex

primary somatosensory cortex

primary visual 2

rhinal fissure

S2

Ent

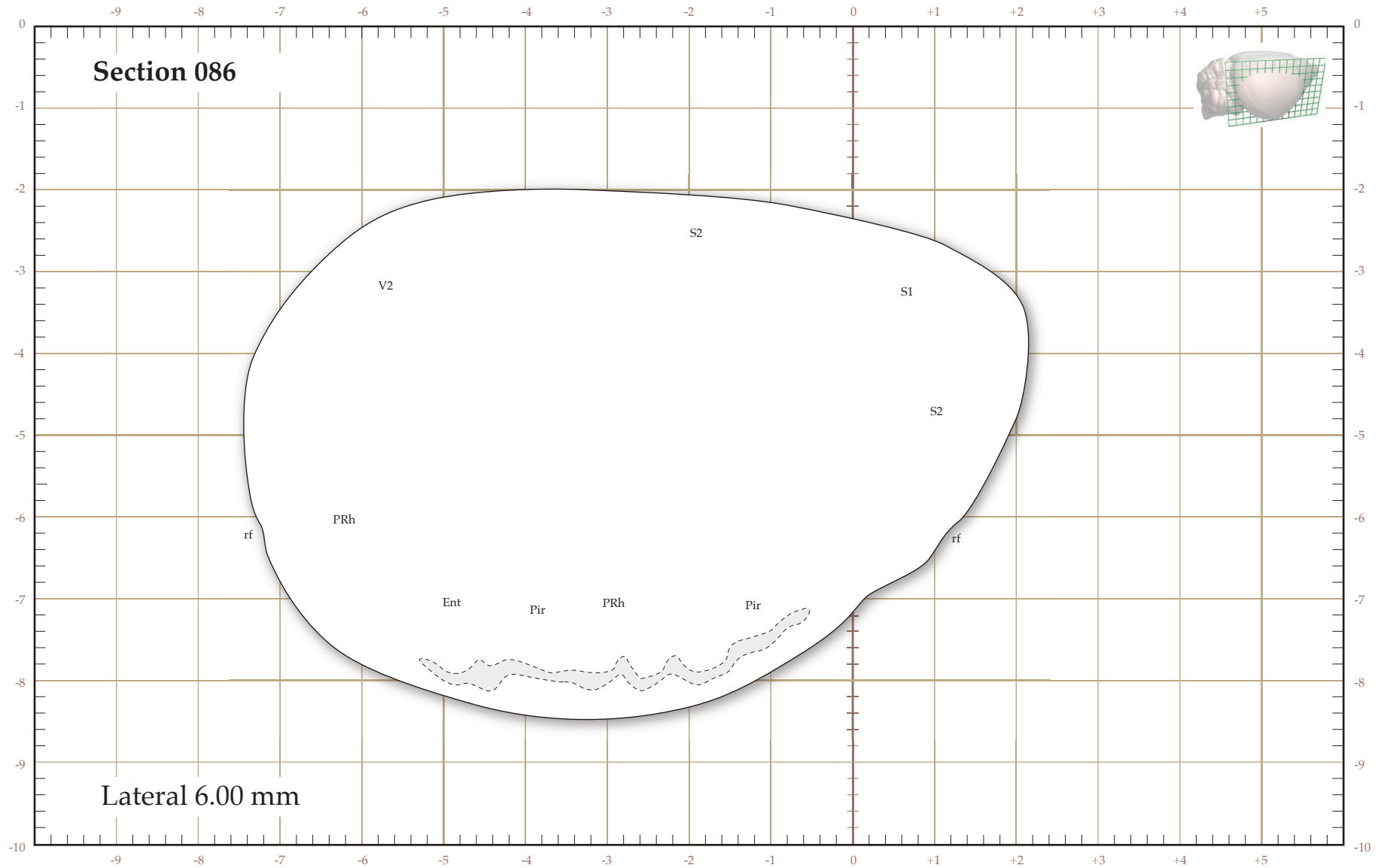
PRh

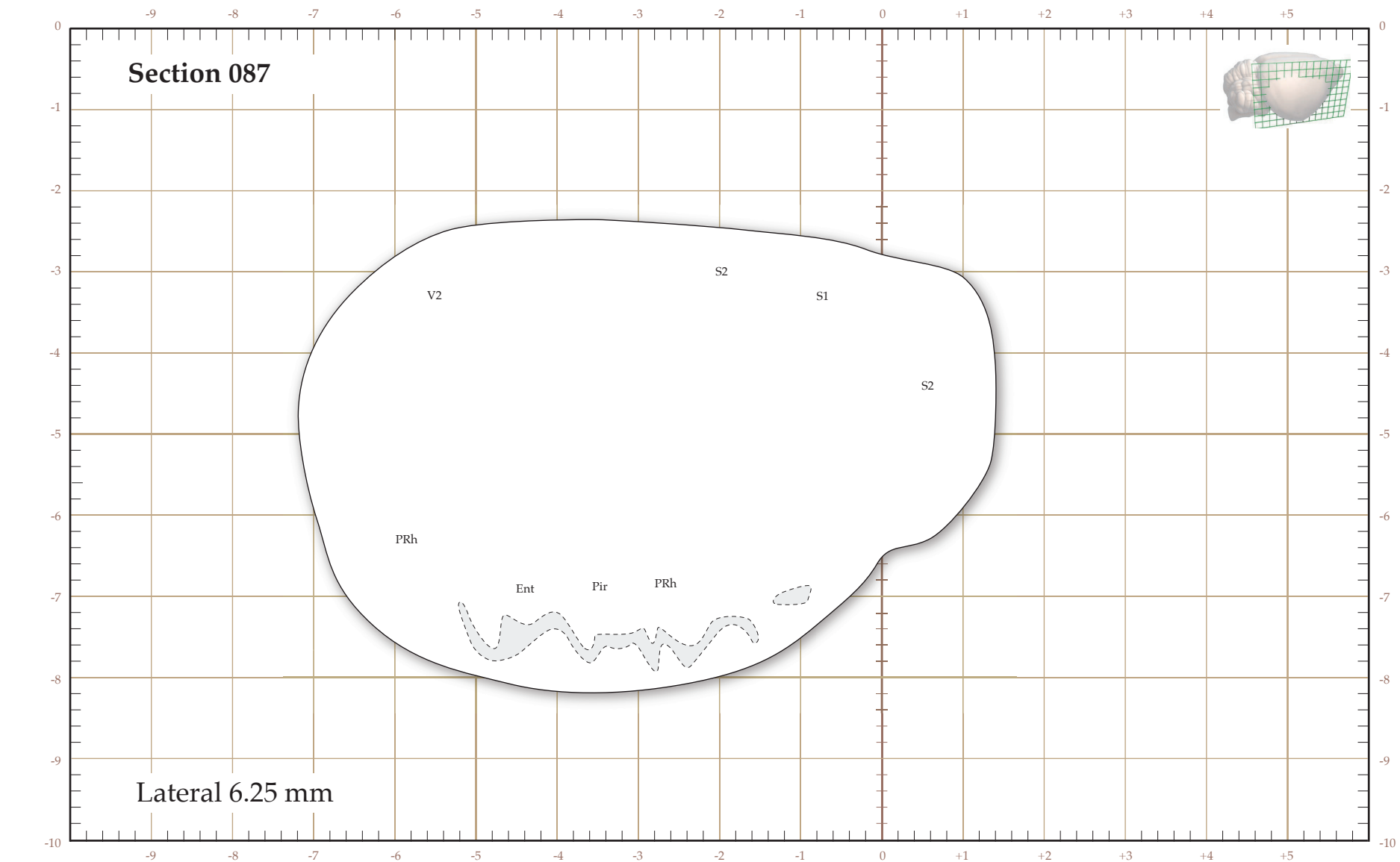
Pir

S1

V2

rf





cortex

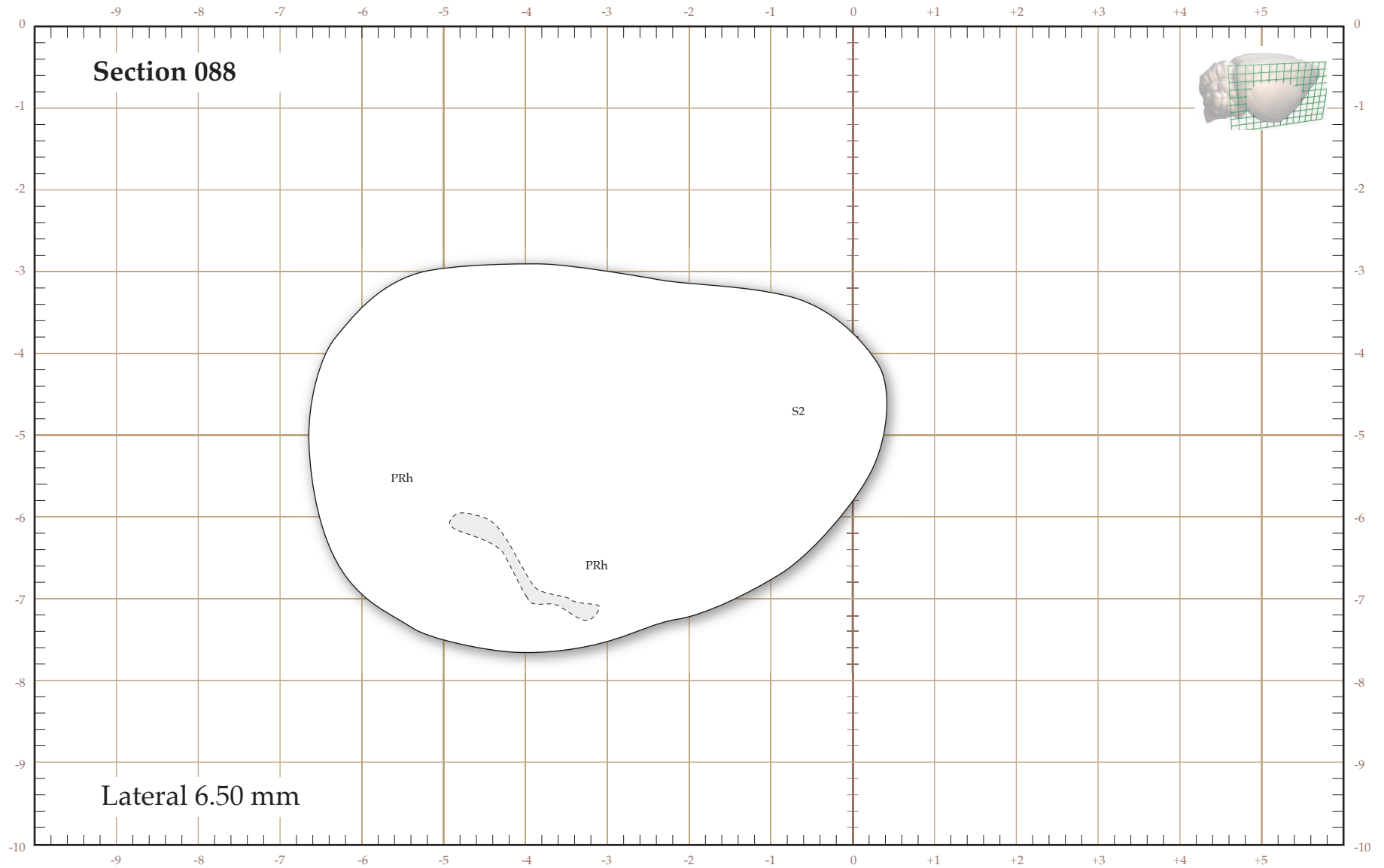
2ary somatosensory cortex
 entorhinal cortex
 perirhinal cx
 piriform cortex
 primary somatosensory cortex
 primary visual 2

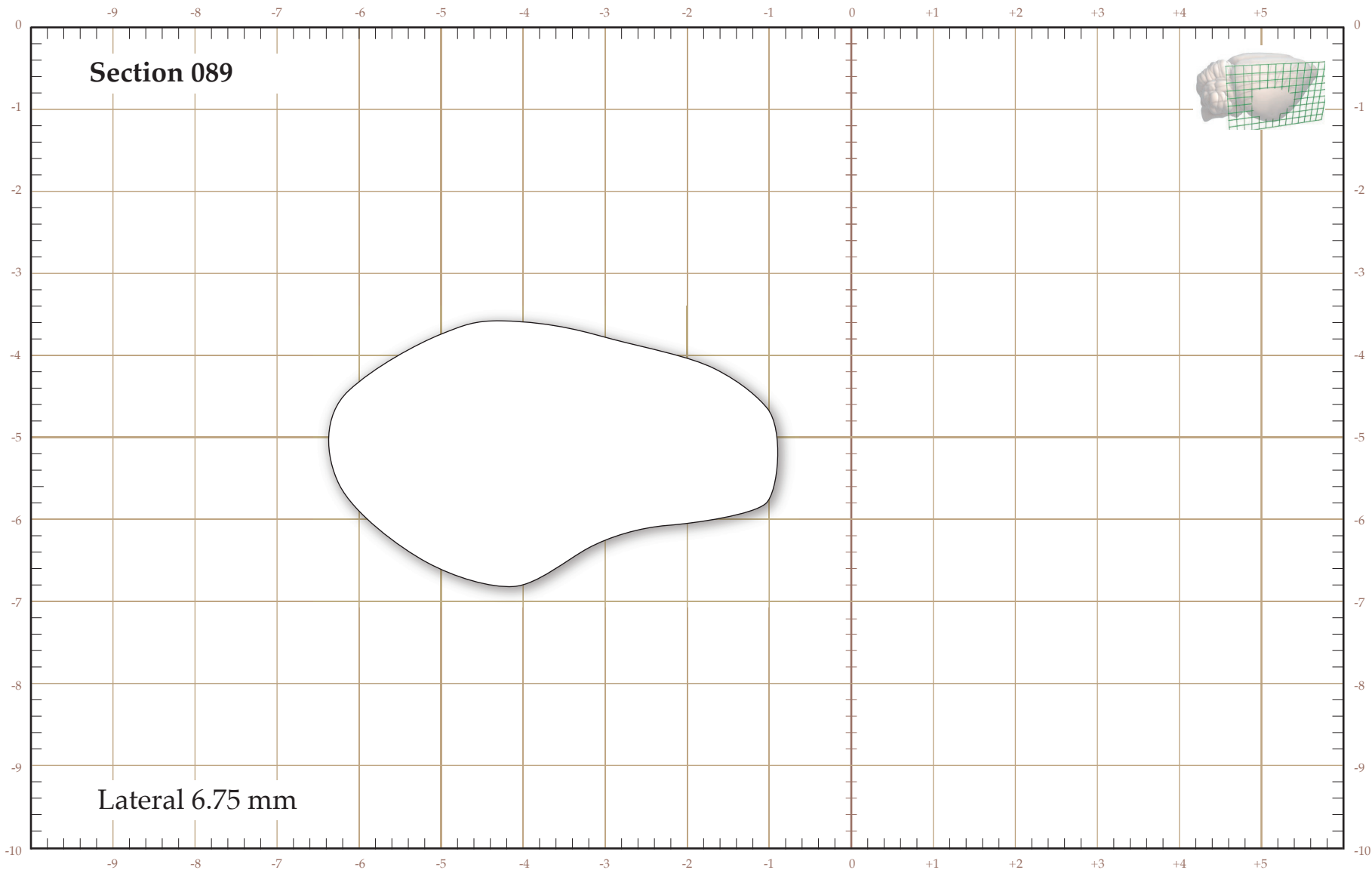
S2
Ent
PRh
Pir
S1
V2

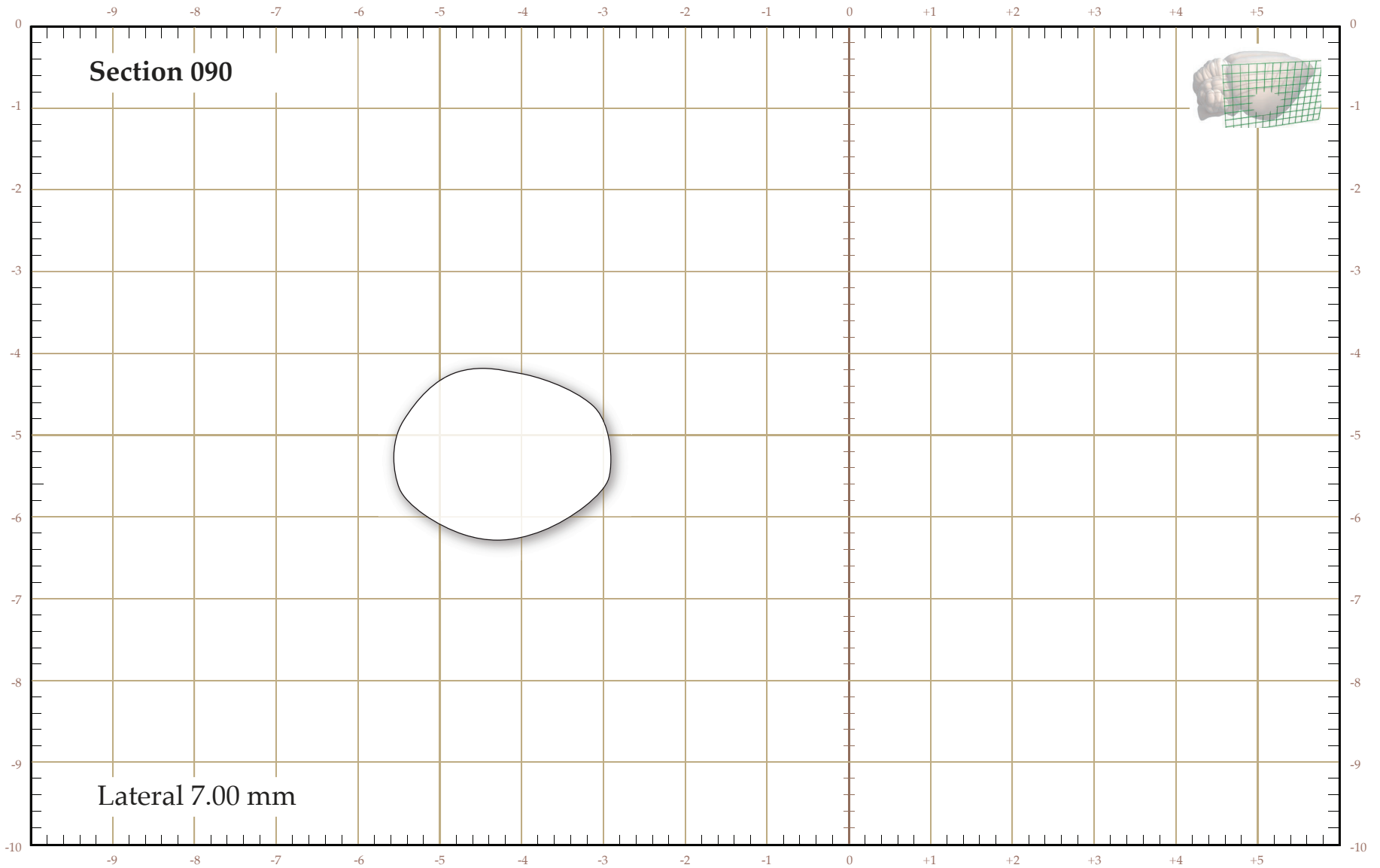
cortex

2ary somatosensory cortex
perirhinal cx

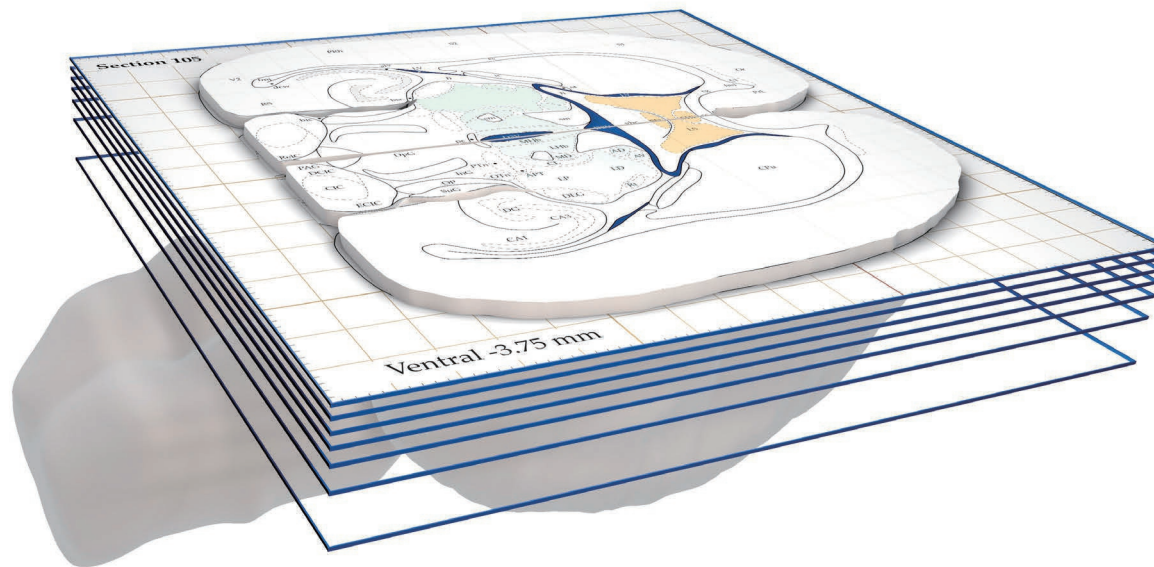
S2
PRh







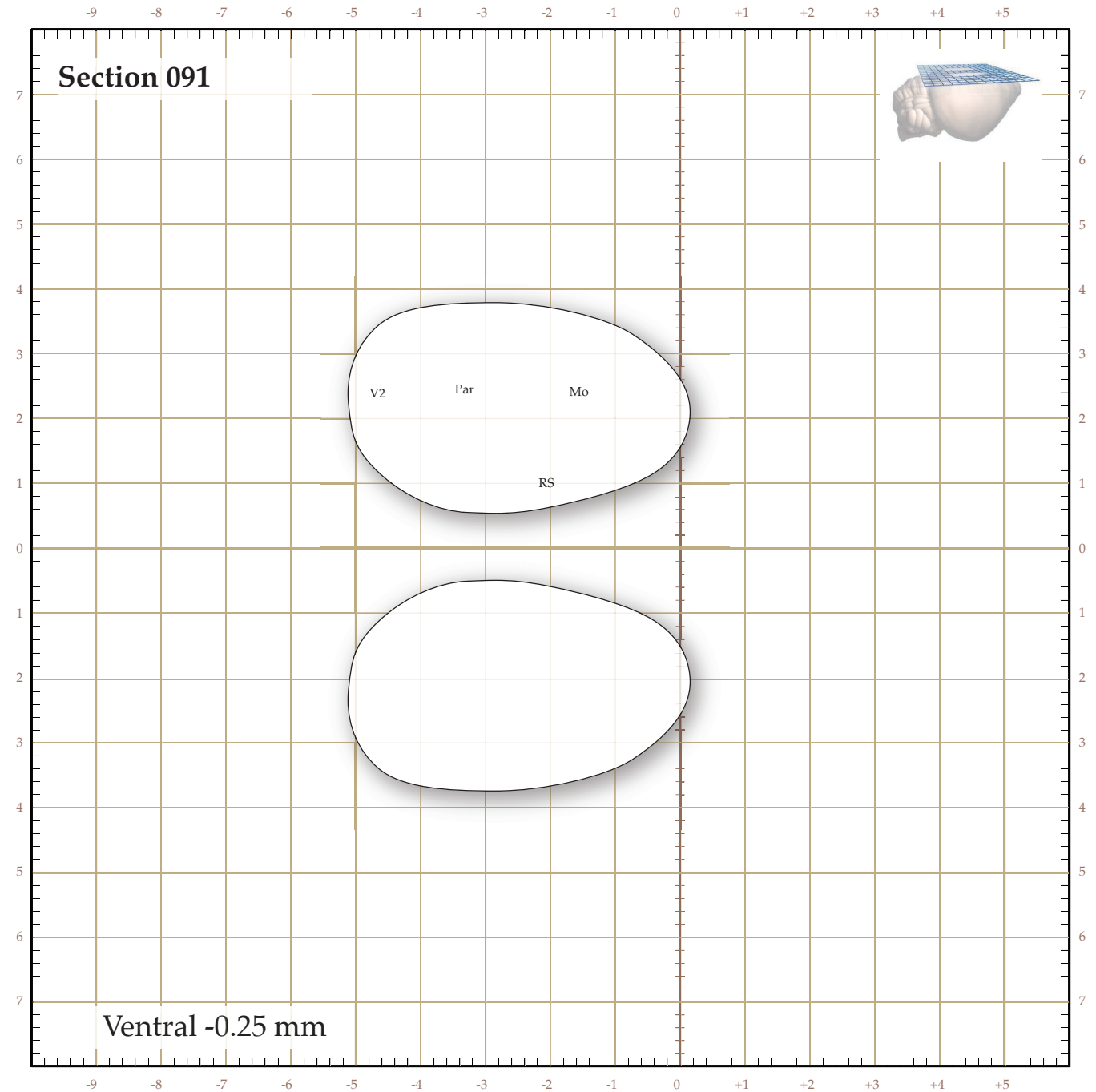
Horizontal sections



cortex

motor cortex
parietal cortex
primary visual 2
retrosple cortex

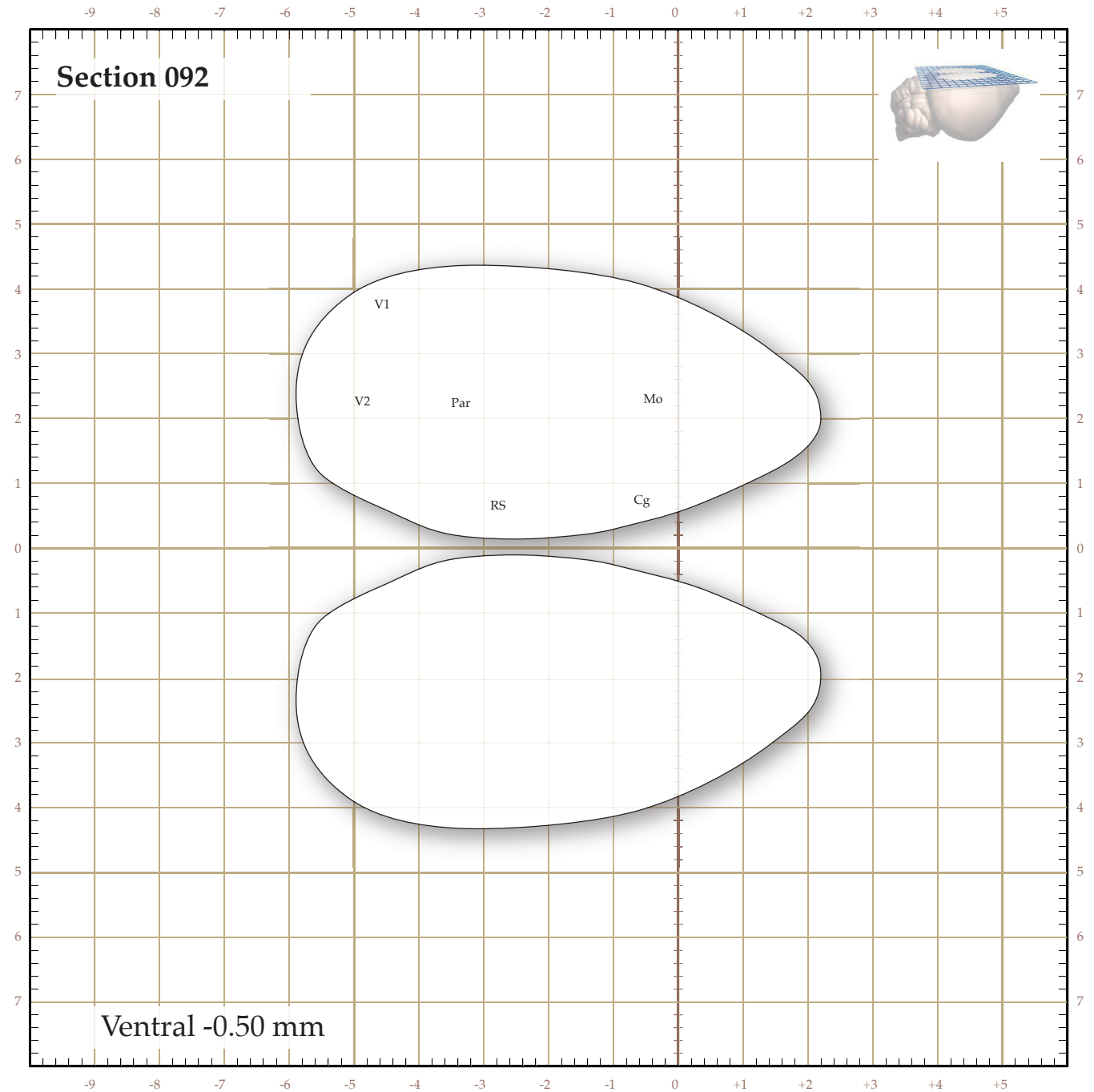
Mo
Par
V2
RS



cortex

cingulate cortex
motor cortex
parietal cortex
primary visual
primary visual 2
retrosple cortex

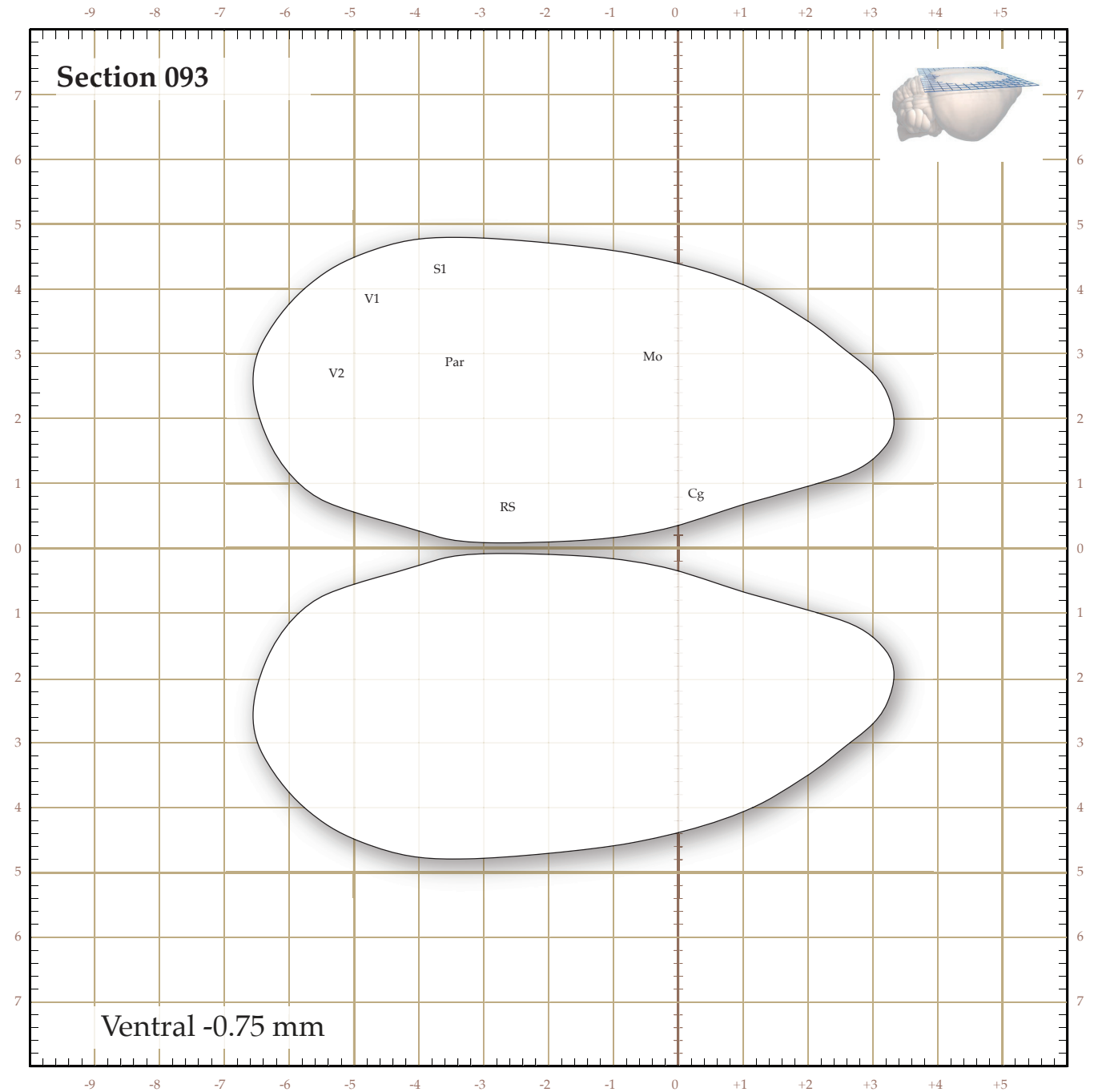
Cg
Mo
Par
V1
V2
RS



cortex

cingulate cortex
motor cortex
parietal cortex
primary somatosensory cortex
primary visual
primary visual 2
retrosple cortex

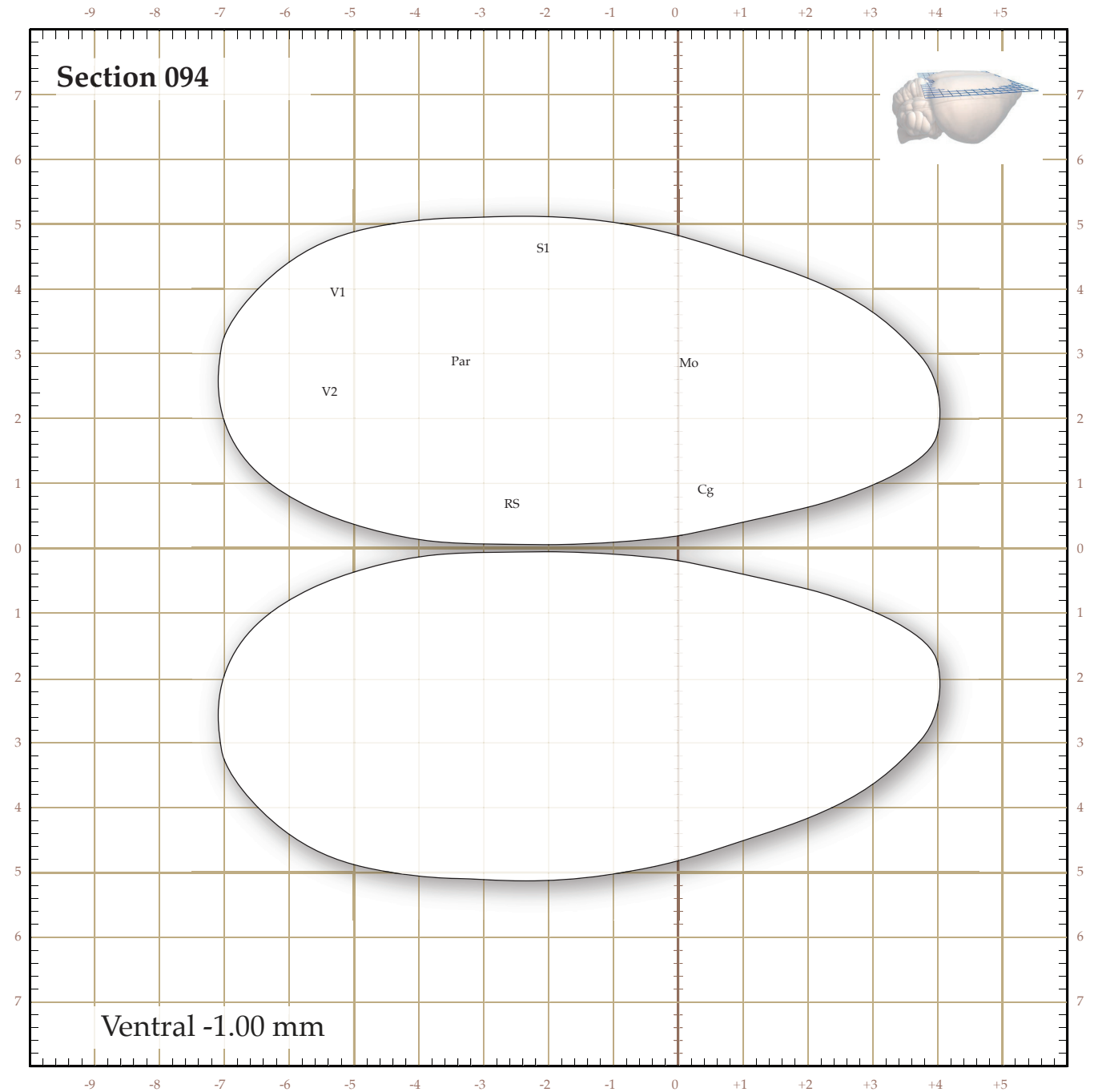
Cg
Mo
Par
S1
V1
V2
RS



cortex

cingulate cortex
motor cortex
parietal cortex
primary somatosensory cortex
primary visual
primary visual 2
retrosple cortex

Cg
Mo
Par
S1
V1
V2
RS



corpus callosum
cingulum

cortex

- cingulate cortex
- motor cortex
- parietal cortex
- primary somatosensory cortex
- primary visual
- primary visual 2
- retrosple cortex

cg

Cg

Mo

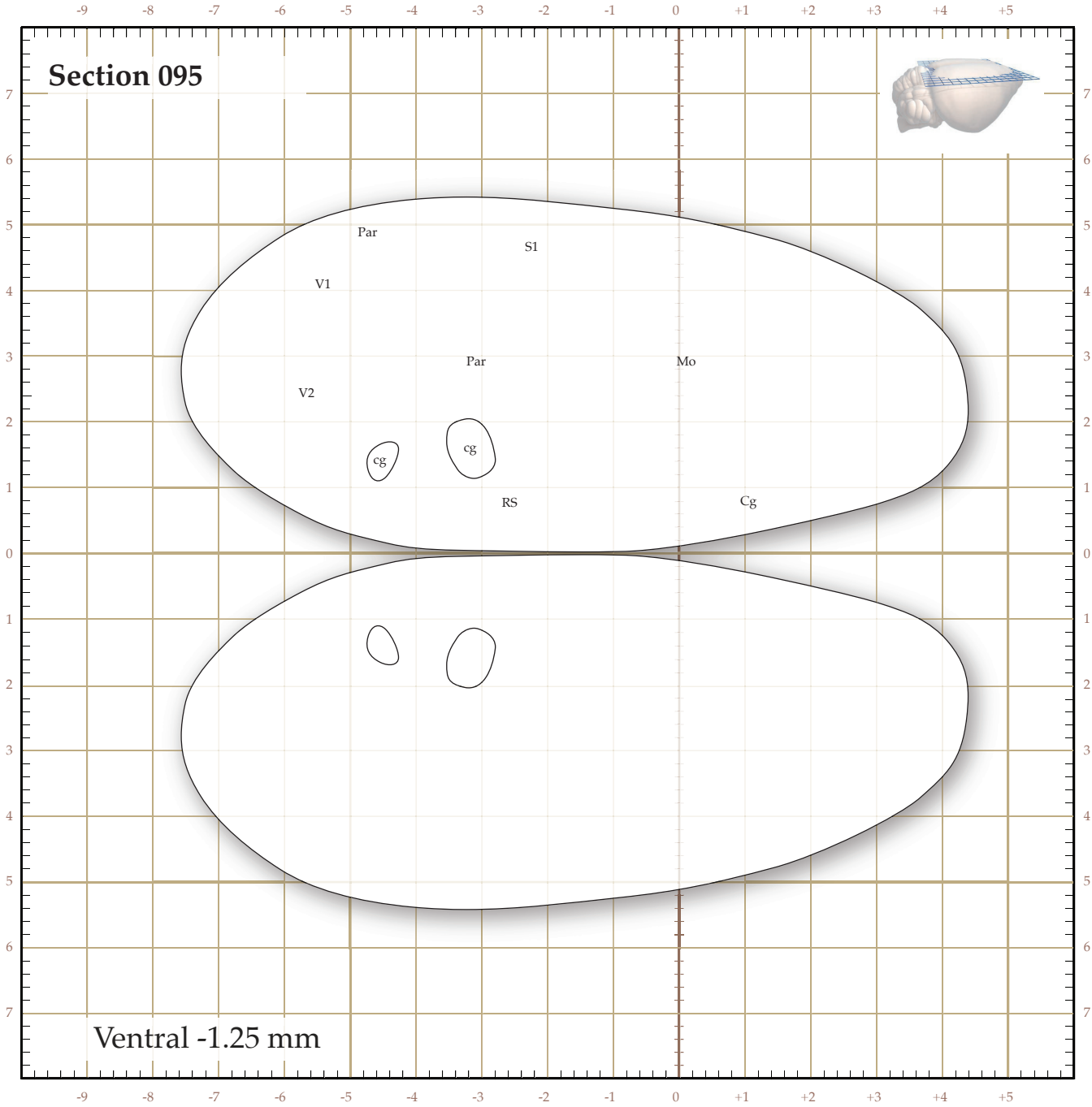
Par

S1

V1

V2

RS

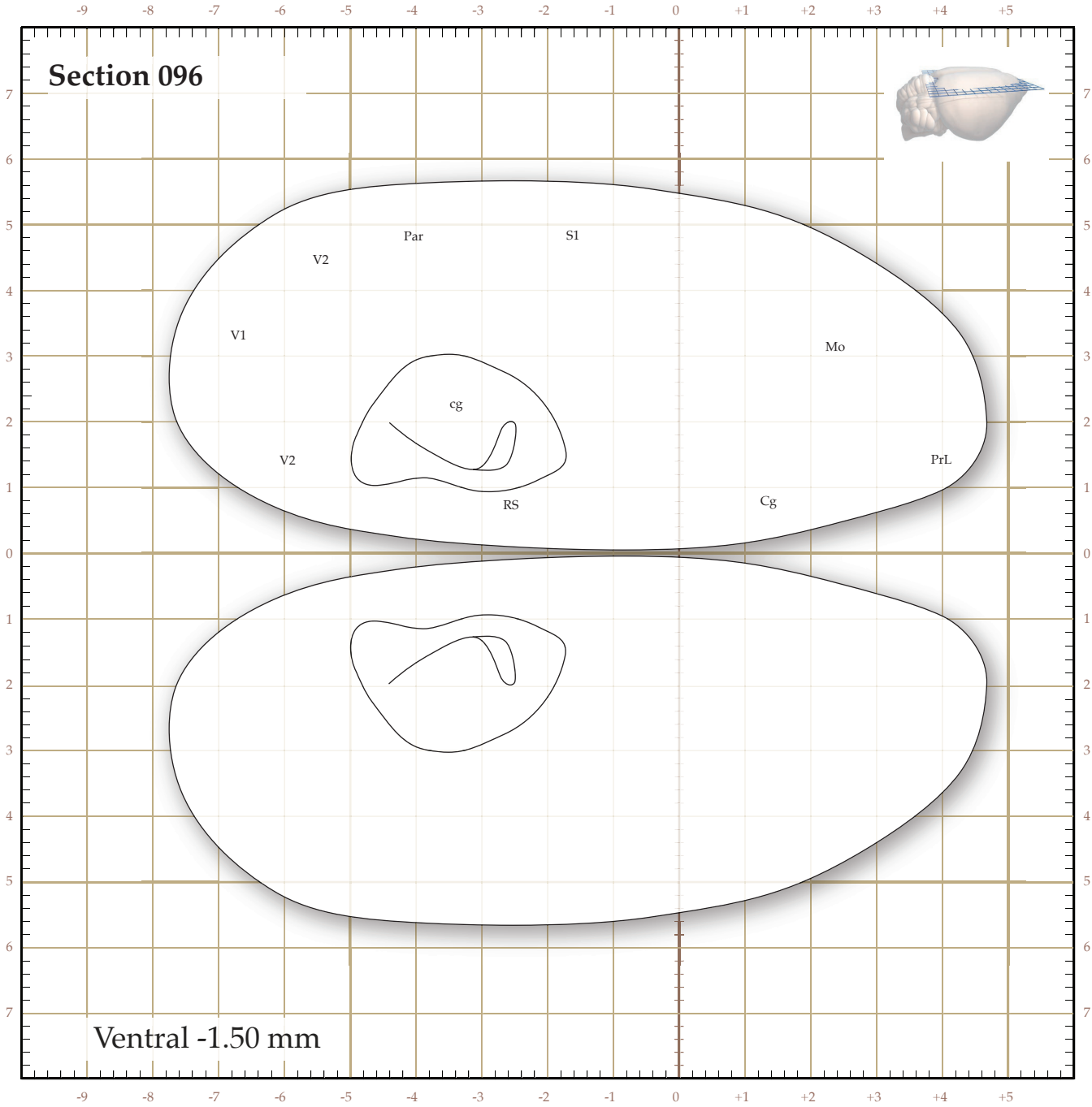


corpus callosum
cingulum

cortex

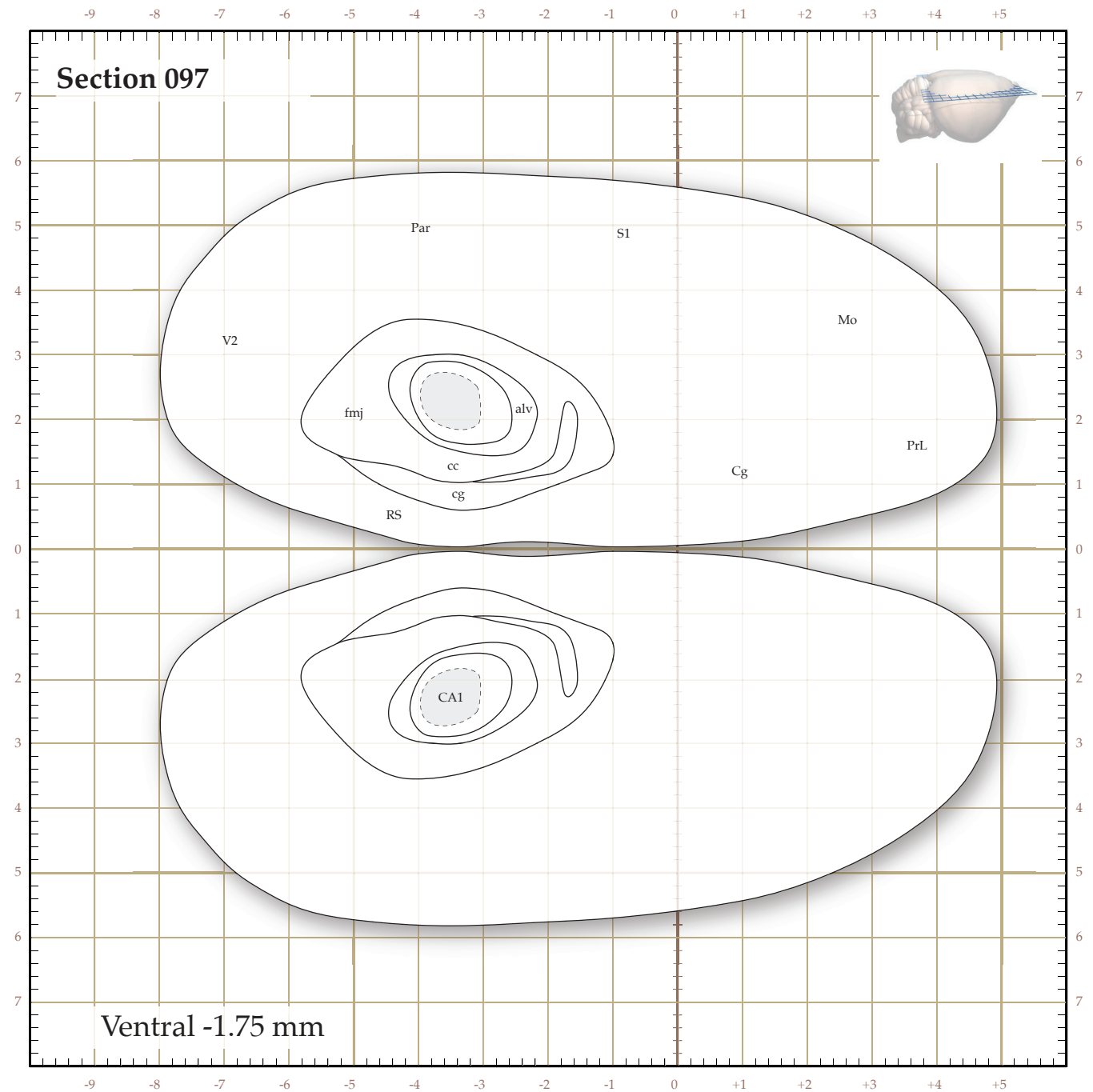
- cingulate cortex
- motor cortex
- parietal cortex
- prelimbic cortex
- primary somatosensory cortex
- primary visual
- primary visual 2
- retrosple cortex

cg
Cg
Mo
Par
PrL
S1
V1
V2
RS



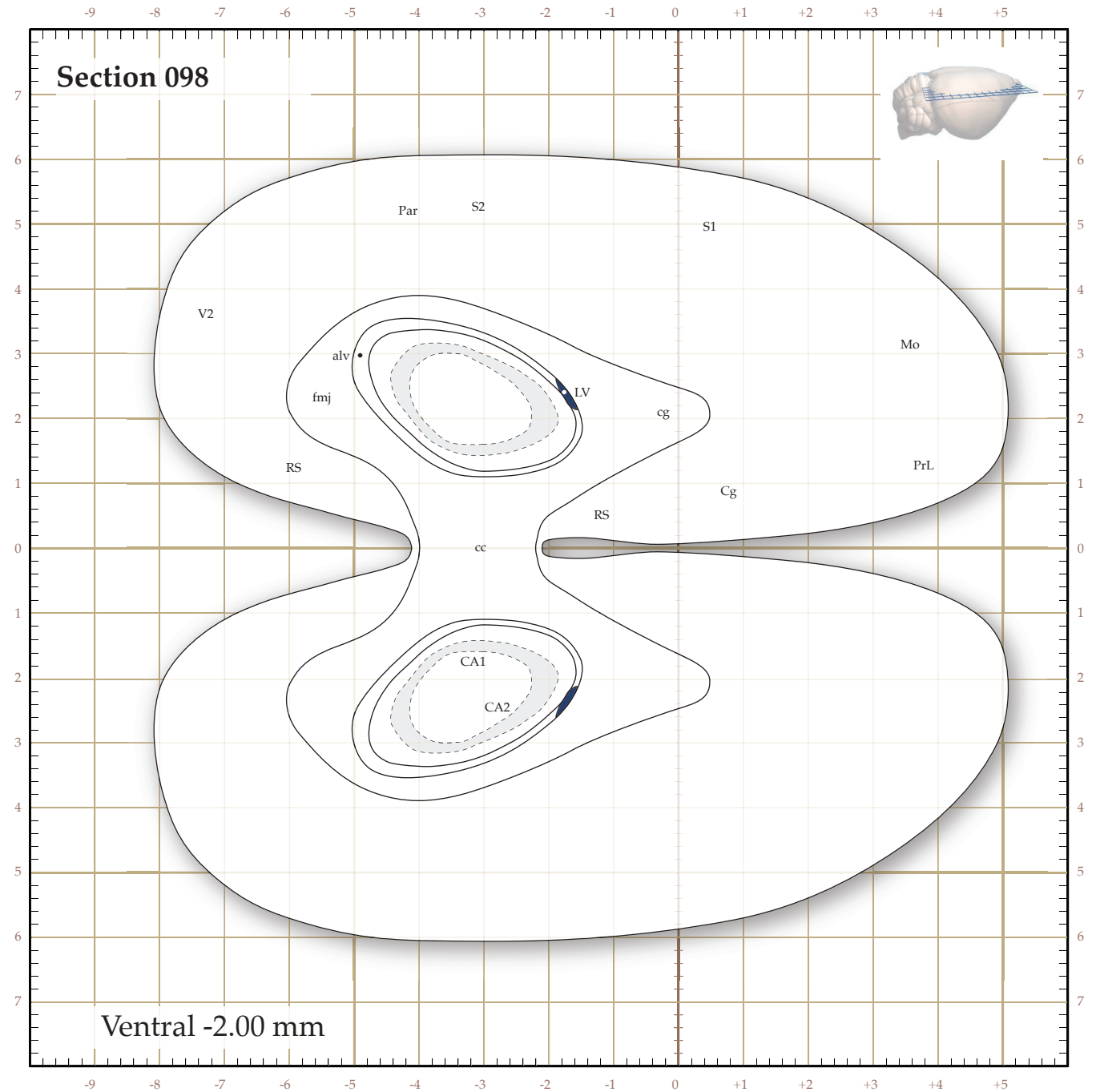
corpus callosum
 alveus hippocampus
 cingulum
 forceps major
cortex
 cingulate cortex
 motor cortex
 parietal cortex
 prelimbic cortex
 primary somatosensory cortex
 primary visual 2
 retrosple cortex
hippocampus
 CA1 field

cc
 alv
 cg
 fmj
 Cg
 Mo
 Par
 PrL
 S1
 V2
 RS
 CA1



corpus callosum
 alveus hippocampus
 cingulum
 forceps major
cortex
 2ary somatosensory cortex
 cingulate cortex
 motor cortex
 parietal cortex
 prelimbic cortex
 primary somatosensory cortex
 primary visual 2
 retrosple cortex
hippocampus
 CA1 field
 CA2 field
ventricle
 lateral ventricle

cc
 alv
 cg
 fmj
 S2
 Cg
 Mo
 Par
 PrL
 S1
 V2
 RS
 CA1
 CA2
 LV



cerebellar lobes

4th Cb lob

corpus callosum

alveus hippocampus

cingulum

external capsule

forceps major

cortex

2ary somatosensory cortex

cingulate cortex

motor cortex

parietal cortex

prelimbic cortex

primary somatosensory cortex

primary visual 2

retrosple cortex

hippocampus

CA1 field

CA2 field

CA3 field

ventricle

lateral ventricle

4Cb

cc

alv

cg

ec

fmj

S2

Cg

Mo

Par

PrL

S1

V2

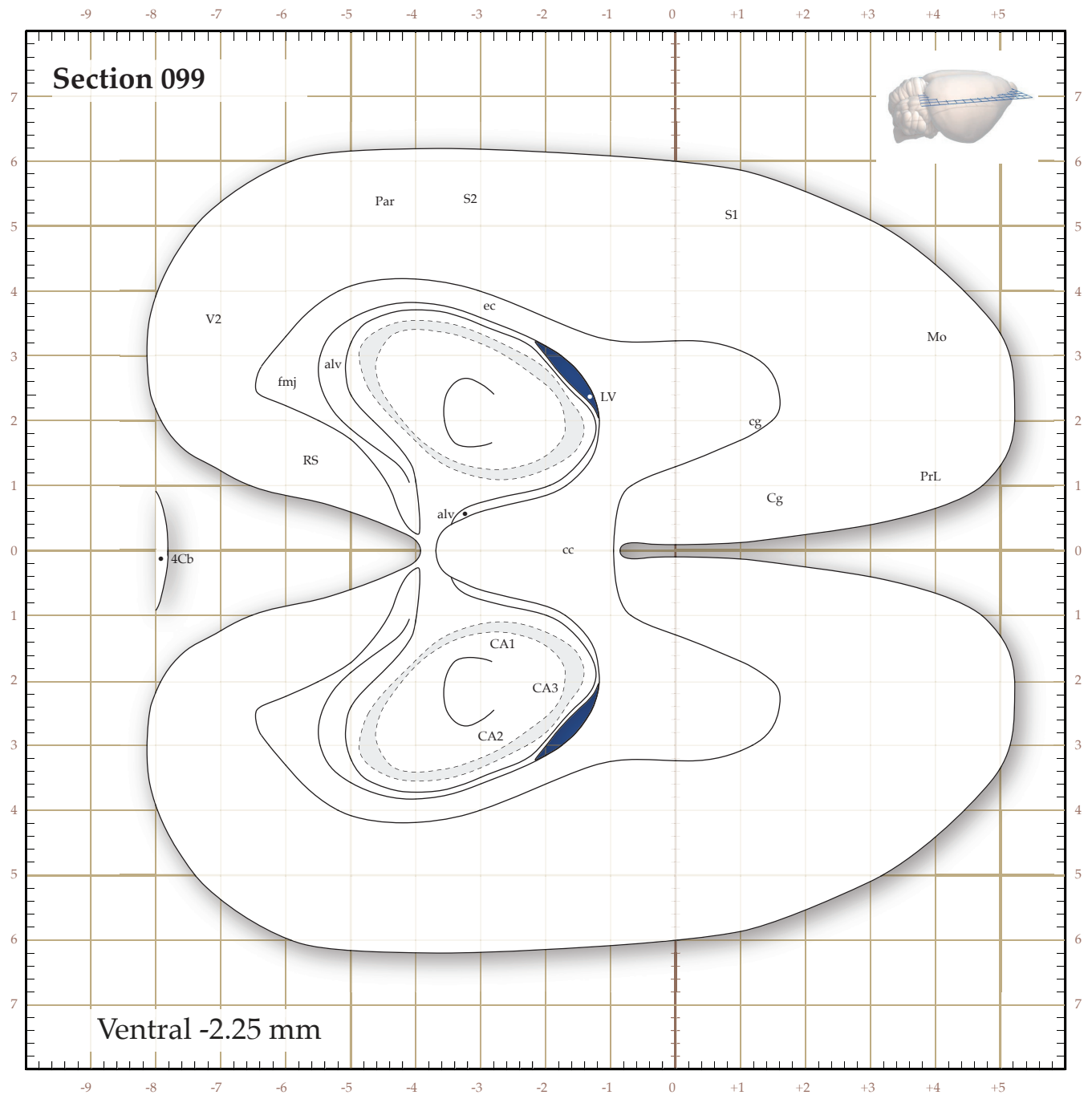
RS

CA1

CA2

CA3

LV



cerebellar lobes

4th Cb lob

corpus callosum

alveus hippocampus

cingulum

external capsule

forceps major

cortex

2ary somatosensory cortex

cingulate cortex

motor cortex

parietal cortex

prelimbic cortex

primary somatosensory cortex

primary visual 2

retrosple cortex

hippocampus

CA1 field

CA2 field

CA3 field

inferior colliculus

central nu

dorsal ctx inf coll

ext ctx inf coll

striatum

caudate putamen

superior colliculus

superficial gray layer

ventricle

3rd ventricle

dorsal third ventricle

lateral ventricle

4Cb

cc

alv

cg

ec

fmj

S2

Cg

Mo

Par

PrL

S1

V2

RS

CA1

CA2

CA3

CIC

DCIC

ECIC

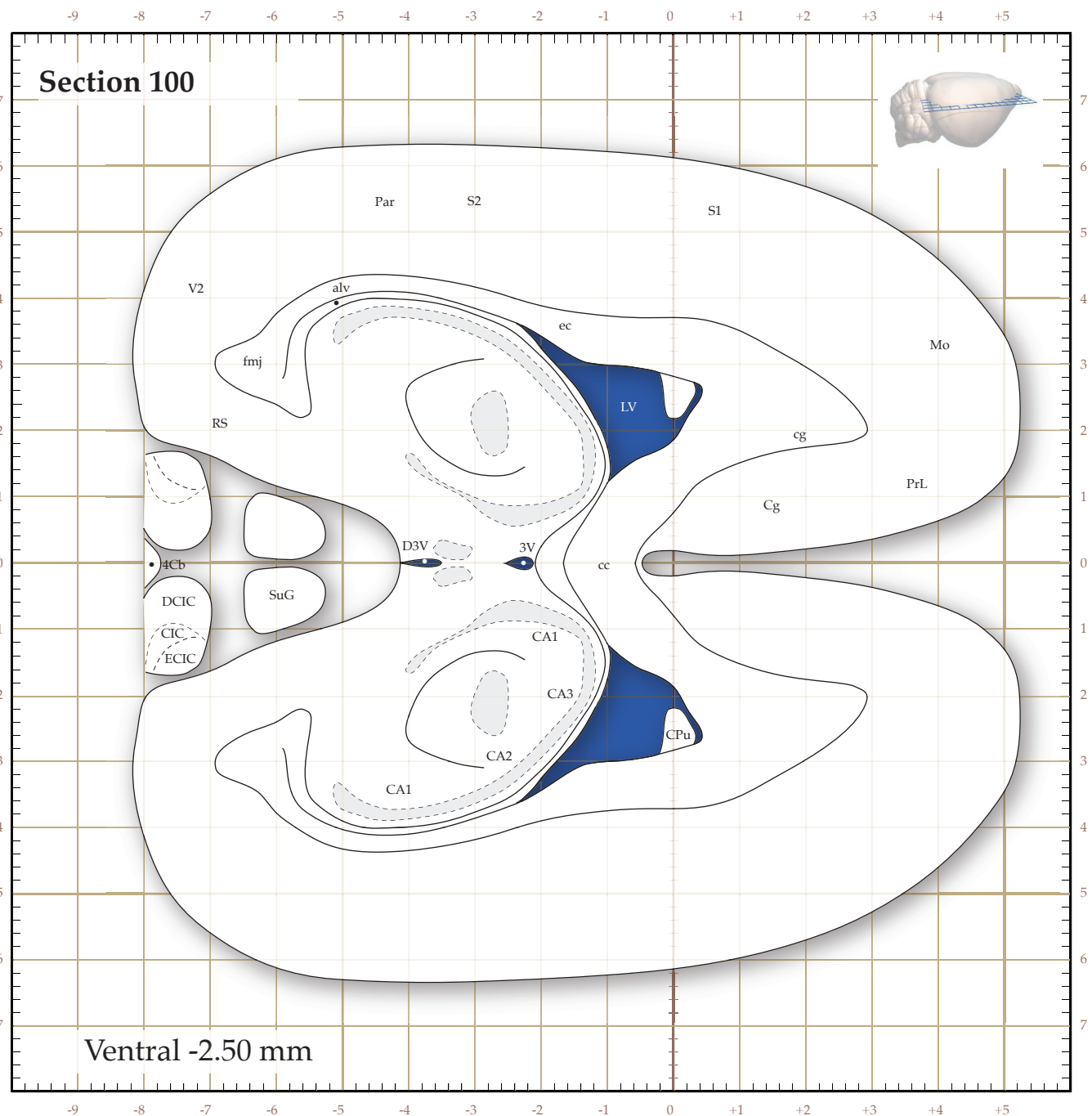
CPu

SuG

3V

D3V

LV



corpus callosum
 alveus hippocampus
 cingulum
 dorsal hipp comm
 external capsule
 forceps major
 forceps minor

cortex
 2ary somatosensory cortex
 cingulate cortex
 motor cortex
 parietal cortex
 prelimbic cortex
 primary somatosensory cortex
 primary visual 2
 retrosple cortex

hippocampus
 CA1 field
 CA2 field
 CA3 field
 dentate gyrus
 ventral hipp comm

inferior colliculus
 central nu
 dorsal ctx inf coll
 ext ctx inf coll

striatum
 caudate putamen

superior colliculus
 optic n layer
 superficial gray layer

ventricle
 3rd ventricle
 dorsal third ventricle
 lateral ventricle

cc
 alv
 cg
 dhc
 ec
 fmj
 fmi

S2
 Cg
 Mo
 Par
 PrL
 S1
 V2
 RS

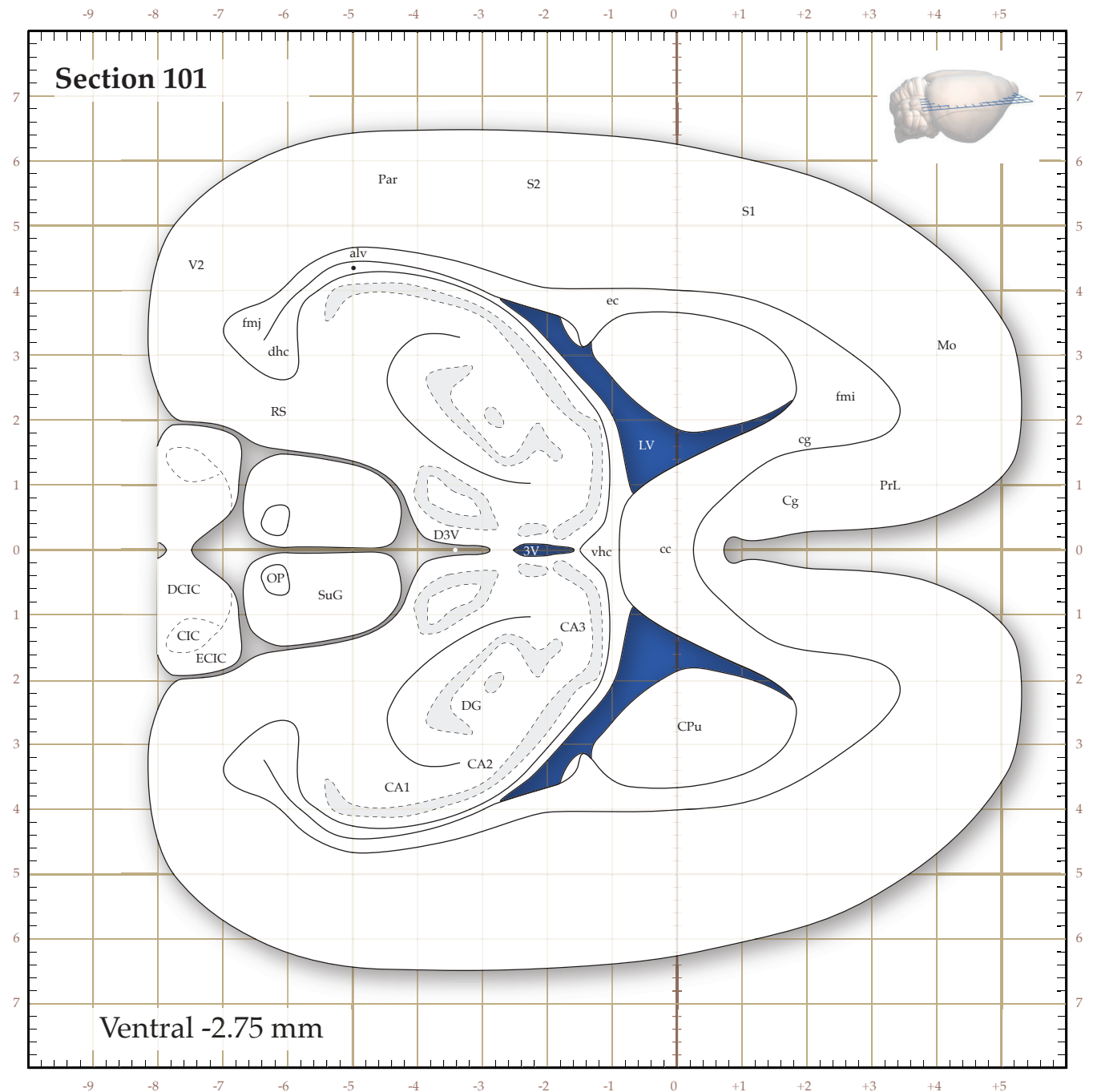
CA1
 CA2
 CA3
 DG
 vhc

CIC
 DCIC
 ECIC

CPu

OP
 SuG

3V
 D3V
 LV



corpus callosum
 alveus hippocampus
 cingulum
 external capsule
 forceps major
 forceps minor

cortex
 2ary somatosensory cortex
 cingulate cortex
 motor cortex
 parietal cortex
 prelimbic cortex
 primary somatosensory cortex
 primary visual 2
 retrosple cortex

hippocampus
 fimbria hippocampus
 CA1 field
 CA2 field
 CA3 field
 dentate gyrus
 ventral hipp comm

inferior colliculus
 central nu
 comm of inf coll
 dorsal ctx inf coll
 ext ctx inf coll

septum
 lateral septum

striatum
 caudate putamen

superior colliculus
 optic n layer
 superficial gray layer

ventricle
 3rd ventricle
 dorsal third ventricle
 lateral ventricle

cc
 alv
 cg
 ec
 fmj
 fmi

S2
 Cg
 Mo
 Par
 PrL
 S1
 V2
 RS

fi
 CA1
 CA2
 CA3
 DG
 vhc

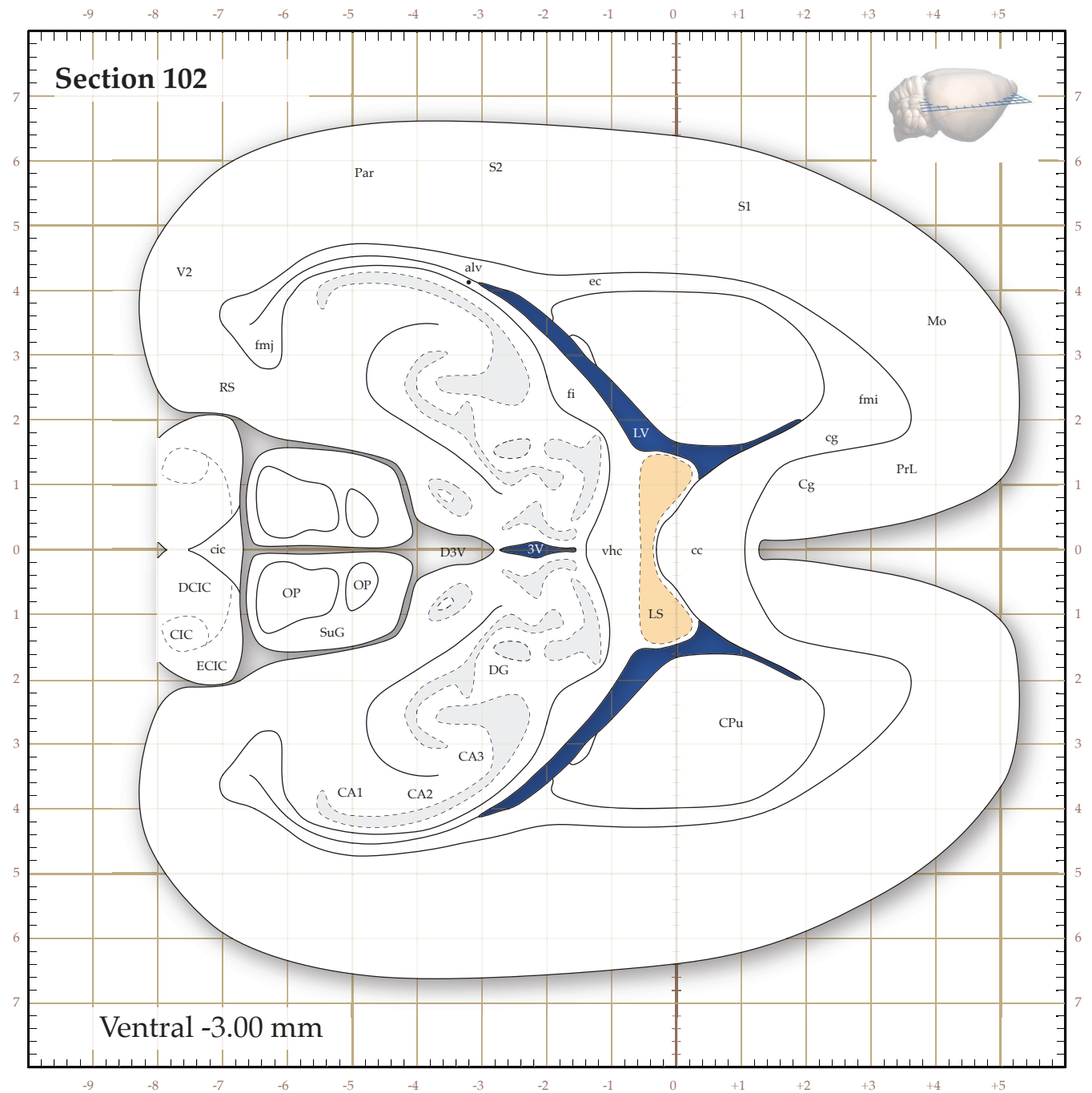
CIC
 cic
 DCIC
 ECIC

LS

CPu

OP
 SuG

3V
 D3V
 LV



corpus callosum
 alveus hippocampus
 cingulum
 external capsule
 forceps major
 forceps minor

cortex
 2ary somatosensory cortex
 cingulate cortex
 motor cortex
 parietal cortex
 prelimbic cortex
 primary somatosensory cortex
 primary visual 2
 retrosple cortex

hippocampus
 fimbria hippocampus
 CA1 field
 CA3 field
 dentate gyrus
 ventral hipp comm

inferior colliculus
 central nu
 comm of inf coll
 dorsal ctx inf coll
 ext ctx inf coll

int capsule

septum
 lateral septum

striatum
 caudate putamen

superior colliculus
 brachium sup coll
 intermediate gray layer
 optic n layer
 superficial gray layer

thalamus
 laterodorsal thal nu
 stria medullaris thal

ventricle
 3rd ventricle
 dorsal third ventricle
 lateral ventricle

cc
 alv
 cg
 ec
 fmj
 fmi

S2
 Cg
 Mo
 Par
 PrL
 S1
 V2
 RS

fi
 CA1
 CA3
 DG
 vhc

CIC
 cic
 DCIC
 ECIC
 ic

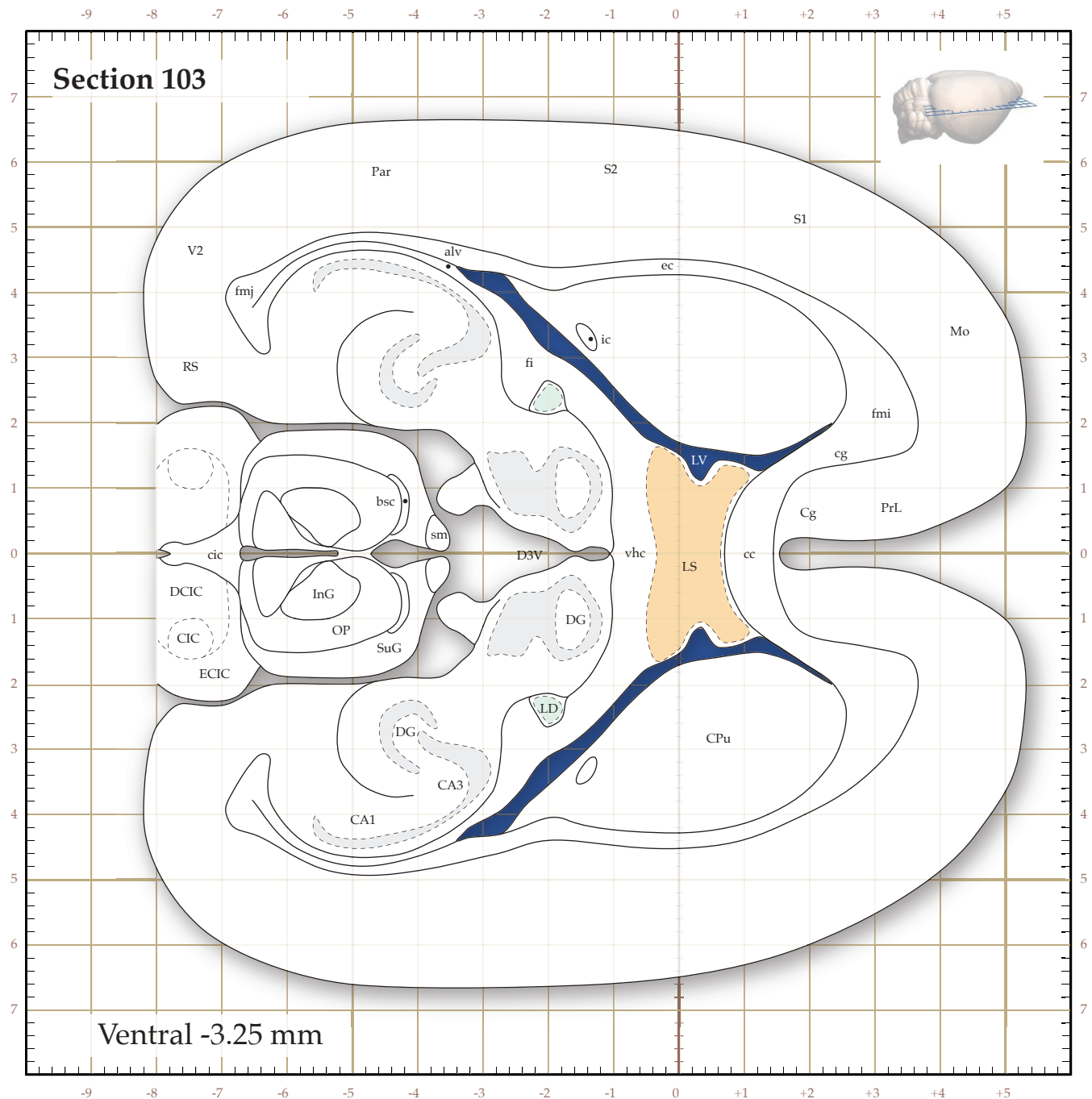
LS

CPu

bsc
 InG
 OP
 SuG

LD
 sm

3V
 D3V
 LV



claustrum

corpus callosum

alveus hippocampus

cingulum

external capsule

forceps major

forceps minor

cortex

2ary somatosensory cortex

parietal cortex

prelimbic cortex

primary somatosensory cortex

primary visual 2

retrosple cortex

geniculate nu

dorsal lateral geniculate nu

hippocampus

fimbria hippocampus

CA1 field

CA3 field

dentate gyrus

ventral hipp comm

inferior colliculus

central nu

comm of inf coll

dorsal ctx inf coll

ext ctx inf coll

int capsule

optic

optic tract

septum

lateral septum

septofimbrial nu

septohipp nu

triangular septal nucleus

striatum

caudate putamen

superior colliculus

brachium sup coll

deep gray

intermediate gray layer

optic n layer

superficial gray layer

thalamus

anteriordors th nu

centrallateral thal nu

lat habenular nu

lateral posterior thal nu

laterodorsal thal nu

med habenular nu

stria medullaris thal

ventricle

dorsal third ventricle

lateral ventricle

Cl

cc

alv

cg

ec

fmj

fmi

S2

Par

PrL

S1

V2

RS

DLG

fi

CA1

CA3

DG

vhc

CIC

cic

DCIC

ECIC

ic

opt

LS

SFi

SHi

TS

CPu

bsc

DpG

InG

OP

SuG

AD

CL

LHb

LP

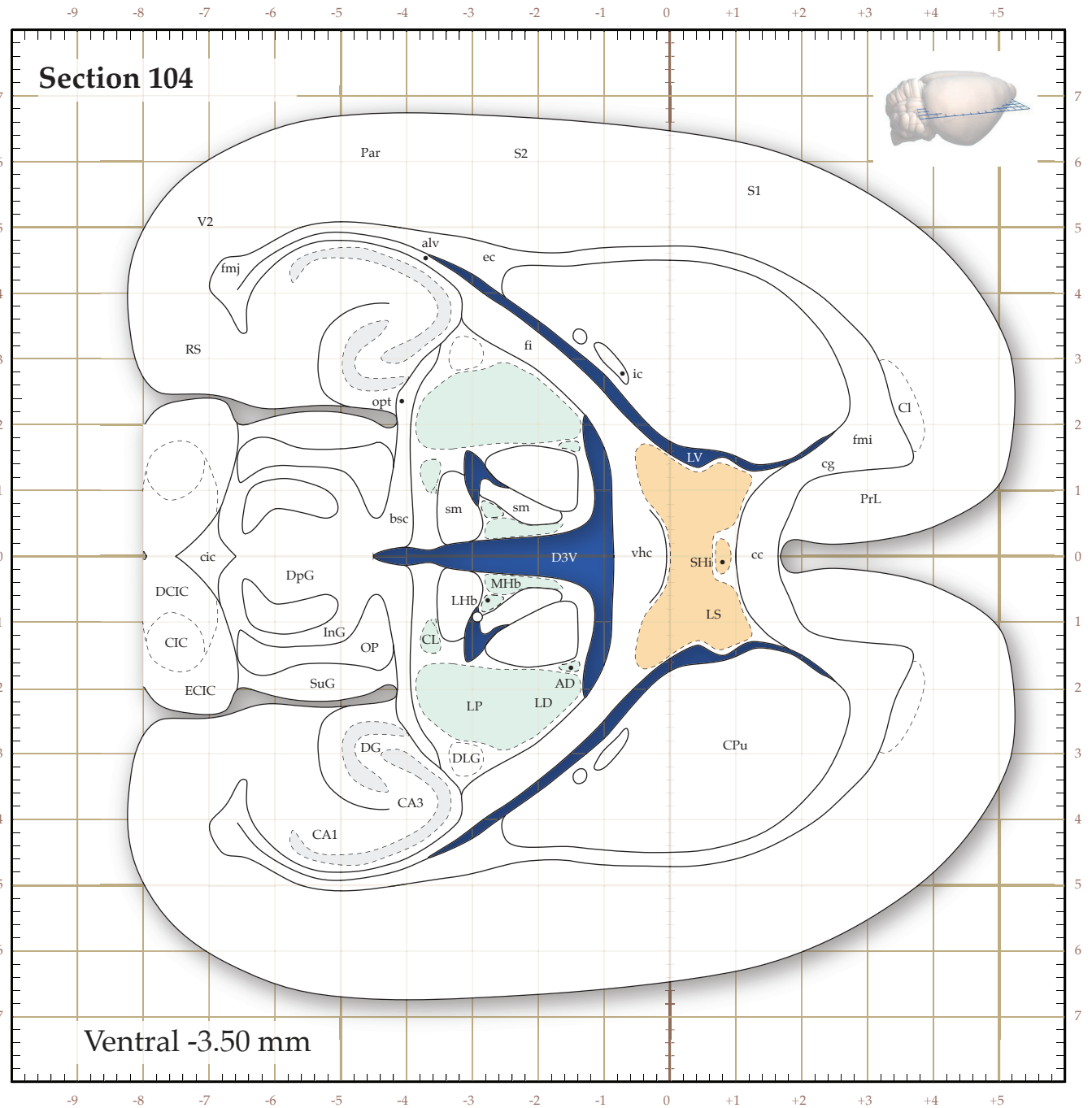
LD

MHb

sm

D3V

LV



ant pretecal
claustrum
corpus callosum
 alveus hippocampus
 cingulum
 external capsule
 forceps major
 forceps minor
cortex
 2ary somatosensory cortex
 orbital cortex
 perirhinal cx
 prelimbic cortex
 primary somatosensory cortex
 primary visual 2
 retrosple cortex
external globus pallidus
fasciculus retroflexus
geniculate nu
 dorsal lateral geniculate nu
hippocampus
 fimbria hippocampus
 CA1 field
 CA3 field
 dentate gyrus
 ventral hipp comm
inferior colliculus
 brachium inf coll
 central nu
 comm of inf coll
 dorsal ctx inf coll
 ext ctx inf coll
 nu brachium inf coll
int capsule
optic
 nu of optic tract
 optic tract
periaqueduct gray
posterior commissure
pretectal nu
septum
 lateral septum
 septofimbrial nu
 septohipp nu
stria terminalis
striatum
 caudate putamen
superior colliculus
 brachium sup coll
 commissure of sup colliculus
 deep gray
 intermediate gray layer
 optic n layer
 superficial gray layer

APT
Cl
cc
alv
cg
ec
fmj
fmi

S2
Or
PRh
PrL
S1
V2
RS
EGP
fr

DLG

fi
CA1
CA3
DG
vhc

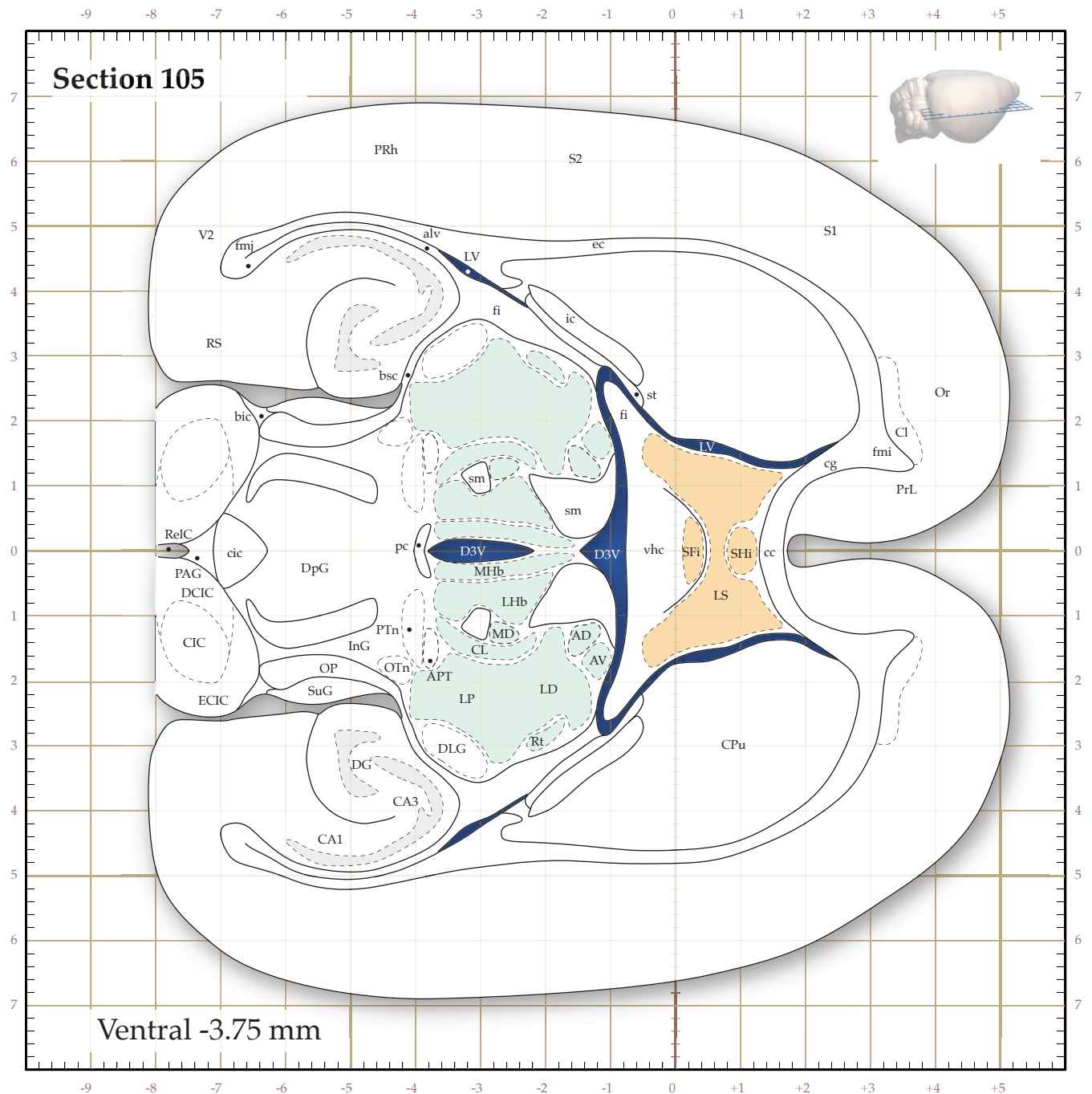
bic
CIC
cic
DCIC
ECIC
BIC
ic

OTn
opt
PAG
pc
PTn

LS
SFi
SHi
st

CPu

bsc
csc
DpG
InG
OP
SuG



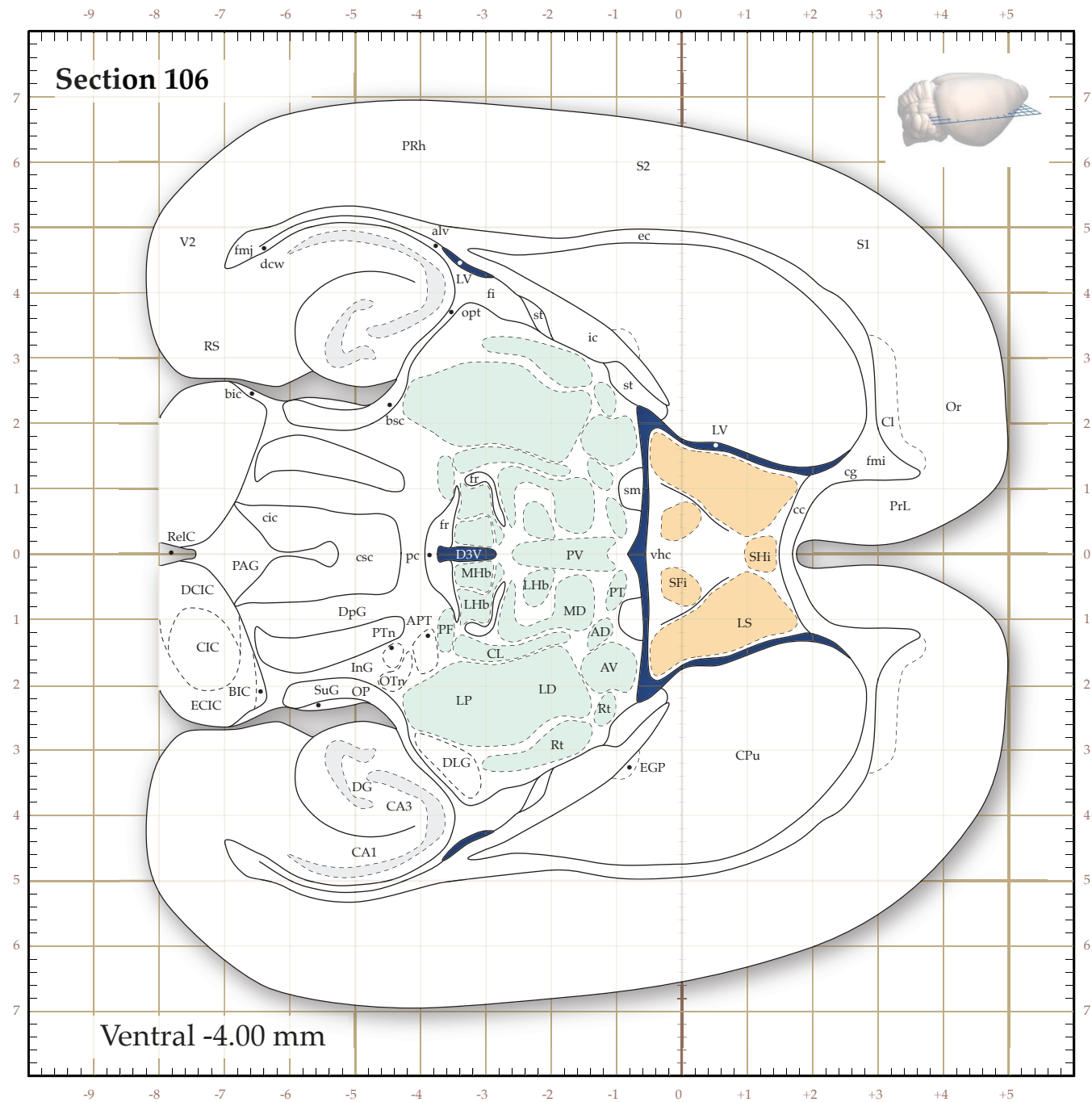
Ventral -4.00 mm

anterior dors th nu
anterior vent th nu
centrallateral thal nu
lat habenular nu
lateral posterior thal nu
laterodorsal thal nu
med habenular nu
mediodorsal thal nu
parafascic th nu
paratenial th nu
paraventricular thal nu
reticular thal nu
stria medullaris thal

dorsal third ventricle
lateral ventricle
recess of inf coll

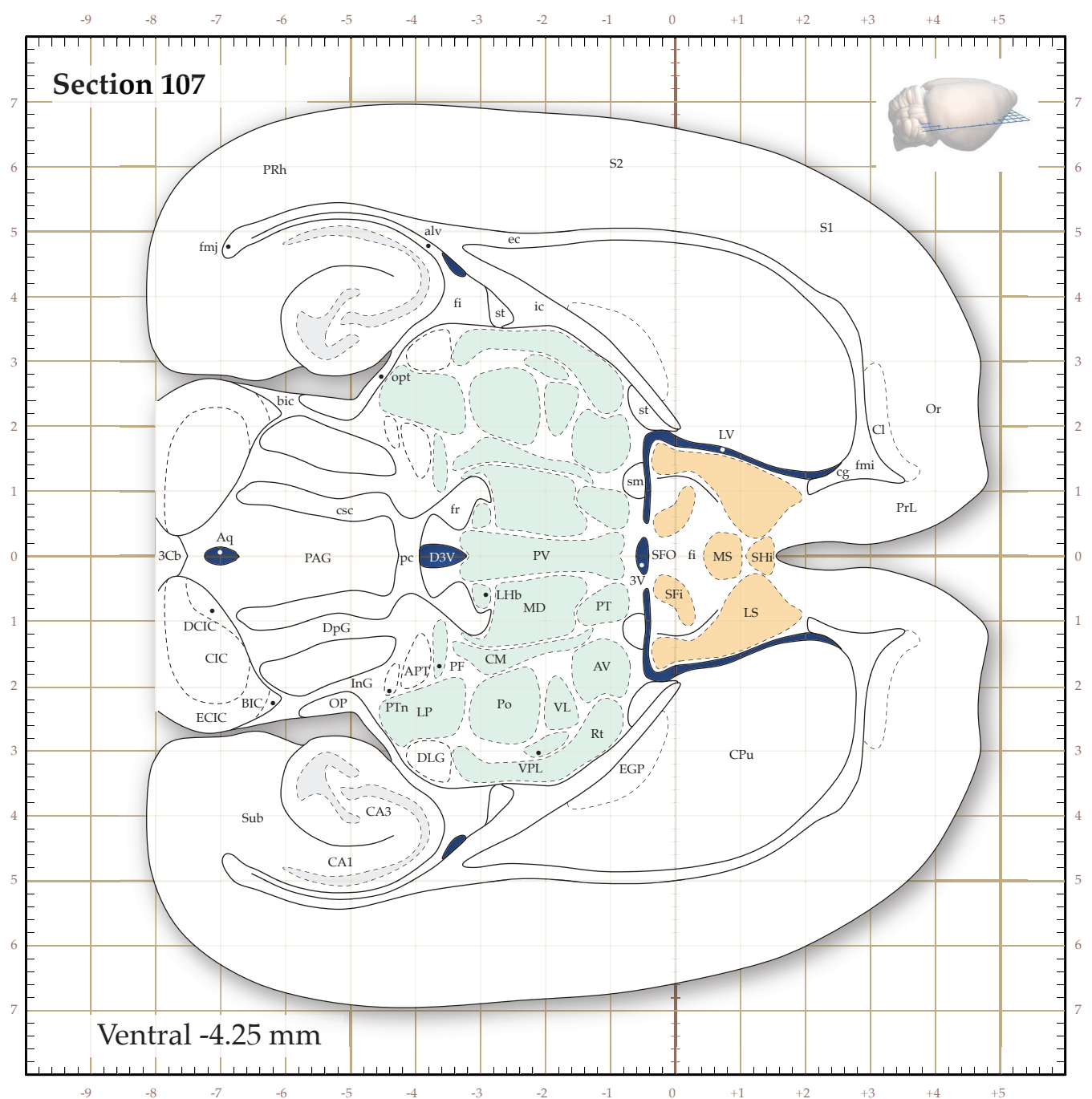
AD
AV
CL
LHb
LP
LD
MHb
MD
PF
PT
PV
Rt
sm

D3V
LV
RelC



ant pretectal
 cerebellar lobes
 3rd Cb lobs
 4th & 5th Cb lobs
 claustrum
 corpus callosum
 alveus hippocampus
 cingulum
 external capsule
 forceps major
 forceps minor
 cortex
 2ary somatosensory cortex
 orbital cortex
 perirhinal cx
 prelimbic cortex
 primary somatosensory cortex
 retrosple cortex
 external globus pallidus
 fasciculus retroflexus
 fornix
 geniculate nu
 dorsal lateral geniculate nu
 hippocampus
 fimbria hippocampus
 CA1 field
 CA3 field
 dentate gyrus
 inferior colliculus
 brachium inf coll
 central nu
 dorsal ctx inf coll
 ext ctx inf coll
 nu brachium inf coll
 int capsule
 lemniscus
 medial lemniscus
 optic
 optic tract
 periaqueduct gray
 posterior commissure
 prepectal nu
 septum
 lateral septum
 medial septum
 paralambdoid septal nu
 septofimbrial nu
 septohipp nu
 stria terminalis
 striatum
 bed nu of ST med
 caudate putamen
 subiculum
 subfornical organ

APT
 3Cb
 4/5Cb
 Cl
 alv
 cg
 ec
 fmj
 fmi
 S2
 Or
 PRh
 PrL
 S1
 RS
 EGP
 fr
 f
 DLG
 fi
 CA1
 CA3
 DG
 bic
 CIC
 DCIC
 ECIC
 BIC
 ic
 ml
 opt
 PAG
 pc
 PTn
 LS
 MS
 PLd
 SFi
 SHi
 st
 BNSTm
 CPu
 Sub
 SFO



superior colliculus
 commissure of sup colliculus
 deep gray
 intermediate gray layer
 optic n layer

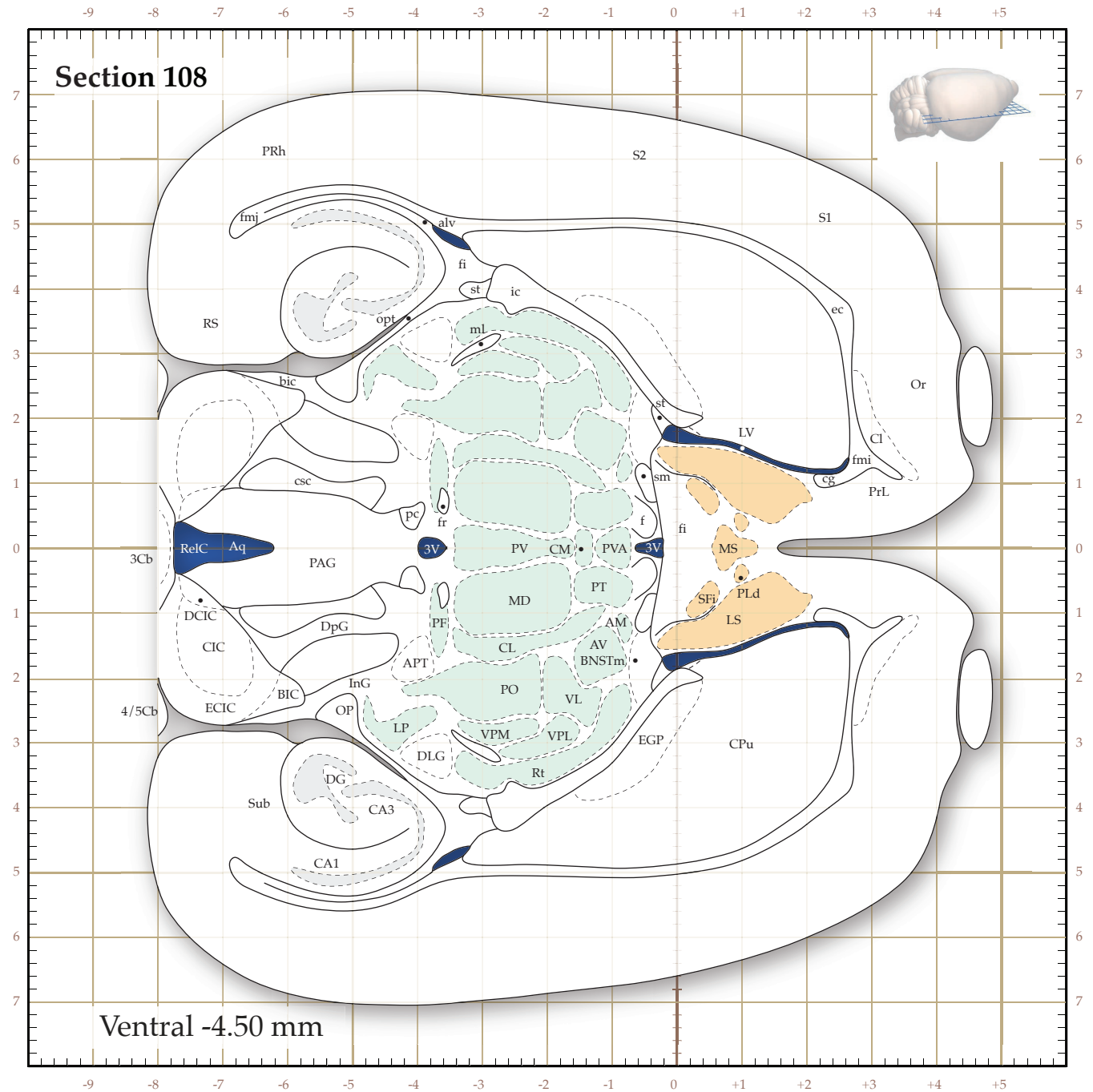
thalamus
 anteriomedial thal nu
 anteriorvent th nu
 centrallateral thal nu
 centralmedial thal nu
 lat habenular nu
 lateral posterior thal nu
 mediodorsal thal nu
 parafascic th nu
 paratenial th nu
 paraventricular thal nu
 paraventricular thal nu ant
 post thalamic nu
 reticular thal nu
 stria medullaris thal
 ventral posteromed thal nu
 ventral posterolat thal nu
 ventrolateral thal nu

ventricle
 aqueduct
 3rd ventricle
 dorsal third ventricle
 lateral ventricle
 recess of inf coll

csc
 DpG
 InG
 OP

AM
 AV
 CL
 CM
 LHb
 LP
 MD
 PF
 PT
 PV
 PVA
 Po
 Rt
 sm
 VPM
 VPL
 VL

aq
 3V
 D3V
 LV
 RelC



striatum

bed nu of ST med
caudate putamen

subiculum

superior colliculus

commissure of sup colliculus
deep gray
intermediate gray layer

thalamus

anteromedial thal nu
anteriorvent th nu
centrallateral thal nu
centralmedial thal nu
intermediodors nu
mediodorsal thal nu
parafascic th nu
paratenial th nu
paraventricular thal nu
paraventricular thal nu ant
post thalamic nu
reticular thal nu
ventral posteromed thal nu
ventral posterolat thal nu
ventrolateral thal nu

ventricle

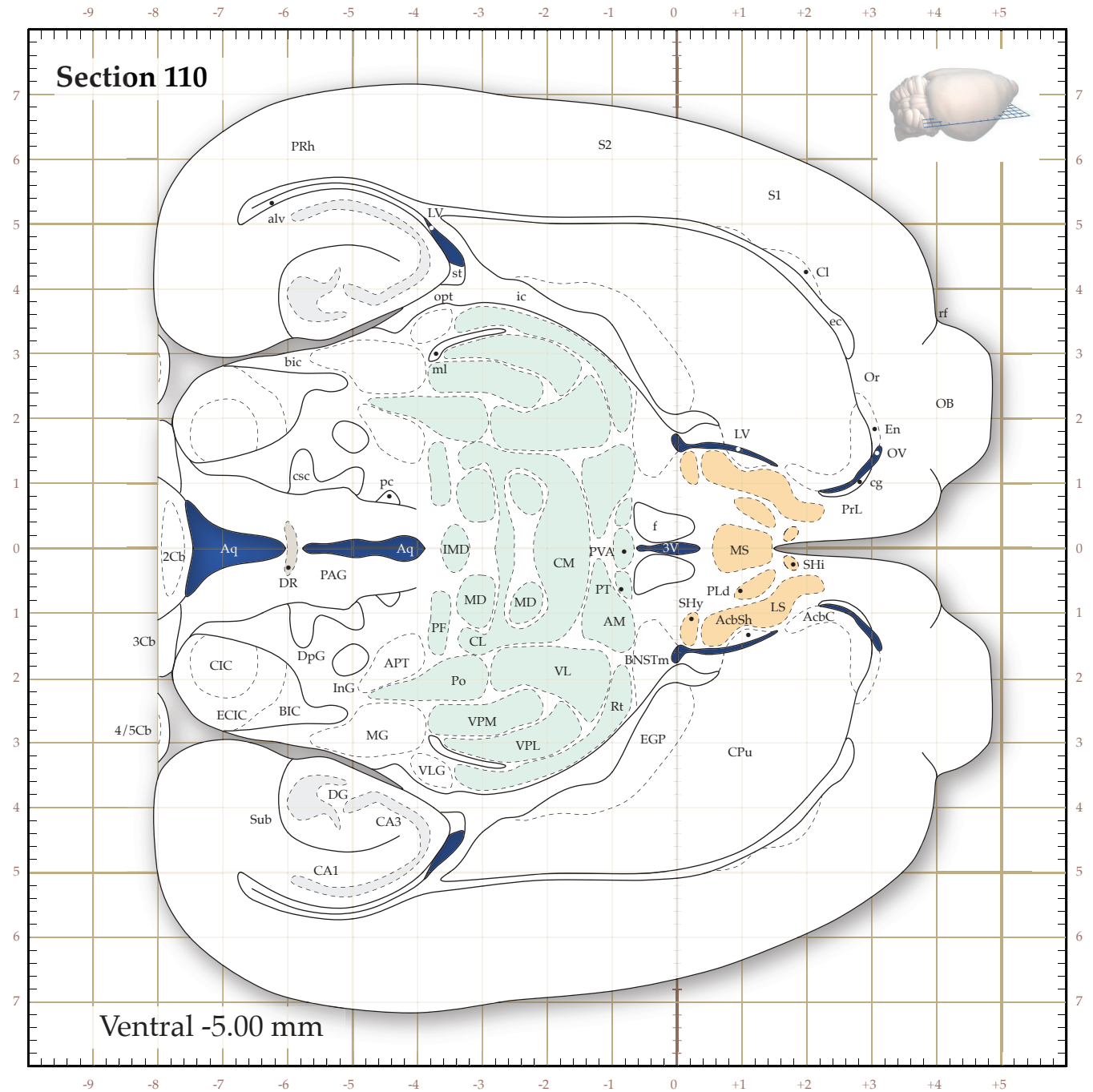
aqueduct
3rd ventricle
lateral ventricle
olfactory ventricle

BNSTm
CPu
Sub

csc
DpG
InG

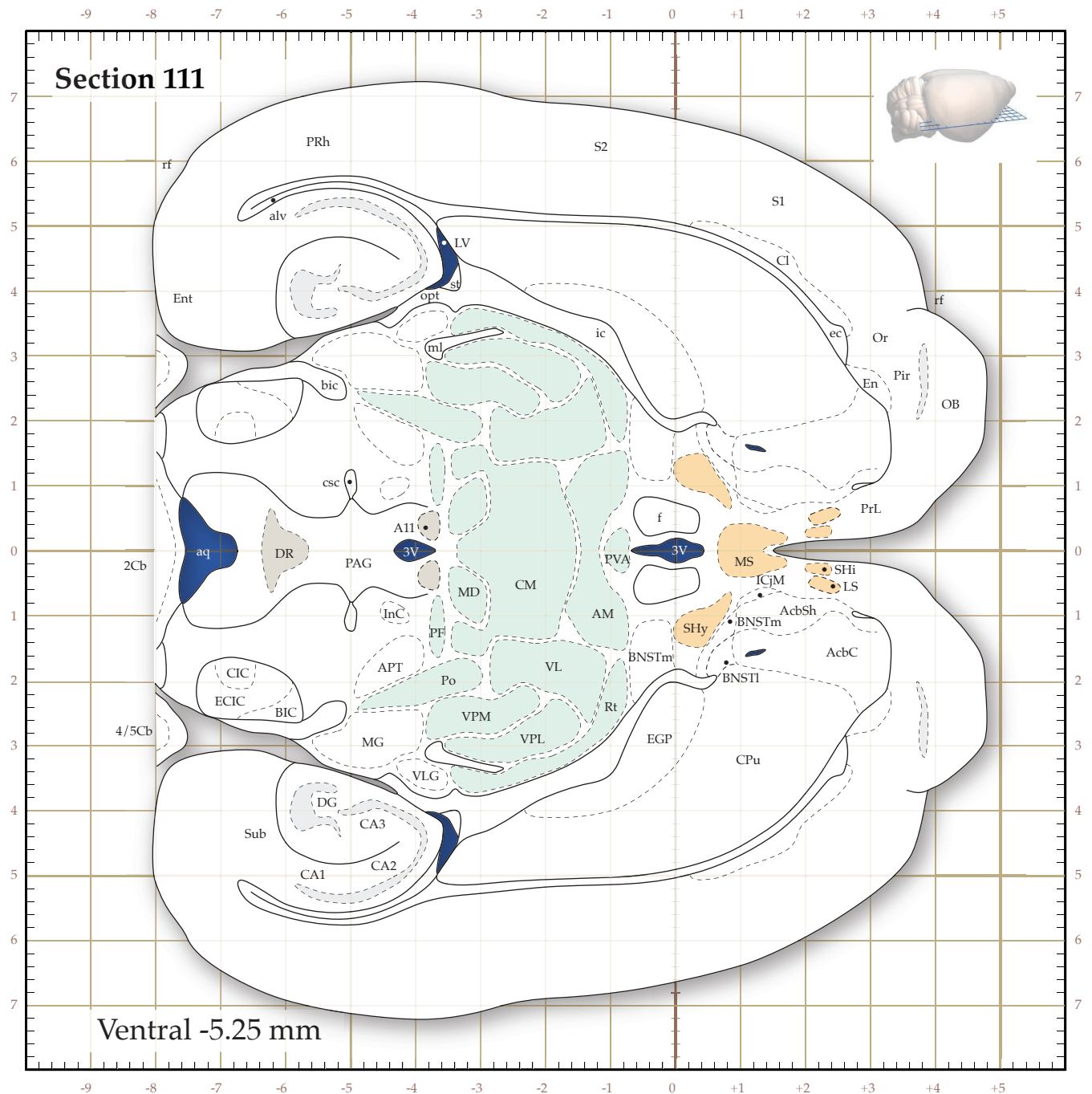
AM
AV
CL
CM
IMD
MD
PF
PT
PV
PVA
Po
Rt
VPM
VPL
VL

aq
3V
LV
OV



accumbens
 accumbens nu, core
 accumbens nu, shell
 ant pretecal
anterior commissure
 anterior commissure, anterior
cerebellar lobes
 2nd Cb lobs
 4th & 5th Cb lobs
 claustrum
corpus callosum
 alveus hippocampus
 external capsule
cortex
 2ary somatosensory cortex
 entorhinal cortex
 orbital cortex
 perirhinal cx
 piriform cortex
 prelimbic cortex
 primary somatosensory cortex
 endopiriform nu
dopamine
 A11 dopamine cell gr
 caudal A10 dopamine cell gr
 dorsal raphe nu
 external globus pallidus
 fasciculus retroflexus
 fornix
geniculate nu
 medial geniculate nu
 subgeniulate nu
 vent lat geniculate nu
hippocampus
 CA1 field
 CA2 field
 CA3 field
 dentate gyrus
inferior colliculus
 brachium inf coll
 central nu
 ext ctx inf coll
 nu brachium inf coll
 int capsule
 interstit nu Cajal
 island of Calleja, major
lemniscus
 lat lemniscus
 medial lemniscus
 med long fasc
olfactory bulb
 optic
 optic tract
 periaqueduct gray
 rhinal fissure

AcbC
 AcbSh
 APT
 ac
 aca
 2Cb
 4/5Cb
 Cl
 alv
 ec
 S2
 Ent
 Or
 PRh
 Pir
 PrL
 S1
 En
 A11
 A10c
 DR
 EGP
 fr
 f
 MG
 SubG
 VLG
 CA1
 CA2
 CA3
 DG
 bic
 CIC
 ECIC
 BIC
 Sub
 ic
 InC
 ICjM
 ll
 ml
 mlf
 OB
 opt
 PAG
 rf



septum

lateral septum
medial septum
septohipp nu
septohypothal nu

stria terminalis

bed nu of ST lat
bed nu of ST med
caudate putamen

subiculum

superior colliculus
commissure of sup colliculus

thalamus

anteromedial thal nu
centralmedial thal nu
mediodorsal thal nu
parafascic th nu
paraventricular thal nu ant
post thalamic nu
reticular thal nu
reuniens th nu
ventral posteromed thal nu
ventral posterolat thal nu
ventrolateral thal nu

ventricle

aqueduct
3rd ventricle
lateral ventricle
olfactory ventricle

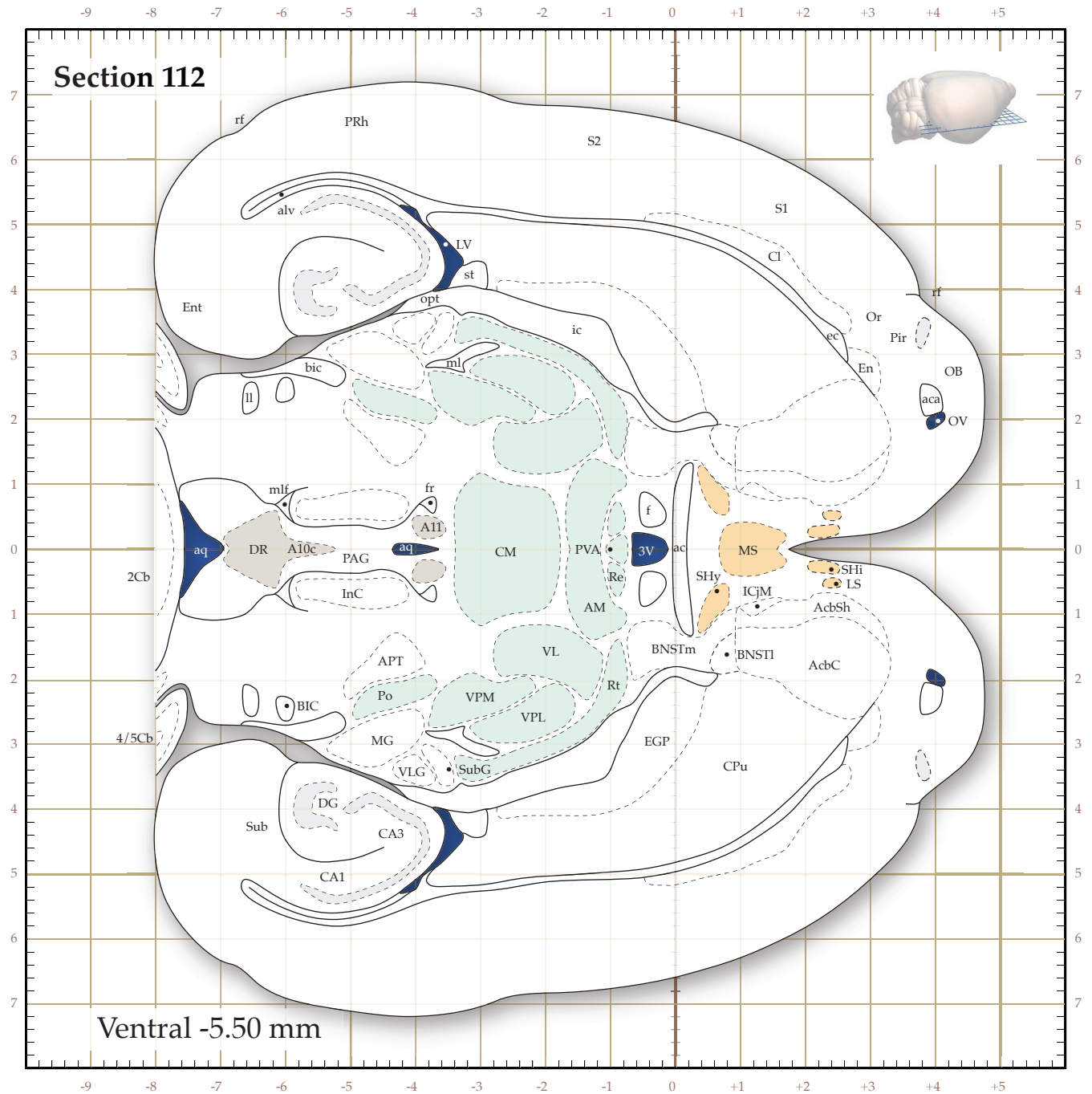
LS
MS
SHi
SHy
st

BNSTl
BNSTm
CPu
Sub

csc

AM
CM
MD
PF
PVA
Po
Rt
Re
VPM
VPL
VL

aq
3V
LV
OV



accumbens
 accumbens nu, core
 accumbens nu, shell

amygdala
 central amygdaloid nu
 lateral amygd nu

anterior commissure
 anterior commissure, anterior
 anterior commissure, posterior

cerebellar lobes
 2nd Cb lobs
 2nd & 3rd Cb lobs
 4th & 5th Cb lobs

claustrum

corpus callosum
 alveus hippocampus
 external capsule

cortex
 2ary somatosensory cortex
 entorhinal cortex
 orbital cortex
 perirhinal cx
 piriform cortex
 primary somatosensory cortex

diagonal band
 vertical limb diagonal band

dorsal tegm nu

dopamine
 A11 dopamine cell gr
 A14 dopamine cell gr, dorsal
 caudal A10 dopamine cell gr
 dorsal raphe nu

endopiriform nu

external globus pallidus

fasciculus retroflexus

fornix

geniculate nu
 medial geniculate nu
 subgeniculate nu
 vent lat geniculate nu

hippocampus
 CA1 field
 CA3 field
 dentate gyrus

hypothalamus
 posterior hypoth area

inferior colliculus
 brachium inf coll

int capsule

interstit nu Cajal

island of Calleja, major

lemniscus
 dorsal nu lat lem
 medial lemniscus

mesencephalic trigeminal tract

med long fasc

AcbC
 AcbSh

Ce
 La

ac
 aca
 acp

2Cb
 2/3Cb
 4/5Cb

Cl

alv
 ec

S2
 Ent
 Or
 PRh
 Pir
 S1

VDB
 DTg

A11
 A14d
 A10c
 DR
 En
 EGP
 fr
 f

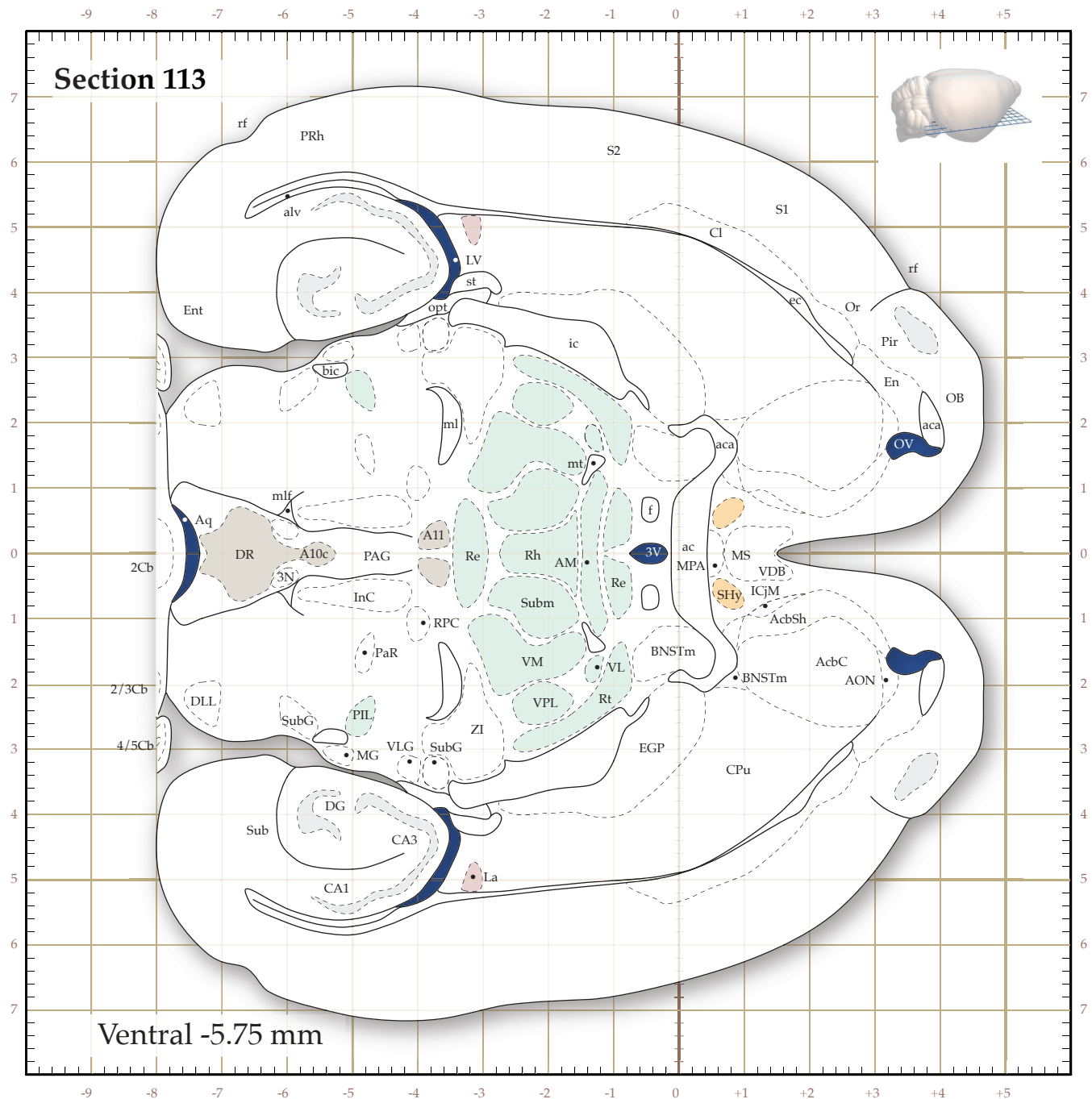
MG
 SubG
 VLG

CA1
 CA3
 DG

PH

bic
 ic
 InC
 ICjM

DLL
 ml
 me5
 mlf



accumbens
 accumbens nu, core
 accumbens nu, shell

amygdala
 basolateral amygdaloid
 central amygdaloid nu
 lateral amygd nu

anterior commissure
 anterior commissure, anterior
 anterior commissure, posterior

cerebellar lobes
 2nd & 3rd Cb lob

cerebral peduncle

claustrum

corpus callosum
 alveus hippocampus

cortex
 2ary somatosensory cortex
 entorhinal cortex
 perirhinal cx
 piriform cortex
 primary somatosensory cortex

diagonal band
 vertical limb diagonal band

dorsal tegm nu

endopiriform nu

dopamine
 A8 dopamine cell gr
 A9 dopamine cell gr
 A10 dopamine cell gr
 A11 dopamine cell gr
 A13 dopamine cell gr
 A14 dopamine cell gr
 A14 dopamine cell gr, dorsal
 caudal A10 dopamine cell gr
 dorsal raphe nu
 linear raphe
 rostral raphe
 substantia nigra compacta
 substantia nigra lat
 substantia nigra retic
 ventral tegmental area

external globus pallidus

fornix

hippocampus
 CA1 field
 CA2 field
 CA3 field
 dentate gyrus

hypothalamus
 posterior hypoth area

int capsule

lemniscus
 dorsal nu lat lem
 intermediate nu lat lem
 medial lemniscus
 ventral lemniscus nu

mesencephalic trigeminal tract

AcbC
 AcbSh

BL
 Ce
 La

aca
 acp

2/3Cb

cp
 Cl

alv

S2
 Ent
 PRh
 Pir
 S1

VDB

DTg

En

A8
 A9
 A10
 A11
 A13
 A14
 A14d
 A10c
 DR
 Li
 RL
 RL
 SNC
 SNL
 SNR
 VTA

EGP

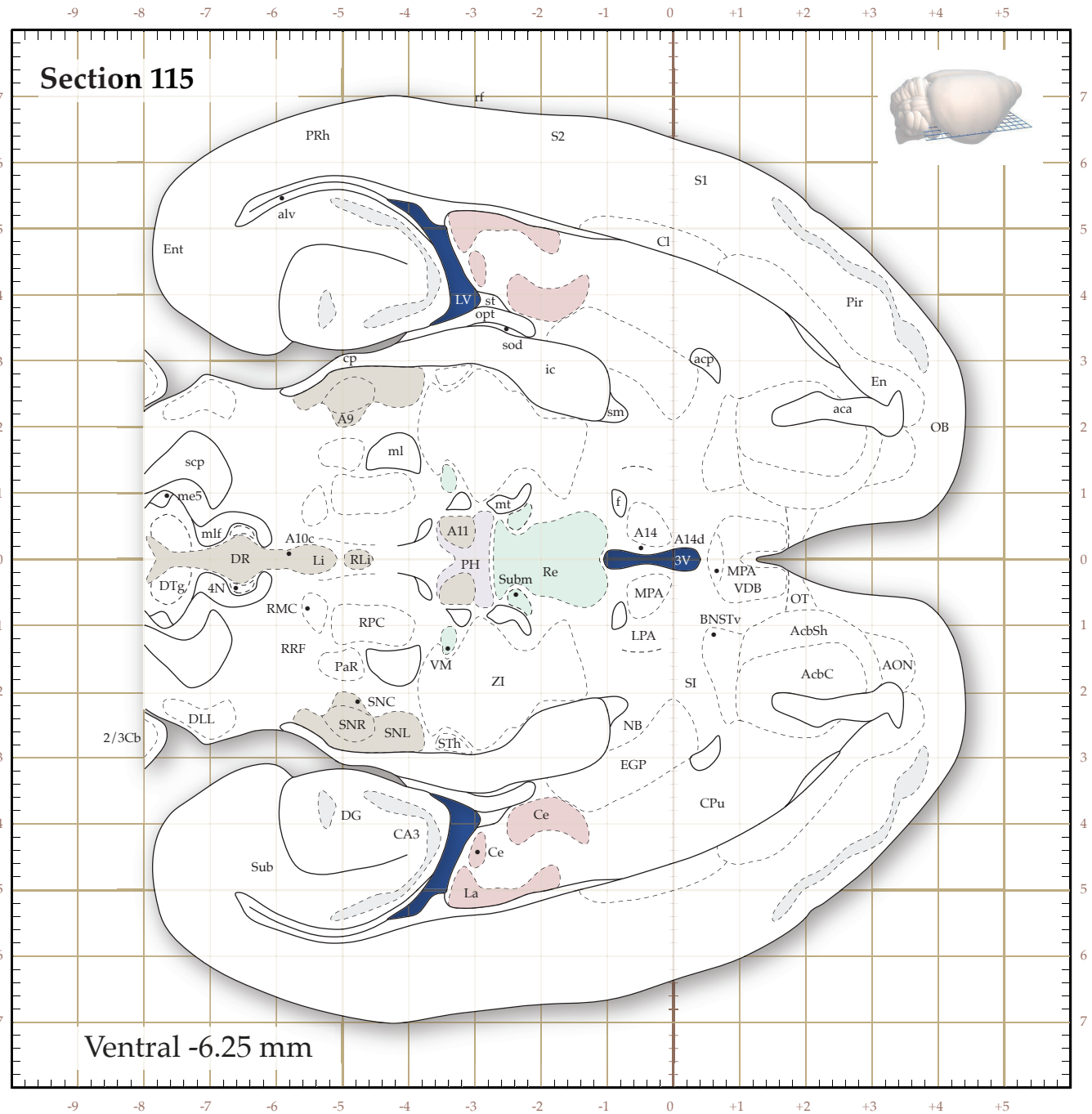
f

CA1
 CA2
 CA3
 DG

PH
 ic

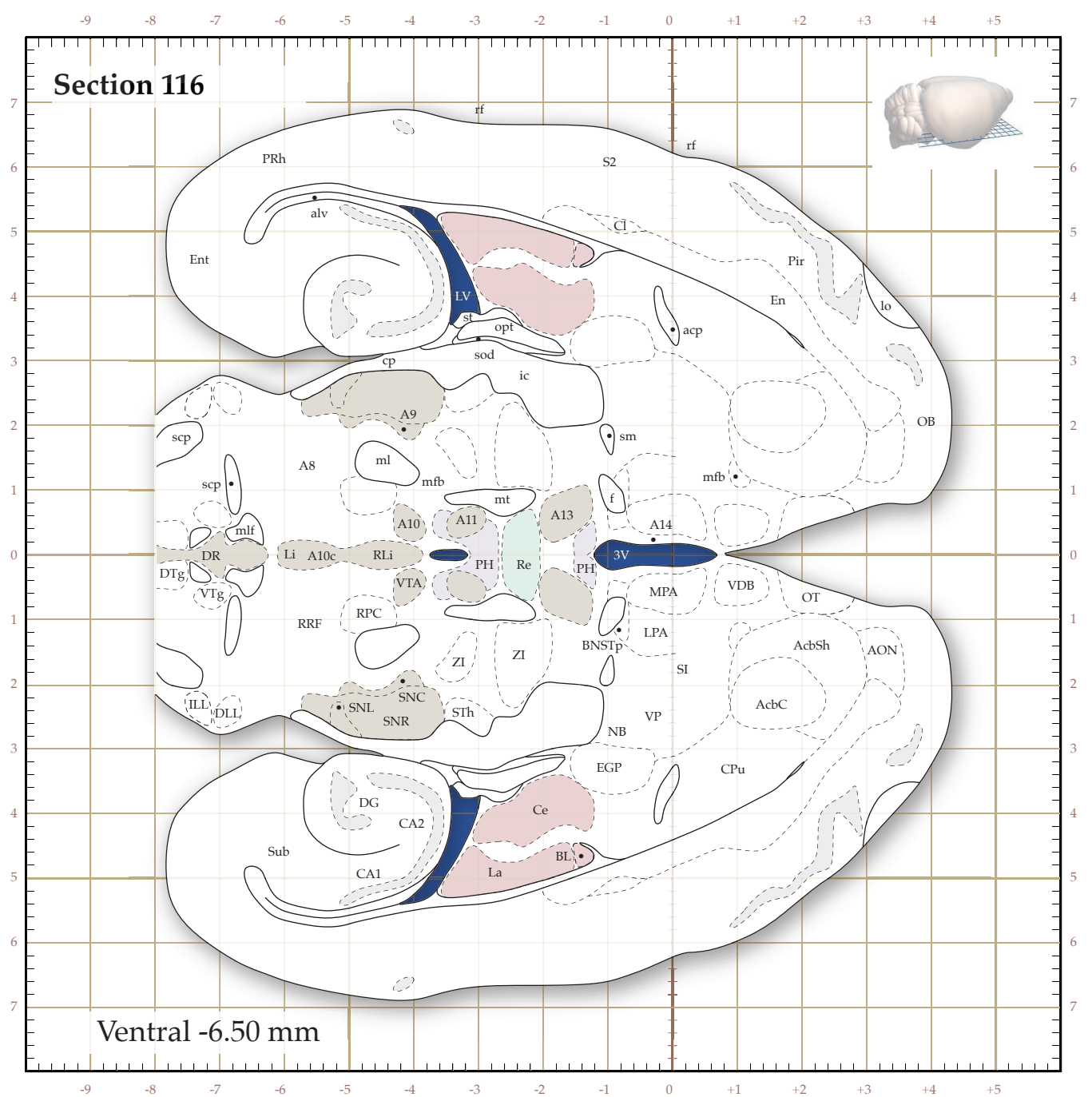
DLL
 ILL
 ml
 VTg

me5



med long fasc
 medial forebrain bundle
 nu basalis
olfactory bulb
 anterior olf nucleus
optic
 nu of optic tract
 optic tract
 supraoptic decussation
preoptic area
 lateral preoptic area
 medial preoptic area
red nu
 parabrachial nu
 red nu magnocell
 red nu parvocell
 retrorubral field
 rhinal fissure
 stria terminalis
striatum
 bed nu of ST post
 bed nu of ST ventr
 caudate putamen
 subst innominata
 subiculum
 subthalamic nu
superior colliculus
 sup coll peduncle
thalamus
 mamillothalamic tract
 reuniens th nu
 stria medullaris thal
 submedius th nu
 ventromedial thal nu
 trochlear nu
 ventral pallidum
ventricle
 3rd ventricle
 lateral ventricle
 zona incerta

mlf
 mfb
 NB
 OB
 AON
 OT
 opt
 sod
 LPA
 MPA
 PaR
 RMC
 RPC
 RRF
 rf
 st
 BNSTp
 BNSTv
 CPu
 SI
 Sub
 STh
 scp
 mt
 Re
 sm
 Subm
 VM
 4N
 VP
 3V
 LV
 ZI



accumbens
 accumbens nu, core
 accumbens nu, shell

amygdala
 basolateral amygdaloid
 central amygdaloid nu
 lateral amygd nu
 medial amygd nu

cerebral peduncle

corpus callosum
 alveus hippocampus

cortex
 2ary somatosensory cortex
 entorhinal cortex
 lateral olfactory tract
 perirhinal cx
 piriform cortex

diagonal band
 horizontal limb diagonal band

dorsal tegm nu

endopiriform nu

fornix

dopamine
 A7 noradr cell gr
 A8 dopamine cell gr
 A9 dopamine cell gr
 A10 dopamine cell gr
 A11 dopamine cell gr
 A13 dopamine cell gr
 A14 dopamine cell gr
 caudal A10 dopamine cell gr
 dorsal raphe nu
 linear raphe
 median raphe nu
 rostr linear raphe
 subst nigra compacta
 subst nigra retic
 ventral tegmental area

hippocampus
 CA1 field
 CA2 field
 dentate gyrus

hypothalamus
 anterior hypothalamic area
 dorsal hy area
 magnocell lat hy
 posterior hypoth area

int capsule

interfascicular nu

island of Calleja

lemniscus
 intermediate nu lat lemn
 medial lemniscus
 ventral lemniscus nu
 ventral nu lat lemniscus

magnocell preoptic

mid cerebellar ped

med long fasc

AcbC
 AcbSh

BL
 Ce
 La
 Me

cp

alv

S2
 Ent
 lo
 PRh
 Pir

HDB

DTg

En

f

A7
 A8
 A9
 A10
 A11
 A13
 A14
 A10c

DR
 Li
 MnR
 RLi
 SNC
 SNR
 VTA

CA1
 CA2
 DG

AH
 DH
 MCLH
 PH

ic

IF

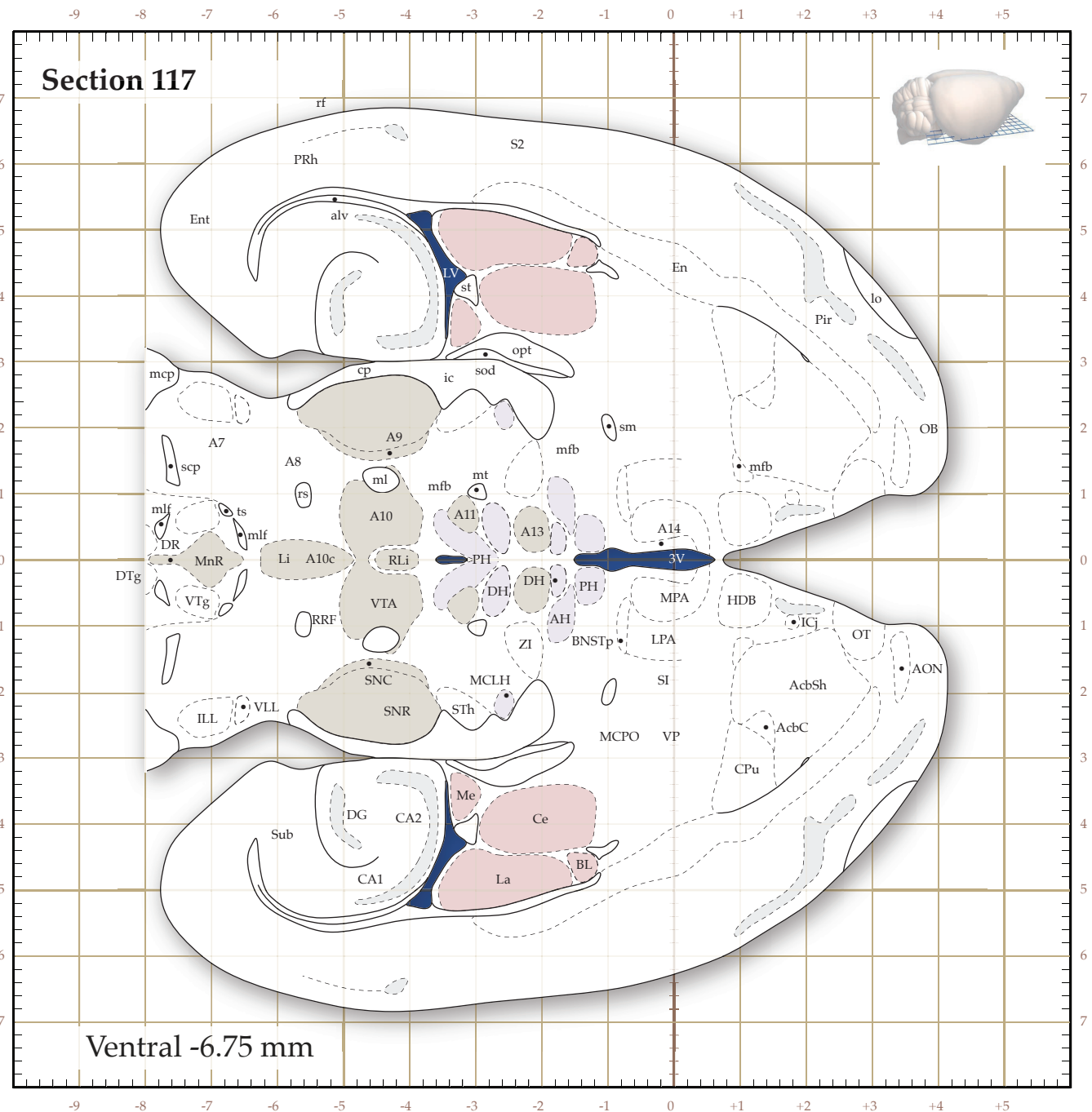
ICj

ILL
 ml
 VTg
 VLL

MCPO

mcp

mlf





accumbens
 accumbens nu, shell

amygdala
 ant amy area
 basolateral amygdaloid
 basomedial amygdaloid nu
 central amygdaloid nu
 lateral amy nu
 medial amy nu

cerebral peduncle

corpus callosum
 alveus hippocampus

cortex
 entorhinal cortex
 lateral olfactory tract
 piriform cortex

diagonal band
 horizontal limb diagonal band

endopiriform nu

dopamine
 A7 noradr cell gr
 A8 dopamine cell gr
 A9 dopamine cell gr
 A10 dopamine cell gr
 A14 dopamine cell gr
 caudal A10 dopamine cell gr
 linear raphe
 median raphe nu
 subst nigra compacta
 subst nigra retic
 ventral tegmental area

fasciculus retroflexus

fornix

hippocampus
 CA1 field

hypothalamus
 anterior hypothalamic area
 arcuate nu
 dorsal hy area
 lat ant hypoth nu
 magnocell lat hy
 med mamm nu
 mammillary ped
 paravent hyp nu
 supramamm
 ventromedial hypoth nu

int capsule

interfascicular nu

interpeduncular nu

island of Calleja

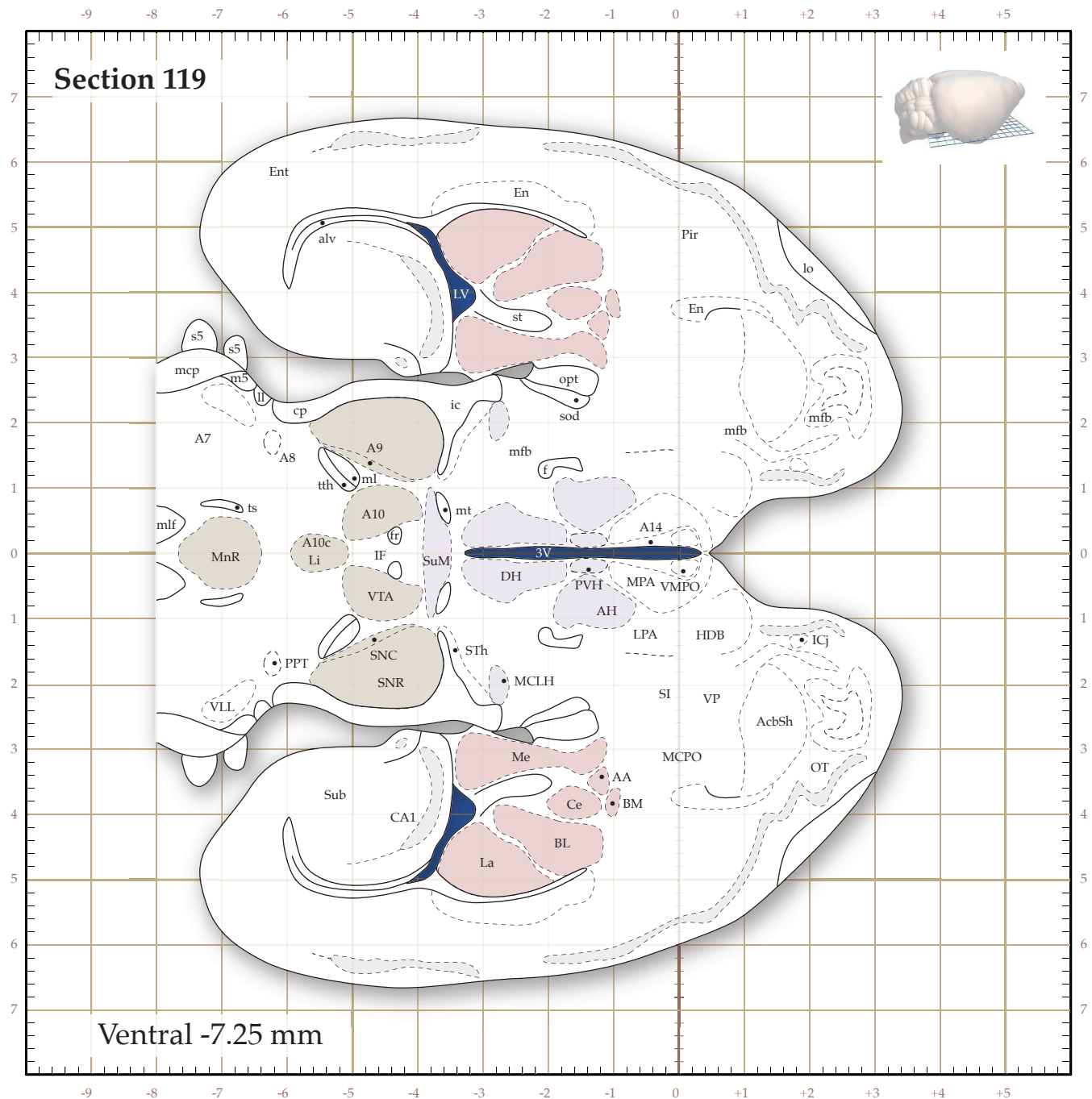
lemniscus
 intermediate nu lat lemn
 lat lemniscus
 medial lemniscus
 ventral nu lat lemniscus

magnocell preoptic

mid cerebellar ped

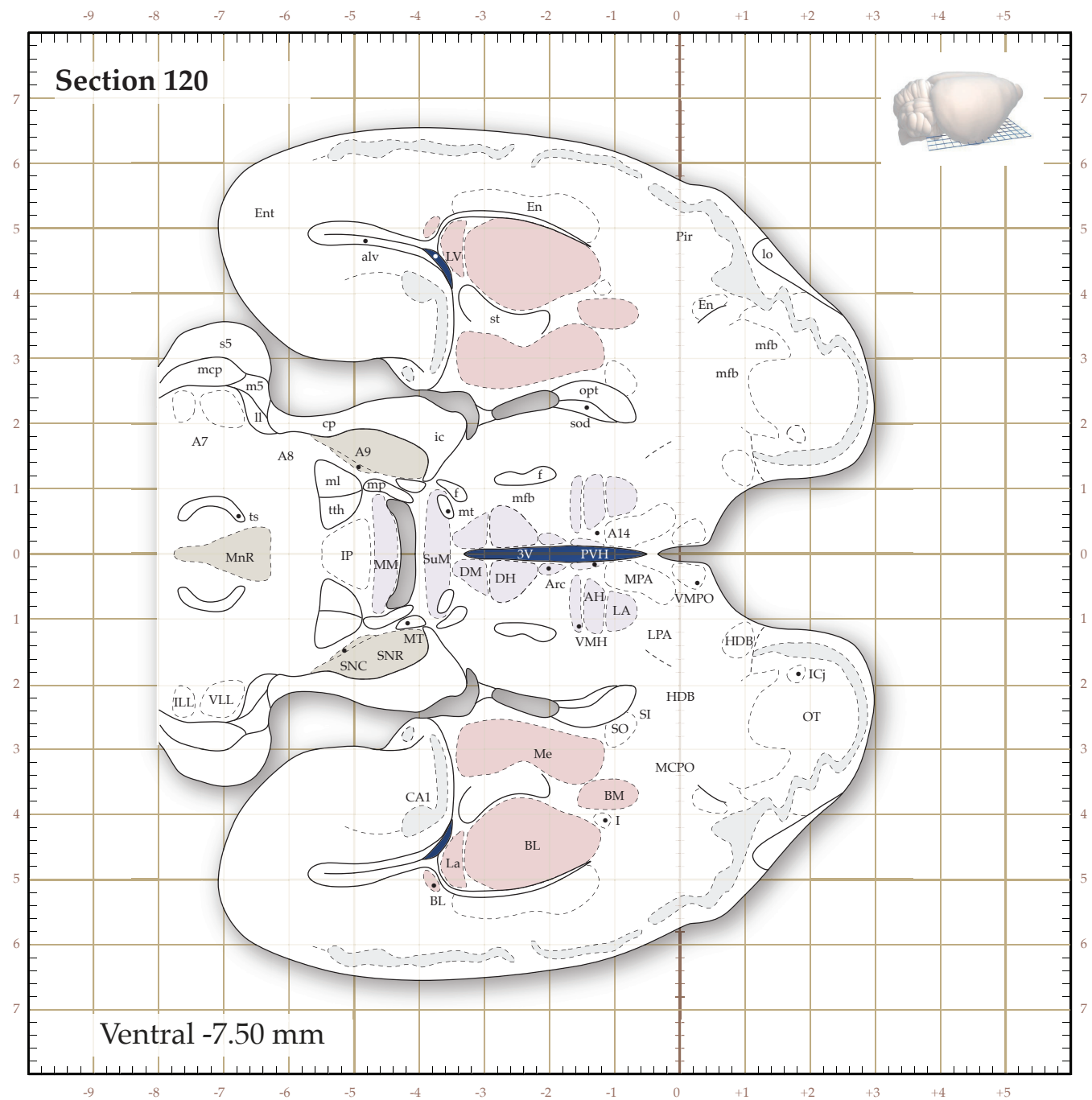
motor root of trig nerve

AcbSh
 AA
 BL
 BM
 Ce
 La
 Me
 cp
 alv
 Ent
 lo
 Pir
 HDB
 En
 A7
 A8
 A9
 A10
 A14
 A10c
 Li
 MnR
 SNC
 SNR
 VTA
 fr
 f
 CA1
 AH
 Arc
 DH
 LA
 MCLH
 MM
 mp
 PVH
 SuM
 VMH
 ic
 IF
 IP
 ICj
 ILL
 ll
 ml
 VLL
 MCPO
 mcp
 m5



med long fasc
 med terminal nu
 medial forebrain bundle
optic
 nu of optic tract
 optic tract
 supraoptic decussation
 pedunculopontine tegmental nu
preoptic area
 lateral preoptic area
 medial preoptic area
 ventromed preopt area
 sensory root of trig nerve
 stria terminalis
striatum
 subst innominata
 supraoptic nu
 subiculum
 subthalamic nu
 tectospinal tract
thalamus
 mammillothalamic tract
 trigeminothal tr
 ventral pallidum
ventricle
 3rd ventricle
 lateral ventricle

mLf
 MT
 mfb
 OT
 opt
 sod
 PPT
 LPA
 MPA
 VMPO
 s5
 st
 SI
 SO
 Sub
 STh
 ts
 mt
 tth
 VP
 3V
 LV



amygdala

amygdalohip are
basolateral amygdaloid
basomedial amygdaloid nu
medial amy nu

cerebral peduncle

corpus callosum

alveus hippocampus

cortex

entorhinal cortex
lateral olfactory tract
piriform cortex

cortex-amygdala transition zone

endopiriform nu

dopamine

A7 noradr cell gr
A14 dopamine cell gr
medial raphe nu

fornix

hypothalamus

arcuate nu
dorsal hy area
lat ant hypoth nu
lat mammid nu
med mamm nu
ventromedial hypoth nu

int capsule

interpeduncular nu

island of Calleja

lemniscus

lat lemniscus
medial lemniscus
ventral nu lat lemniscus

mid cerebellar ped

motor root of trig nerve

medial forebrain bundle

optic

nu of optic tract
optic tract
supraoptic decussation

preoptic area

ventrolat preopt

reticulotegmental

reticulotegmental pericen

sensory root of trig nerve

stria terminalis

suprachiasmatic nu

supraoptic nu

tectospinal tract

trigeminothal tr

ventricle

3rd ventricle

AHi

BL

BM

Me

cp

alv

Ent

lo

Pir

CxA

En

A7

A14

MnR

f

Arc

DH

LA

LM

MM

VMH

ic

IP

ICj

ll

ml

VLL

mcp

m5

mfb

OT

opt

sod

VLPO

RtTgP

s5

st

SCh

SO

ts

tth

3V

Section 121

Ventral -7.75 mm

Ventral -8.00 mm

AHi
ACo
BL
BLV
BM
Me
cp

alv

Ent
Pir
CxA

MnR

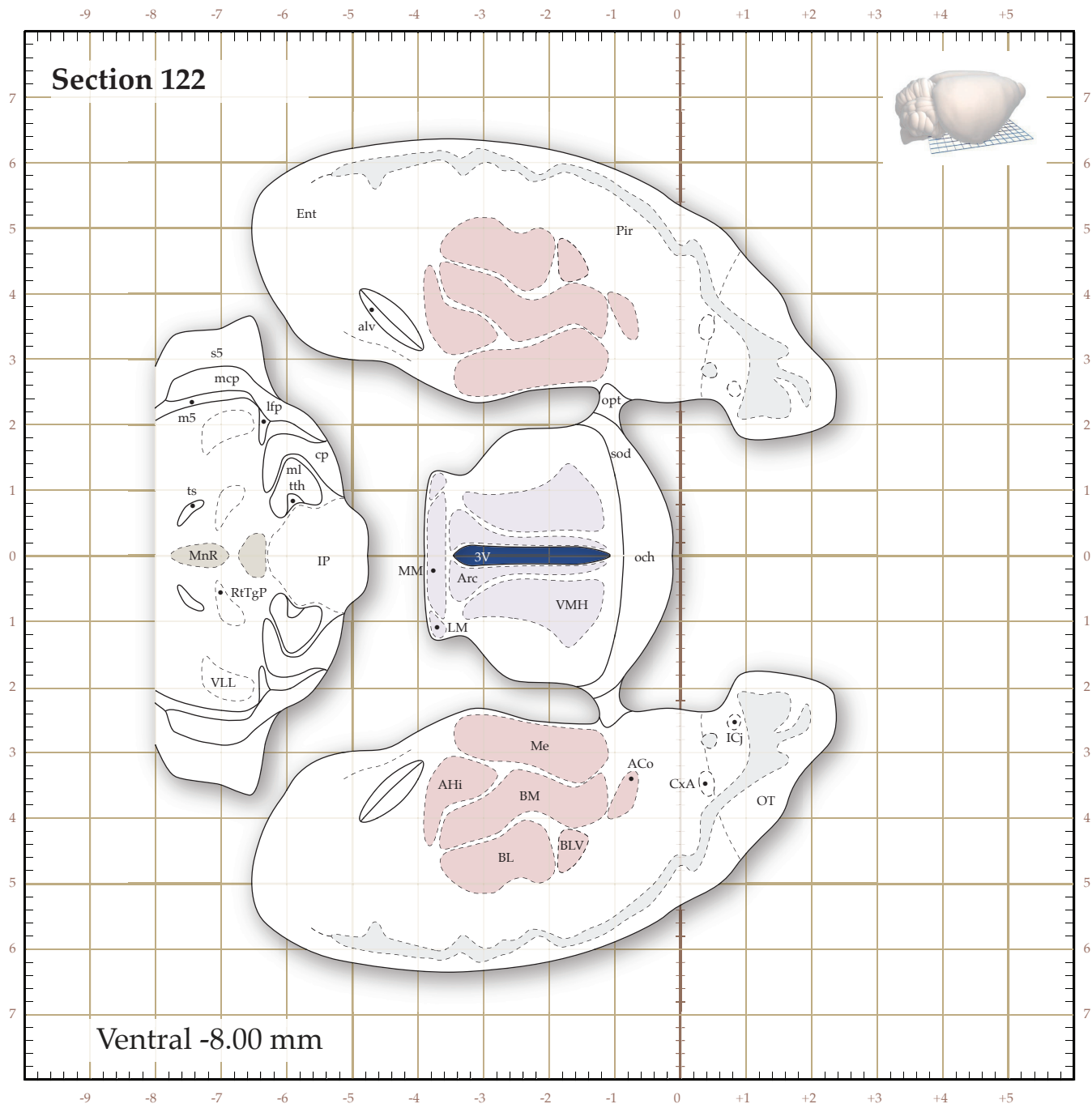
Arc
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MM
VMH
IP
ICj

ml
VLL
lfp
mcp
m5

och
OT
opt
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RtTgP
s5
ts
tth

3V



amygdala

amygdalohip are
ant cortical amygdaloid nu
basolateral amygdaloid nu, vent
basomedial amygdaloid nu
cortical amyg
medial amyg nu

cerebral peduncle

cortex

entorhinal cortex
lateral olfactory tract
piriform cortex

cortex-amygdala transition zone

dopamine

A12 dopamine cell gr
median raphe nu

hypothalamus

arcuate nu
ventromedial hypoth nu

interpeduncular nu

lemniscus

medial lemniscus
ventral nu lat lemniscus

long fasc pons

mid cerebellar ped

motor root of trig nerve

optic

optic chiasm
nu of optic tract

reticulotegmental

reticulotegmental
reticulotegmental pericen

sensory root of trig nerve

tectospinal tract

trigeminothal tr

ventricle

3rd ventricle
mamm recess 3V

AHi

ACo

BLV

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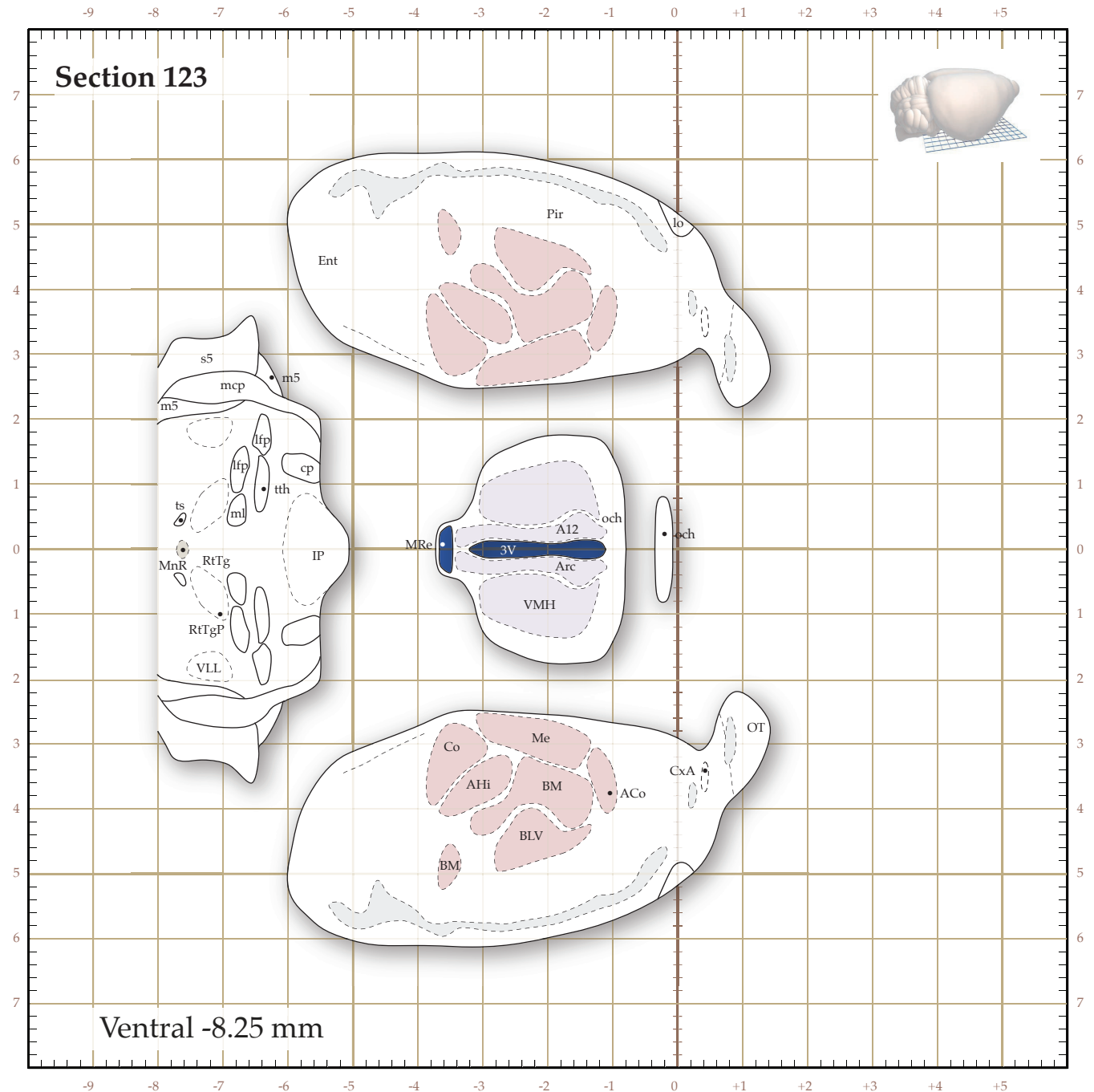
ts

tth

3V

MRe

Section 123



amygdala
 ant cortical amygdaloid nu
 cortical amyg
 medial amyg nu

cortex
 entorhinal cortex
 lateral olfactory tract
 piriform cortex

dopamine
 A12 dopamine cell gr

hypothalamus
 arcuate nu
 ventromedial hypoth nu

interpeduncular nu

lemniscus
 medial lemniscus
 ventral nu lat lemniscus

long fasc pons

mid cerebellar ped

motor root of trig nerve

pontine nuclei

reticulotegmental
 reticulotegmental
 reticulotegmental pericen

sensory root of trig nerve

trigeminothal tr

ventricle
 3rd ventricle

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Ent
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 Pir

A12

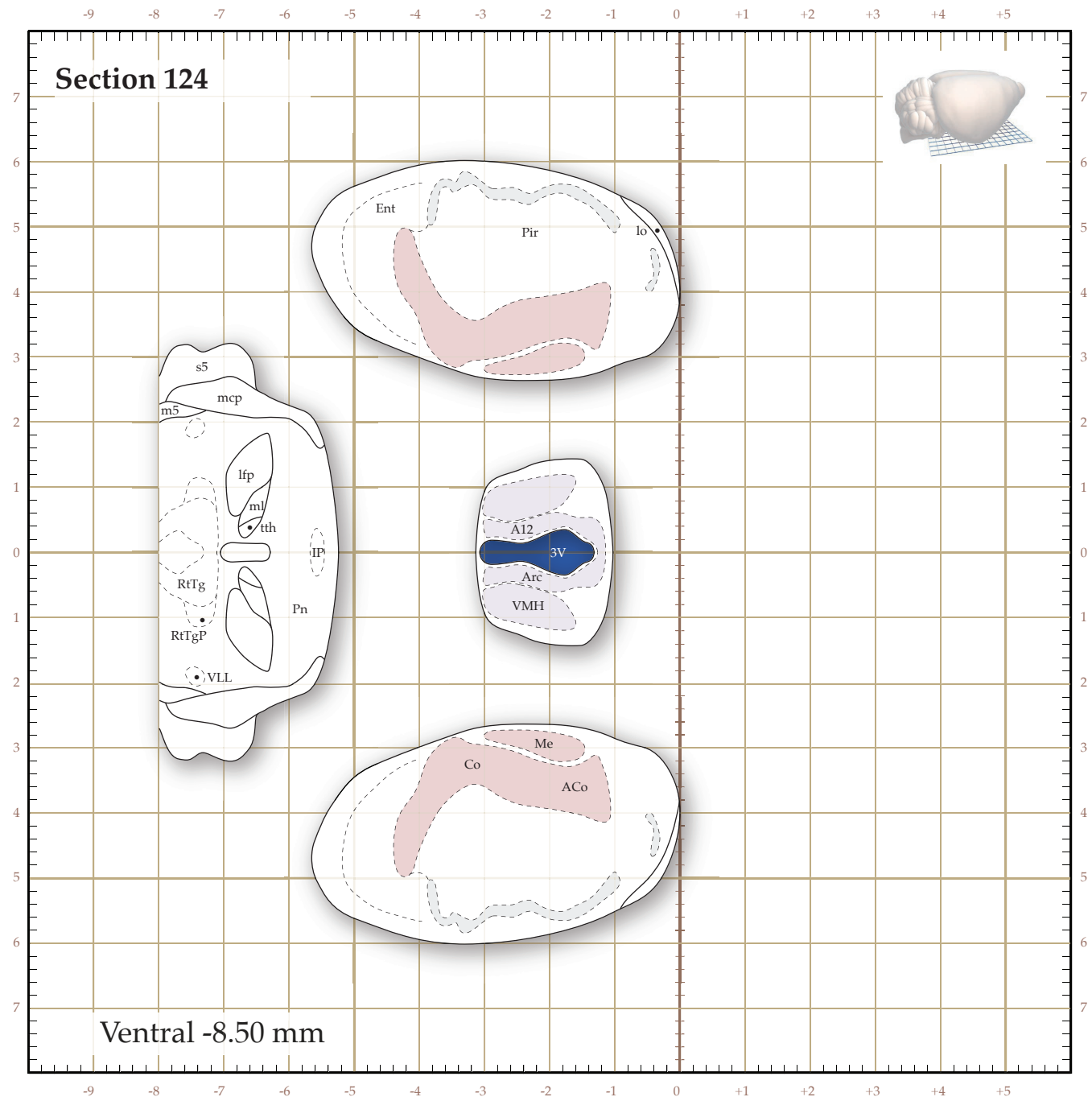
Arc
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RtTg
 RtTgP

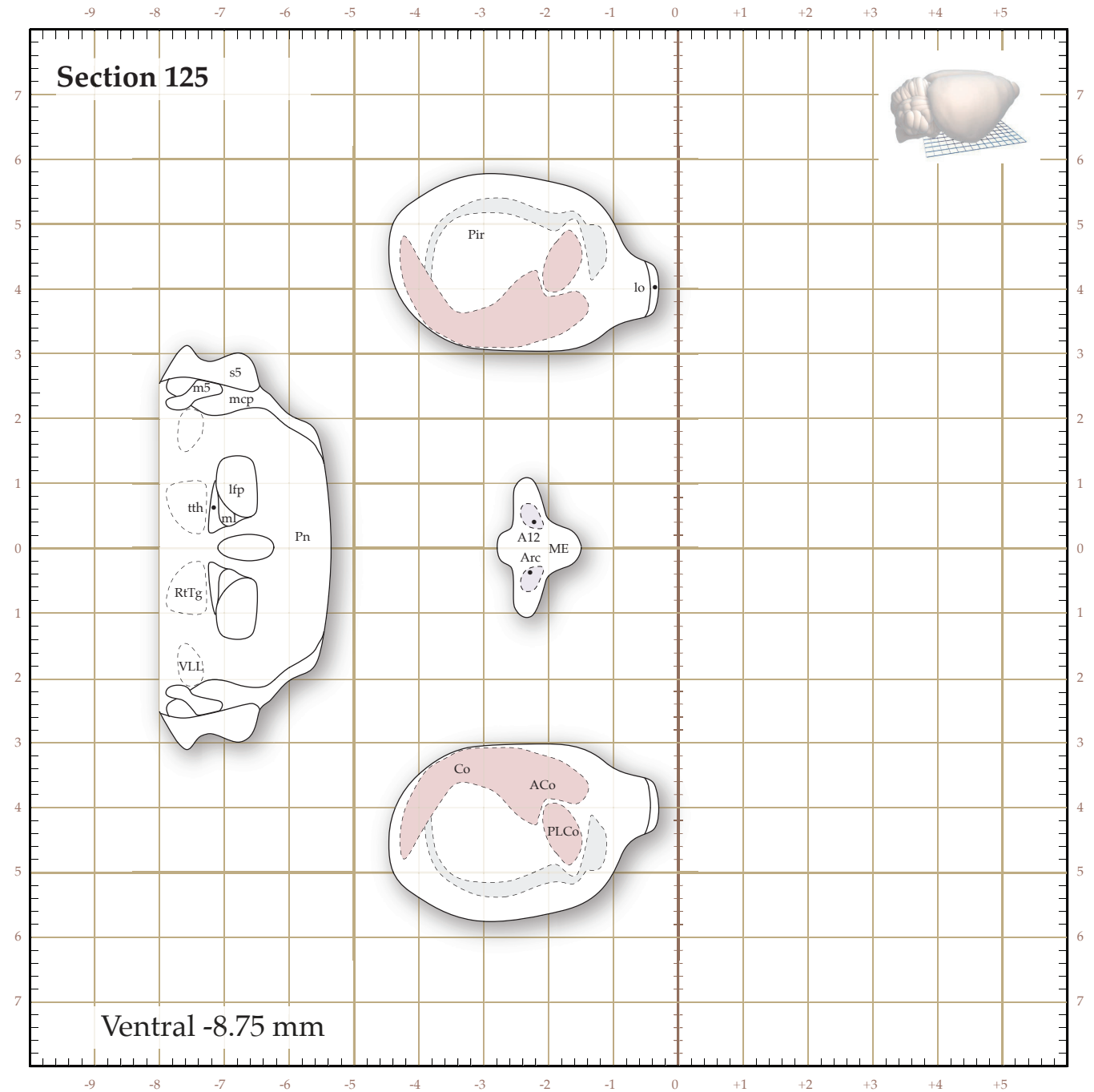
s5
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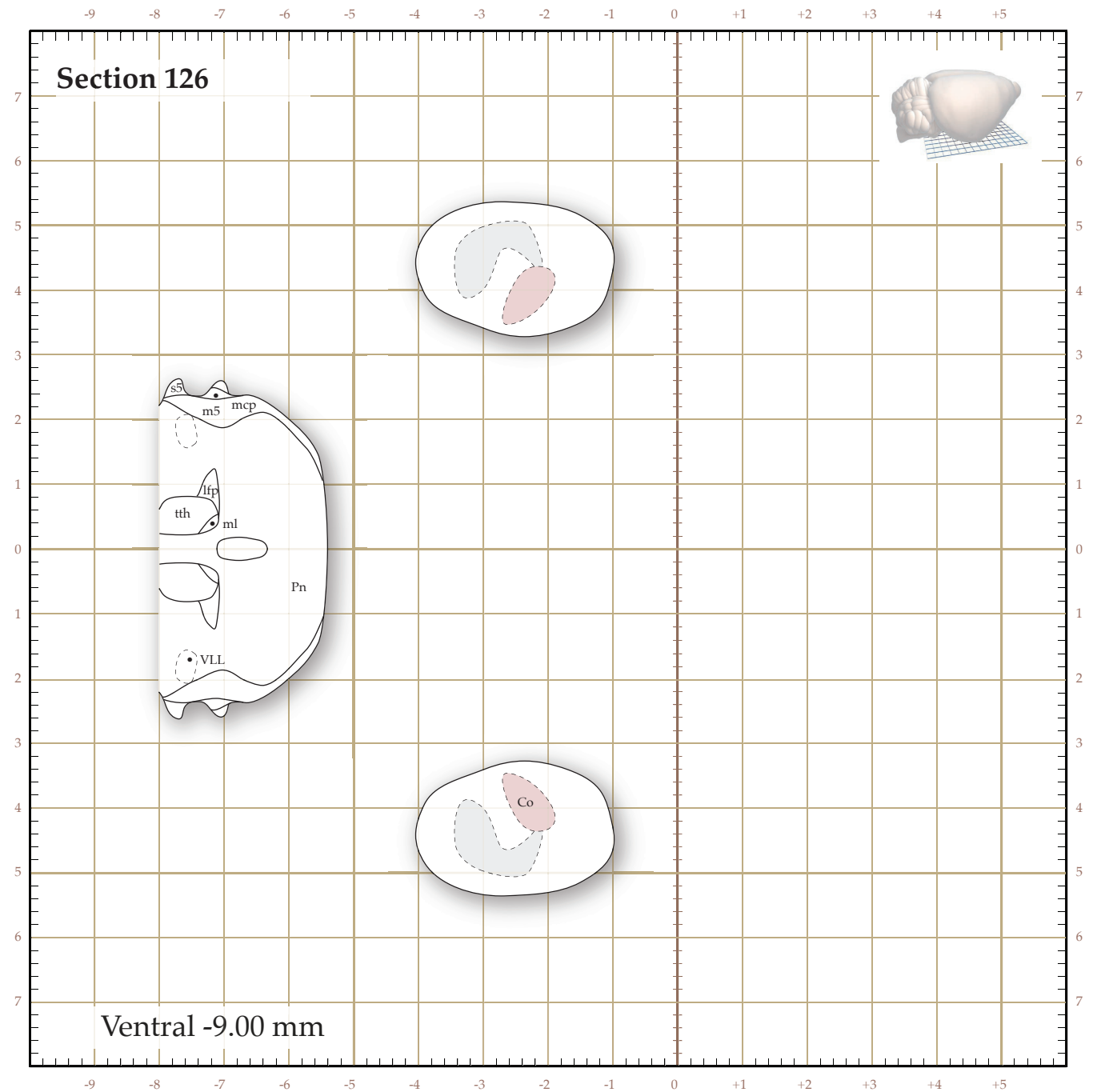
amygdala
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 cortical amyg
 posterolat cortical amygdaloid nu
cortex
 lateral olfactory tract
 piriform cortex
dopamine
 A12 dopamine cell gr
hypothalamus
 arcuate nu
 median eminence
lemniscus
 medial lemniscus
 ventral nu lat lemniscus
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 mid cerebellar ped
 motor root of trig nerve
 pontine nuclei
reticulotegmental
 reticulotegmental
 sensory root of trig nerve
 trigeminothal tr

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amygdala
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ATHYMIC NUDE RAT BRAIN ATLAS

Bengt Mattsson, Lund University, Sweden

Malin Parmar, PhD, Lund University, Sweden

Anders Björklund, PhD, Lund University, Sweden

Athymic Nude Rat Brain Atlas will provide the first stereotaxic brain atlas of the athymic nude rat (CrI:NIH-Foxn1rnu), a T-cell deficient rat model commonly used in experimental studies and pre-clinical safety and efficacy studies. This 2D vector-based atlas contains coronal, sagittal, and horizontal brain sections of an athymic rat brain rendered from a single cleared specimen, placed in a computerized 3D environment. The maps enable readers to better calculate co-ordinates to target specific structures for toxin, virus, or cell delivery using stereotaxic surgery. This atlas will be a valuable resource for any neuroscientist who wishes to work with nude rats in experimental and pre-clinical studies.

Key Features

- Contains coronal, sagittal, and horizontal maps of young adult athymic nude rat brain, spaced with a distance of 0.2 or 0.25 mm
- Uses “flat skull” Bregma and Lambda as anatomical landmarks for correct placement in the 3D environment
- Anatomical structures and nomenclature follow the standard set by the Paxinos and Watson rat brain atlases
- Includes a map of the dopamine projection system as well as the distribution of the A8-A14 dopamine cell groups
- Allows for easy read-out of coordinates for precise injections using stereotactic surgery



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