A. Basic Cell Groups of the Rat CNS

FOREBRAIN (FB)

- ISOCORTEX (ISO) **[1]**
  - Motor areas (MO) **[2]**
    - primary motor area (MOp)
    - secondary motor areas (MOs)
  - Agranular insular area (AI) **[3]**
    - dorsal part (AId) **[4]**
    - ventral part (AIv) **[4]**
    - posterior part (AIp) **[4]**
  - Anterior cingulate area (ACA) **[5]**
    - dorsal part (ACAd)
    - ventral part (ACAv)
  - Auditory areas (AUD) **[6]**
    - primary auditory area (AUDp) **[6]**
    - dorsal auditory areas (AUDd) **[7]**
    - ventral auditory areas (AUDv) **[8]**
  - Ectorhinal area (ECT) **[9]**
  - Gustatory area (GU) **[10]**
  - Infralimbic area (ILA) **[11]**
  - Orbital area (ORB) **[12]**
    - lateral part (ORBl)
    - medial part (ORBm)
    - ventral part (ORBv)
    - ventrolateral part (ORBvl)
  - Perirhinal area (PERI) **[13]**

Posterior parietal association areas (PTLp) **[14]**

Prelimbic area (PL) **[15]**

Retrosplenial area (RSP) **[16]**

- dorsal part (RSPd) **[17]**
- ventral part (RSPv) **[18]**
  - zone a (RSPv-a)
  - zone b/c (RSPv-b/c)

Somatosensory areas (SS)

- primary somatosensory area (SSp) **[19]**
  - barrel field (SSp-bfd)
  - lower limb (SSp-ll)
  - mouth (SSp-m)
  - nose (SSp-n)
  - trunk (SSp-tr)
  - upper limb (SSp-ul)
- supplemental somatosensory area (SSs) **[20]**

Ventral temporal association areas (TEv) **[21]**

Visceral area (VISC) **[22]**

Visual areas (VIS) **[23]**

- anterior laterolateral visual area (VISlla)
- anterolateral visual area (VISal)
- anteromedial visual area (VISam)
- intermediolateral visual area (VISli)
- laterolateral visual area (VISll)
- mediolateral visual area (VISlm)
- posterolateral visual area (VISpl)
- primary visual area (VISp)

rostrolateral visual area (VISrl)

Claustrum (CLA) **[24]**

OLFACTORY CORTEX (OLF) **[25]**

Main olfactory bulb (MOB) **[26]**

glomerular layer (MOBgl)

outer plexiform layer (MOBopl)

mitral layer (MOBmi)

inner plexiform layer (MOBipl)

granule cell layer (MOBgr)

Accessory olfactory bulb (AOB) **[27]**

glomerular layer (AOBgl)

mitral layer (AOBmi)

granular layer (AOBgr)

Anterior olfactory nucleus (AON) **[28]**

dorsal part (AONd)

molecular layer (AONd1)

pyramidal layer (AONd2)

external part (AONe)

molecular layer (AONe1)

pyramidal layer (AONe2)

lateral part (AONl)

molecular layer (AONl1)

pyramidal layer (AONl2)

medial part (AONm)

molecular layer (AONm1)

pyramidal layer (AONm2)

posteroventral part (AONpv)

molecular layer (AONpv1)

pyramidal layer (AONpv2)

Taenia tecta (TT) **[29]**

dorsal part (TTd)

layers 1-4 (TTd1-4)

ventral part (TTv)

layers 1-3 (TTv1-3)

Olfactory tubercle (OT) **[30]**

molecular layer (OT1)

pyramidal layer (OT2)

polymorph layer (OT3)

islands of Calleja (isl) [**31]**

major island of Calleja (islm) **[32]**

Piriform area (PIR) **[33]**

molecular layer (PIR1)

pyramidal layer (PIR2)

polymorph layer (PIR3)

Postpiriform transition area (TR) **[34]**

Piriform-amygdaloid area (PAA) **[35]**

Endopiriform nucleus (EP) **[36]**

dorsal part (EPd)

ventral part (EPv)

HIPPOCAMPAL FORMATION (CORTEX) (HPF) **[37]**

Retrohippocampal region (RHP)

Entorhinal area (ENT)

lateral part (ENTl)

layers 1-6 (ENTl1-6)

medial part, dorsal zone (ENTm)

layers 1-6 (ENTm1-6)

medial part, ventral zone (ENTmv)

Presubiculum (PRE)

layers 1-6 (PRE1-6)

Postsubiculum (POST)

layers 1-6 (POST1-6)

Parasubiculum (PAR)

layers 1-6 (PAR1-6)

Subiculum (SUB)

dorsal part (SUBd)

molecular layer (SUBd-m)

stratum radiatum (SUBd-sr)

pyramidal layer (SUBd-sp)

ventral part (SUBv)

molecular layer (SUBv-m)

stratum radiatum (SUBv-sr)

pyramidal layer (SUBv-sp)

Hippocampal region (HIP)

Ammon's horn (CA)

field CA_1 (CA1)

stratum lacunosum-moleculare (CA1slm)

stratum radiatum (CA1sr)

pyramidal layer (CA1sp)

deep (CA1spd)

superficial (CA1sps)

stratum oriens (CA1so)

field CA_2 (CA2)

stratum lacunosum-moleculare (CA2slm)

stratum radiatum (CA2sr)

pyramidal layer (CA2sp)

stratum oriens (CA2so)

field CA_3 (CA3)

stratum lacunosum-moleculare (CA3slm)

stratum radiatum (CA3sr)

stratum lucidum (CA3slu)

pyramidal layer (CA3sp)

stratum oriens (CA3so)

Dentate gyrus (DG)

crest (DGcr)

molecular layer (DGcr-mo)

granule cell layer (DGcr-sg)

polymorph layer (DGcr-po)

lateral blade (DGlb)

molecular layer (DGlb-mo)

granule cell layer (DGlb-sg)

polymorph layer (DGlb-po)

medial blade (DGmb)

molecular layer (DGmb-mo)

granule cell layer (DGmb-sg)

polymorph layer (DGmb-po)

Induseum griseum (IG) **[38]**

Fasciola cinerea (FC) **[39]**

AMYGDALA (AMY)

Nucleus of the lateral olfactory tract (NLOT) **[40]**

molecular layer (NLOT1)

pyramidal layer (NLOT2)

dorsal cap (NLOT3) **[41]**

Bed nucleus of the accessory olfactory tract (BA) **[42]**

Medial nucleus of the amygdala (MEA) **[43]**

anterodorsal part (MEAad)

anteroventral part (MEAav)

posterodorsal part (MEApd)

sublayers a-c (MEApd-a,b,c)

posteroventral part (MEApv)

Cortical nucleus of the amygdala (COA)

anterior part (COAa) **[44]**

posterior part (COAp) **[45]**

lateral zone (COApl)

medial zone (COApm)

Anterior amygdaloid area (AAA) **[46]**

Central nucleus of the amygdala (CEA) **[47]**

medial part (CEAm)

lateral part (CEAl)

capsular part (CEAc)

Lateral nucleus of the amygdala (LA) **[48]**

Basolateral nucleus of the amygdala (BLA) **[49]**

anterior part (BLAa)

posterior part (BLAp)

Basomedial nucleus of the amygdala (BMA) **[50]**

anterior part (BMAa)

posterior part (BMAp)

Posterior nucleus of the amygdala (PA) **[51]**

Intercalated nuclei of the amygdala (IA) **[52]**

SEPTAL REGION (SEP) **[53]**

Lateral septal nucleus (LS) **[54]**

dorsal part (LSd)

intermediate part (LSi)

ventral part (LSv)

Medial septal complex (MSC) **[55]**

medial septal nucleus (MS)

nucleus of the diagonal band (NDB)

Posterior septal complex (PSC) **[56]**

septofimbrial nucleus (SF)

triangular nucleus of the septum (TRS)

Bed nuclei of the stria terminalis (BST) **[57]**

anterior division (BSTa)

anterodorsal area (BSTad)

anterolateral area (BSTal)

anteroventral area (BSTav)

oval nucleus (BSTov)

juxtacapsular nucleus (BSTju)

rhomboid nucleus (BSTrh)

dorsomedial nucleus (BSTdm)

dorsolateral nucleus (BSTdl)

fusiform nucleus (BSTfu)

ventral nucleus (BSTv)

magnocellular nucleus (BSTmg)

posterior division (BSTp)

principal nucleus (BSTpr)

interfascicular nucleus (BSTif)

transverse nucleus (BSTtr)

premedullary nucleus (BSTpm)

dorsal nucleus (BSTd)

strial extension (BSTse)

cell-sparse zone (BSTsz)

Bed nucleus of the anterior commissure (BAC) **[58]**

Septohippocampal nucleus (SH) **[59]**

Subfornical organ (SFO) **[60]**

CORPUS STRIATUM (CSTR) **[61]**

Striatum (STR)

Caudoputamen (CP) **[62]**

Nucleus accumbens (ACB) **[63]**

Fundus of the striatum (FS) **[64]**

Pallidum (PAL)

Globus pallidus (GP) **[65]**

lateral segment (GPl)

medial segment (GPm)

Substantia innominata (SI) **[66]**

magnocellular preoptic nucleus (MA) **[67]**

THALAMUS (TH) **[68]**

Dorsal Thalamus (DOR) **[69]**

Midline group of the dorsal thalamus (MTN) **[70]**

paraventricular nucleus of the thalamus (PVT) **[71]**

parataenial nucleus (PT) **[72]**

nucleus reuniens (RE) **[73]**

median part (REm) **[74]**

Anterior group of the dorsal thalamus (ATN)**[75]**

anteroventral nucleus of the thalamus (AV) **[76]**

anteromedial nucleus of the thalamus (AM) **[77]**

dorsal part (AMd) **[78]**

ventral part (AMv) **[79]**

anterodorsal nucleus of the thalamus (AD) **[80]**

interanteromedial nucleus of the thalamus (IAM) **[81]**

interanterodorsal nucleus of the thalamus (IAD) **[82]**

lateral dorsal nucleus of the thalamus (LD) **[83]**

Medial group of the dorsal thalamus (MED) **[84]**

mediodorsal nucleus of the thalamus (MD) **[85]**

medial part (MDm)

central part (MDc)

lateral part (MDl)

intermediodorsal nucleus of the thalamus (IMD)

submedial nucleus of the thalamus (SMT) **[86]**

perireuniens nucleus (PR) **[87]**

Lateral group of the dorsal thalamus (LAT) **[88]**

lateral posterior nucleus of the thalamus (LP) **[89]**

posterior complex of the thalamus (PO) **[90]**

suprageniculate nucleus (SGN) **[91]**

posterior limiting nucleus of the thalamus (POL) **[92]**

Ventral group of the dorsal thalamus (VENT) **[93]**

ventral anterior-lateral complex of the thalamus (VAL) **[94]**

ventral medial nucleus of the thalamus (VM) **[95]**

ventral posterior complex of the thalamus (VP)

ventral posterolateral nucleus of the thalamus (VPL) **[96]**

parvicellular part (VPLpc) **[97]**

ventral posteromedial nucleus of the thalamus (VPM) **[98]**

parvicellular part (VPMpc) **[99]**

Geniculate group of the dorsal thalamus (GEN) **[100]**

medial geniculate complex (MG) **[101]**

dorsal part (MGd)

ventral part (MGv)

medial part (MGm)

lateral geniculate complex (LG) **[102]**

dorsal part of the lateral geniculate complex (LGd) **[103]**

Intralaminar nuclei of the thalamus (ILM) **[104]**

rhomboid nucleus (RH) **[105]**

central medial nucleus of the thalamus (CM) **[106]**

paracentral nucleus of the thalamus (PCN) **[107]**

central lateral nucleus of the thalamus (CL) **[108]**

parafascicular nucleus (PF) **[109]**

Epithalamus (EPI) **[110]**

Medial habenula (MH) **[111]**

dorsal part (MHd) **[112]**

ventral part (MHv) **[113]**

Lateral habenula (LH) **[114]**

Ventral Thalamus (VNT) **[115]**

Reticular nucleus of the thalamus (RT) **[116]**

Lateral geniculate complex (LG)

intergeniculate leaflet of the lateral geniculate complex (IGL) **[117]**

ventral part of the lateral geniculate complex (LGv) **[118]**

lateral zone (LGvl)

medial zone (LGvm)

Zona incerta (ZI) **[119]**

dopaminergic group (ZIda) **[120]**

fields of Forel (FF) **[121]**

Subthalamic nucleus (STN) **[122]**

Peripeduncular nucleus (PP) **[123]**

Subparafascicular nucleus (SPF) **[124]**

magnocellular part (SPFm)

parvicellular part (SPFp)

HYPOTHALAMUS (HY) [**125]**

Periventricular zone of the hypothalamus (PVZ) **[126]**

vascular organ of the lamina terminalis (OV) **[127]**

suprachiasmatic preoptic nucleus (PSCH) **[128]**

median preoptic nucleus (MEPO) **[129]**

anteroventral periventricular nucleus (AVPV) **[130]**

preoptic periventricular nucleus (PVpo) **[131]**

supraoptic nucleus (SO) **[132]**

retrochiasmatic part (SOr)

accessory supraoptic group (ASO)

nucleus circularis (NC)

paraventricular nucleus of the hypothalamus (PVH) **[133]**

descending division (PVHd)

medial parvicellular part, ventral zone (PVHmpv)

dorsal parvicellular part (PVHdp)

lateral parvicellular part (PVHlp)

magnocellular division (PVHm)

anterior magnocellular part (PVHam)

medial magnocellular part (PVHmm)

posterior magnocellular part (PVHpm)

medial zone (PVHpmm)

lateral zone (PVHpml)

parvicellular division (PVHp)

anterior parvicellular part (PVHap)

medial parvicellular part, dorsal zone (PVHmpd)

periventricular part (PVHpv)

forniceal part (PVHf)

anterior periventricular nucleus of the hypothalamus (PVa) **[134]**

intermediate periventricular nucleus of the hypothalamus (PVi) **[135]**

arcuate nucleus of the hypothalamus (ARH) **[136]**

posterior periventricular nucleus of the hypothalamus (PVp) **[137]**

Medial zone of the hypothalamus (MEZ) **[138]**

medial preoptic area (MPO) **[139]**

medial preoptic nucleus (MPN)

lateral part (MPNl)

medial part (MPNm)

central part (MPNc)

anterodorsal preoptic nucleus (ADP) **[140]**

anteroventral preoptic nucleus (AVP) **[141]**

posterodorsal preoptic nucleus (PD) **[142]**

parastrial nucleus (PS) **[143]**

suprachiasmatic nucleus (SCH) **[144]**

dorsomedial part (SCHd)

ventrolateral part (SCHv)

subparaventricular zone (SBPV) **[145]**

anterior hypothalamic area (AHA) **[146]**

anterior hypothalamic nucleus (AHN) **[147]**

anterior part (AHNa) **[148]**

central part (AHNc) **[149]**

posterior part (AHNp) **[150]**

dorsal part (AHNd) **[151]**

retrochiasmatic area (RCH) **[152]**

tuberal area of the hypothalamus (TUA) **[153]**

ventromedial nucleus of the hypothalamus (VMH) **[154]**

anterior part (VMHa)

dorsomedial part (VMHdm)

central part (VMHc)

ventrolateral part (VMHvl)

dorsomedial nucleus of the hypothalamus (DMH) **[155]**

anterior part (DMHa) **[156]**

posterior part (DMHp) **[157]**

ventral part (DMHv) **[159]**

ventral premammillary nucleus (PMv) **[159]**

mammillary body (MBO)

tuberomammillary nucleus (TM) **[160]**

dorsal part (TMd)

ventral part (TMv)

supramammillary nucleus (SUM) **[161]**

lateral part (SUMl)

medial part (SUMm)

dorsal premammillary nucleus (PMd) **[162]**

medial mammillary nucleus (MM) **[163]**

median part (MMme)

lateral mammillary nucleus (LM) **[164]**

posterior hypothalamic nucleus (PH) **[165]**

Lateral zone of the hypothalamus (LZ) **[166]**

lateral preoptic area (LPO) **[167]**

lateral hypothalamic area (LHA) **[168]**

RETINA (R) **[169]**

Outer nuclear layer (Ronl)

Outer plexiform layer (Ropl)

Inner nuclear layer (Rinl)

Inner plexiform layer (Ripl)

Ganglion cell layer (Rgcl)

BRAINSTEM (BS)

SENSORY

Visual

superior colliculus (SC) **[170]**

zonal layer (SCzo)

superficial gray layer (SCsg)

optic layer (SCop)

intermediate gray layer (SCig)

sublayers a-c (SCig-a,b,c)

intermediate white layer (SCiw)

deep gray layer (SCdg)

deep white layer (SCdw)

parabigeminal nucleus (PBG) **[171]**

pretectal region (PRT) **[172]**

olivary pretectal nucleus (OP) **[173]**

nucleus of the optic tract (NOT) **[174]**

posterior pretectal nucleus (PPT) **[175]**

nucleus of the posterior commissure (NPC) **[176]**

anterior pretectal nucleus (APN) **[177]**

medial pretectal area (MPT) **[178]**

medial terminal nucleus of the accessory optic tract (MT) **[179]**

lateral terminal nucleus of the accessory optic tract (LT) **[180]**

dorsal terminal nucleus of the accessory optic tract (DT) **[181]**

Somatosensory

trigeminal ganglion (GV) **[182]**

mesencephalic nucleus of the trigeminal (MEV) **[183]**

principal sensory nucleus of the trigeminal (PSV) **[184]**

spinal nucleus of the trigeminal (SPV) **[185]**

oral part (SPVO) **[186]**

ventrolateral part (SPVOvl)

rostral dorsomedial part (SPVOrdm)

middle dorsomedial part, dorsal zone (SPVOmdmd)

middle dorsomedial part, ventral zone (SPVOmdmv)

caudal dorsomedial part (SPVOcdm)

interpolar part (SPVI) **[187]**

caudal part (SPVC) **[188]**

paratrigeminal nucleus (PAT) **[189]**

dorsal column nuclei (DCN) **[190]**

gracile nucleus (GR) **[191]**

median part (GRm) **[192]**

cuneate nucleus (CU) **[193]**

nucleus z (z) **[194]**

external cuneate nucleus (ECU) **[195]**

Auditory

cochlear nuclei (CN) **[196]**

dorsal nucleus (DCO) **[197]**

ventral nucleus (VCO) **[198]**

anterior part (VCOa)

posterior part (VCOp)

subpeduncular granular region of the cochlear nuclei (CNspg) **[199]**

granular lamina of the cochlear nuclei (CNlam) **[200]**

interstitial nucleus of the auditory nerve (IAN) **[201]**

nucleus of the trapezoid body (NTB) **[202]**

superior olivary complex (SOC) **[203]**

medial part (SOCm) **[204]**

lateral part (SOCl) **[205]**

periolivary region (POR) **[206]**

nucleus of the lateral lemniscus (NLL) **[207]**

inferior colliculus (IC) **[208]**

external nucleus (ICe)

dorsal nucleus (ICd)

central nucleus (ICc)

nucleus of the brachium of the inferior colliculus (NB) **[209]**

nucleus sagulum (SAG) **[210]**

Vestibular

vestibular nuclei (VNC) **[211]**

medial vestibular nucleus (MV)

lateral vestibular nucleus (LAV)

superior vestibular nucleus (SUV)

spinal vestibular nucleus (SPIV)

perihypoglossal nuclei (PHY) **[212]**

nucleus intercalatus (NIS) **[213]**

nucleus prepositus (PRP) **[214]**

nucleus of Roller (NR) **[215]**

interstitial nucleus of the vestibular nerve (INV) **[216]**

nucleus x (x) **[217]**

nucleus y (y) **[218]**

infracerebellar nucleus (ICB) **[219]**

Gustatory

nucleus of the solitary tract, rostral zone of medial part (NTSm) **[220]**

Visceral

nucleus of the solitary tract (NTS) **[221]**

central part (NTSce) **[222]**

commissural part (NTSco) **[223]**

gelatinous part (NTSge) **[224]**

lateral part (NTSl) **[225]**

medial part, caudal zone (NTSm) **[226]**

area postrema (AP) **[227]**

parabrachial nucleus (PB) **[228]**

lateral division (PBl)

central lateral part (PBlc)

dorsal lateral part (PBld)

external lateral part (PBle)

extreme lateral part (PBlex)

internal lateral part (PBli)

superior lateral part (PBls)

ventral lateral part (PBlv)

Kölliker-Fuse subnucleus (KF)

medial division (PBm)

medial medial part (PBmm)

external medial part (PBme)

ventral medial part (PBmv) **[229]**

MOTOR

Eye

oculomotor nucleus (III) **[230]**

medial accessory nucleus (MAN) **[231]**

trochlear nucleus (IV) **[232]**

abducens nucleus (VI) **[233]**

accessory abducens nucleus (ACVI) **[234]**

Jaw

motor nucleus of the trigeminal (V) **[235]**

parvicellular part (Vpc) **[236]**

Face

facial nucleus (VII) **[237]**

accessory facial nucleus (ACVII) **[238]**

Labyrinth

efferent cochlear group (ECO) **[239]**

efferent vestibular nucleus (EV) **[240]**

Pharynx/Larynx/Esophagus

nucleus ambiguus, dorsal division (AMBd) **[241]**

Neck

nucleus of the spinal accessory nerve (XI) **[242]**

Tongue

hypoglossal nucleus (XII) **[243]**

Viscera

Edinger-Westphal nucleus (EW) **[244]**

superior salivatory nucleus (SSN) **[245]**

inferior salivatory nucleus (ISN) **[246]**

dorsal motor nucleus of the vagus nerve (DMX) **[247]**

nucleus ambiguus, ventral division (AMBv) **[248]**

Extrapyramidal

substantia nigra (SN) **[249]**

compact part (SNc) **[250]**

reticular part (SNr) **[251]**

ventral tegmental area (VTA) **[252]**

PRE- & POSTCEREBELLAR NUCLEI

Pontine gray (PG) **[253]**

tegmental reticular nucleus (TRN) **[254]**

Inferior olivary complex (IO) **[255]**

dorsal accessory olive (IOda)

medial accessory olive (IOma)

principal olive (IOpr)

Lateral reticular nucleus (LRN) **[256]**

magnocellular part (LRNm)

parvicellular part (LRNp)

Linear nucleus of the medulla (LIN) **[257]**

Paramedian reticular nucleus (PMR) **[258]**

Parasolitary nucleus (PAS) **[259]**

Red nucleus (RN) **[260]**

CEREBELLUM (CB) **[261]**

Deep Cerebellar Nuclei (DNC) **[262]**

Fastigial nucleus (FN)

Interposed nucleus (IP)

parvicellular part (IPp)

Dentate nucleus (DN)

parvicellular part (DNp)

Cerebellar Cortex (CBX) **[263]**

Vermal regions (VERM)

lingula (I) (LING)

central lobule (CENT)

lobule II (CENT2)

sublobules a,b (CENT2a,b)

lobule III (CENT3)

sublobules a,b (CENT3a,b)

culmen (CUL)

lobules IV,V (CUL4,5)

declive (VI) (DEC)

sublobules a-d (DECa-d)

folium-tuber vermis (VII) (FOTU)

pyramus (VIII) (PYR)

sublobules a,b (PYRa,b)

uvula (IX) (UVU)

sublobules ab,c (UVUab,c)

nodulus (X) (NOD)

sublobules a,b (NODa,b)

Hemispheric regions (HEM)

simple lobule (SIM)

sublobules a,b (SIMa,b)

ansiform lobule (AN)

crus 1 (ANcr1)

sublobules a-d (ANcr1a-d)

crus 2 (ANcr2)

sublobules a,b (ANcr2a,b)

paramedian lobule (PRM)

copula pyramidis (COPY)

sublobules a,b (COPYa,b)

paraflocculus (PFL)

flocculus (FL)

RETICULAR CORE **[264]**

Central gray of the brain (CGB) **[265]**

periaqueductal gray (PAG) **[266]**

interstitial nucleus of Cajal (INC) **[267]**

nucleus of Darkschewitsch (ND) **[268]**

dorsal tegmental nucleus (DTN) **[269]**

ventral tegmental nucleus (VTN) **[270]**

anterior tegmental nucleus (AT) **[271]**

laterodorsal tegmental nucleus (LDT) **[272]**

sublaterodorsal nucleus (SLD) **[273]**

locus coeruleus (LC) **[274]**

subcoeruleus nucleus (SLC) **[275]**

Barrington's nucleus (B) **[276]**

supragenual nucleus (SG) **[277]**

pontine central gray (PCG) **[278]**

Raphé (RA) **[279]**

interfascicular nucleus raphé (IF) **[280]**

rostral linear nucleus raphé (RL) **[281]**

central linear nucleus raphé (CLI) **[282]**

superior central nucleus raphé (CS) **[283]**

medial part (CSm)

lateral part (CSl)

dorsal nucleus raphé (DR) **[284]**

nucleus incertus (NI) **[285]**

nucleus raphé pontis (RPO) **[286]**

nucleus raphé magnus (RM) **[287]**

nucleus raphé pallidus (RPA) **[288]**

nucleus raphé obscurus (RO) **[289]**

Interpeduncular nucleus (IPN) **[290]**

rostral subnucleus (IPNr)

apical subnucleus (IPNa)

dorsomedial subnucleus (IPNd)

lateral subnucleus (IPNl)

dorsal part (IPNld)

intermediate part (IPNli) **[291]**

ventral part (IPNlv) **[292]**

rostral part (IPNlr)

intermediate subnucleus (IPNi)

central subnucleus (IPNc)

Reticular formation (RET) **[293]**

mesencephalic reticular nucleus (MRN) **[294]**

retrorubral area (RR) **[295]**

pedunculopontine nucleus (PPN) **[296]**

cuneiform nucleus (CUN) **[297]**

pontine reticular nucleus (PRN) **[298]**

caudal part (RPNc) **[299]**

rostral part (RPNr) **[300]**

gigantocellular reticular nucleus (GRN) **[301]**

paragigantocellular reticular nucleus (PGRN) **[302]**

dorsal part (PGRNd) **[303]**

lateral part (PGRNl) **[304]**

magnocellular reticular nucleus (MARN) **[305]**

supratrigeminal nucleus (SUT) **[306]**

parvicellular reticular nucleus (PARN) **[307]**

medullary reticular nucleus (MDRN) **[308]**

dorsal part (MDRNd) **[309]**

ventral part (MDRNv)

SPINAL CORD (SP) [310]

Dorsal Horn of the Spinal Cord (DH) **[311]**

Marginal zone of the spinal cord (MZ) **[312]**

Substantia gelatinosa of the spinal cord (SGE)**[313]**

Nucleus proprius of the spinal cord (NP) **[314]**

Reticular nucleus of the spinal cord (RS) **[315]**

Basal nucleus of the dorsal horn (BN) **[316]**

lateral cervical nucleus (LCN) **[317]**

lateral spinal nucleus (LSN) **[318]**

Intermediate Gray of the Spinal Cord (IH) **[319]**

Central cervical nucleus (CEC) **[320]**

Dorsal nucleus of the spinal cord (DSN) **[321]**

caudal part (DSNc) **[322]**

Intermediomedial column of the spinal cord (IMM) **[323]**

Intermediolateral column of the spinal cord (IML) **[324]**

dorsal commissural nucleus (DOL) **[325]**

intercolated nucleus of the spinal cord (ICS) **[326]**

sympathetic column (IMLs)

parasympathetic column (IMLp)

Central Gray of the Spinal Cord (CGS) **[327]**

Ventral Horn of the Spinal Cord (VH) **[328]**

Nucleus of the bulbocavernosus (NBC) **[329]**

Onuf's nucleus (ON) **[330]**

Phrenic nucleus (PN) **[331]**

Basic Cell Groups of the Rat CNS (Footnote Annotations)

1 The cerebral cortex has been divided into areas that may (isocortical) or may not (allocortical) be fitted into a basic six-layered scheme (Vogt and Vogt 1919), numbered 1-6 here. These terms are preferred to the equivalent homotypical and heterotypical of the Vogt's pupil, Brodmann (1909), and to the terms neocortical, archicortical, and paleocortical (Ariëns Kappers 1909), all of which imply unsubstantiated phylogenetic and ontogenetic attributes (see Lorente de Nó 1934; Ebbeson 1980). The olfactory cortex (including superficial parts of the amygdala) and hippocampal formation form the allocortex, as interpreted here. Names of the 6 isocortical layers, from superficial to deep, would include: 1, molecular layer (ISO1); 2, superficial supragranular pyramidal layer (ISO2); 3, deep supragranular pyramidal layer (ISO3); granular layer (ISO4); infragranular pyramidal layer (ISO5); and polymorph layer (ISO6).

2 Donoghue and Wise 1982; Neafsey et al. 1986.

3 Cechetto and Saper 1987.

4 Krettek and Price 1977.

5 Krettek and Price 1977; Vogt and Peters 1981.

6 Sally and Kelly 1988; Kelly and Sally 1988; Arnault and Roger 1990.

7 Azizi et al. 1985; Sally and Kelly 1988; Kelly and Sally 1988.

8 Clear cytoarchitectonic differences between areas Te3 and Te2 (see Arnault and Roger 1990) were not observed.

9 Krieg 1946a,b; Miller and Vogt 1984; see note 21.

10 Kosar et al. 1986; Cechetto and Saper 1987.

11 Krettek and Price 1977; Vogt and Peters 1981.

12 Krettek and Price 1977; our parcellation of these topologically difficult areas was greatly aided by examining sections cut in the three standard planes.

13 Krieg 1946a,b; Deacon et al. 1983.

14 This region appears to lie between unimodal somatosensory and visual areas and receives inputs from the lateral posterior nucleus; to this extent it may correspond to posterior parietal association areas in primates and other mammals; see Hughes 1977; Miller and Vogt 1984.

15 Krettek and Price 1977; Vogt and Peters 1981.

16 Vogt and Miller 1983.

17 This is the so-called agranular region of the retrosplenial area; see Krettek and Price 1977; Vogt and Miller 1983.

18 This is the so-called granular region of the retrosplenial area; we could not distinguish clearly zones b and c of Miller and Vogt 1983; also see Sripanidkulchai and Wyss 1987 for information about lamination.

19 Chapin and Lin 1984; Sanderson et al. 1984.

20 Welker and Sinha 1972; see also Chapin and Lin 1984.

21 We have recognized two distinct fields in the temporal region between the visual and auditory cortices dorsally and the perirhinal area ventrally. Krieg (1946a) appears to have regarded this entire area as ECT; more in keeping with Brodmann (1909), we suggest that the dorsal part of this region

(where layer 4 is still recognizable) may correspond to temporal association cortex (perhaps in the dorsal, middle, and inferior temporal gyri in humans), and have labeled it TEv; we have retained ECT for the distinct ventral area, just dorsal to the perirhinal area, where layers 2 and 4 are quite indistinct. The architecture and connections of this region require much more analysis.

22 Cechetto and Saper 1987.

23 Sefton and Dreher 1985; Thomas and Espinosa 1987; Reid and Juraska 1991.

24 Krettek and Price 1977, 1978.

25 Defined here as regions of the cortical mantle that receive a direct input from the olfactory nerve (primary; see Brodmann 1909), or from the main and accessory olfactory bulbs (unimodal association; see Price 1987). The latter also includes superficial regions of the amygdala (the NLOT, BA, MEA, and COA), and it is important to point out that the entorhinal area of the hippocampal formation also receives direct olfactory input (Kosel et al. 1981).

26 Gurdjian 1925; Switzer et al. 1985.

27 Gurdjian 1925; Switzer et al. 1985.

28 This “nucleus” is an area of the olfactory cortex, with a molecular layer (1) and a pyramidal layer (2); except for the external part, the divisions are based on topology, not architecture (see Haberly and Price 1978b).

29 There is little agreement in the literature about the parcellation and nomenclature associated with the taenia tecta and induseum griseum. From examining sections in the three standard planes, it seems clear to us that the induseum griseum continues uninterrupted around the genu of the corpus callosum to the septohippocampal nucleus (Atlas Levels 11-13; also see Wyss and Sripanidkulchai 1983); the part of the induseum griseum rostral and ventral to the genu was called the dorsal part of the taenia tecta by Haberly and Price (1978b). The ventral taenia tecta of Haberly and Price (1978b) has a very different structure. They divided it into superior and inferior parts, which we refer to here as the dorsal and ventral parts of the taenia tecta proper, respectively. The taenia tecta reminds one of differentiated parts of the adjacent anterior olfactory nucleus (see Davis et al. 1978). We recognize three layers in the TTv (as Haberly and Price 1978b) and four layers in the TTd.

30 Price 1973; Millhouse and Heimer 1984.

31 Meyer et al. 1989.

32 Gurdjian 1928.

33 Craigie 1925; Haberly and Price 1978a.

34 Haug 1976; Canteras et al. 1992a.

35 Canteras et al. 1992a.

36 Krettek and Price 1978. This "nucleus" appears to form the olfactory component of the claustrum, deep to the piriform area (see also Gurdjian 1928).

37 Blackstad 1956; Swanson et al. 1987. See Canteras et al. (1992a) for a discussion of the ventral part of the medial entorhinal area.

38 Wyss and Sripanidkulchai 1983 (see note 29).

39 Hjorth-Simonsen 1972.

40 McDonald 1983; Millhouse and Uemura-Sumi 1985. Like the NLOT, MEA, and CoA, this is an area of the olfactory cortex.

41 Gurdjian 1928.

42 Scalia and Winans 1975.

43 DeOlmos et al. 1985. The medial and cortical "nuclei" of the amygdala are in fact cortical structures with a molecular layer that receives a dense olfactory input (see Price 1987).

44 DeOlmos et al. 1985.

45 Canteras et al. 1992a.

46 This term was introduced by Gurdjian (1928) to describe an ill-defined region that essentially all later workers have defined somewhat differently, depending on how better-differentiated neighboring cell groups have been defined; we have followed in this tradition here.

47 We have followed McDonald's (1982) parcellation into medial, lateral, and capsular parts, although it is clear that the nucleus is much more complex than this. McDonald's intermediate part was not recognized; it appears to fall within the lateral part as outlined here.

48 Krettek and Price 1978.

49 Krettek and Price 1978.

50 DeOlmos et al. 1985; Canteras et al. 1992a.

51 Canteras et al. 1992a.

52 Millhouse 1986.

53 Swanson et al. 1987.

54 Swanson and Cowan 1979 (see note 140).

55 Swanson and Cowan 1979. There is no morphologically distinct border between the medial septal nucleus and the nucleus of the diagonal band, although an arbitrary border is often drawn at the widest point in this complex (see Atlas Level 16). This level also shows that it is often convenient to describe horizontal and vertical limbs of the nucleus of the diagonal band (Raisman 1966). Unfortunately, Price and Powell (1970) applied the term "nucleus of the horizontal limb of the diagonal band" to a laterally adjacent cell group that had been widely referred to as the magnocellular preoptic nucleus since the time of Loo (1931), and that projects to the olfactory bulb rather than the hippocampal formation (see note 66).

56 Swanson and Cowan 1979.

57 Ju and Swanson 1989.

58 Gurdjian 1925; Swanson and Cowan 1979.

59 Swanson and Cowan 1979.

60 Shaver et al. 1990.

61 Graybiel and Ragsdale 1979.

62 Graybiel and Ragsdale 1979.

63 There is no morphologically distinct boundary between this ventromedial region of the striatum and the caudoputamen; Gurdjian (1928) first defined the nucleus accumbens in the rat as that part of the ventromedial striatum lacking massive bundles of ascending and descending fibers, which is still a useful working criterion.

64 The cytoarchitecture of this ventrolateral region of the striatum just deep to the substantia innominata is more heterogeneous than that of the nucleus accumbens and especially the caudoputamen. While

the term "fundus of the striatum (fundus striati of Heimer 1972)" has been used here and there in the recent literature, its borders have not been clearly defined; it is used here to refer to the region identified as the substriatal gray by Crosby and Humphrey (1941).

65 Gurdjian 1928; Graybiel and Ragsdale 1979. In the rat, the lateral segment is often referred to as "the globus pallidus", whereas the medial segment is often referred to as the entopeduncular nucleus. This anomalous nomenclature will probably gradually disappear.

66 Jones et al. 1976. This region has been renamed the ventral pallidum (see Alheid and Heimer 1988), and contains a characteristic subpopulation of scattered, cortically projecting cholinergic neurons (Rye et al. 1984) that in some animals (especially primates) form distinct cell clusters known as the basal nuclei of Meynert (see Gorry 1963). These cholinergic cells extend into the medial septal complex and lateral preoptic area. The term magnocellular basal "nucleus" has been introduced to refer to the basal forebrain cholinergic neurons that project to the cerebral cortex (Saper 1984).

67 This nucleus comes as close to a basal nucleus of Meynert as anything in the rat; cholinergic neurons here innervate preferentially the olfactory bulb. See Swanson 1976a; Rye et al. 1984; and notes 55 and 66.

68 Berman and Jones 1982; Jones 1985.

69 These nuclei project in a topographically organized way to all parts of the cortical mantle.

70 Macchi and Bentivoglio 1986; Berendse and Groenewegen 1991. These nuclei preferentially innervate the hippocampal formation and amygdala.

71 Krieg 1944.

72 Gurdjian 1927.

73 Gurdjian 1927.

74 Gurdjian 1927.

75 Gurdjian 1927. These nuclei preferentially innervate the cingulate region.

76 Krieg 1944.

77 Krieg 1944.

78 Canteras and Swanson 1992a.

79 Canteras and Swanson 1992a.

80 Krieg 1944; Rose 1942.

81 Gurdjian 1927.

82 Gurdjian 1927; Rose 1942.

83 Gurdjian 1927; Thompson and Robertson 1987.

84 These nuclei preferentially innervate the prefrontal region.

85 Gurdjian 1927; Krieg 1944; Krettek and Price 1977.

86 Krieg 1944; Price and Slotnick 1983.

87 Brittain 1988.

88 These nuclei preferentially innervate association areas in the parietal, temporal, and occipital regions.

89 Gurdjian 1927; Faull and Mehler 1985. This cell group, which includes the pulvinar complex of many other species, has been little studied in the rat.

90 Feldman and Kruger 1980; Faull and Mehler 1985; Fabri and Burton 1991.

91 LeDoux et al. 1987; Clerici and Coleman 1990.

92 LeDoux et al. 1987; Clerici and Coleman 1990.

93 These nuclei innervate preferentially somatic sensory and motor areas.

94 Sawyer et al. 1989.

95 Herkenham 1979.

96 Lund and Webster 1967b; Faull and Mehler 1985; Emmers 1988.

97 Cechetto and Saper 1987.

98 Lund and Webster 1967a; Faull and Mehler 1985; Emmers 1988.

99 Cechetto and Saper 1987.

100 These nuclei innervate preferentially auditory and visual areas.

101 Winer and Laurue 1987; Clerici and Coleman 1990.

102 Several parts of this complex do not project to the cerebral cortex (see notes 117 and 118).

103 Reese 1988.

104 Macchi and Bentivoglio 1986; Berendse and Groenewegen 1991. These “nonspecific” nuclei have

somewhat wider projections to the cortex than many other thalamic nuclei.

105 Gurdjian 1927; Krieg 1944.

106 Gurdjian 1927; Jones and Leavitt 1974.

107 Gurdjian 1927; Jones and Leavitt 1974.

108 Jones and Leavitt 1974.

109 Gurdjian 1927. A closely related centre médian nucleus is now commonly identified in primates but not rodents; it is interesting to note, however, that Krieg (1944) pointed out what he regarded as the equivalent of a centre médian nucleus in the rat.

110 These nuclei do not project to the telencephalon.

111 Gurdjian 1925; Herkenham and Nauta 1979.

112 Wada et al. 1989.

113 Wada et al. 1989.

114 Gurdjian 1925; Herkenham and Nauta 1979.

115 These nuclei do not project to the telencephalon.

116 Gurdjian 1927; Spreafico et al. 1991.

117 Hickey and Spear 1976.

118 Swanson et al. 1974.

119 Gurdjian 1927.

120 Björklund and Lindvall 1984.

121 Kuzemensky 1977; Berman and Jones 1982.

122 Gurdjian 1927; Afsharpour 1985; Canteras et al. 1990.

123 Saper et al. 1976a.

124 Faull and Mehler 1985. LeDoux et al. (1987) have divided the parvicellular part of the subparafascicular nucleus as defined here into a posterodorsal part (which they called the posterior intralaminar nucleus—although it is not continuous with the intralaminar nuclei of the thalamus), and a ventral part (which they called the parvicellular part of the subparafascicular nucleus). This distinction was difficult to make in our Nissl-stained material.

125 Rioch et al. 1940; Swanson 1987.

126 This zone is characterized by pools of neuroendocrine motor neurons.

127 Weindl 1973.

128 Simerly et al. 1984.

129 Swanson 1976a.

130 Simerly et al. 1984.

131 Gurdjian 1927.

132 Peterson 1966; Palkovits et al. 1974.

133 Swanson 1991, 1992; Swanson and Simmons 1989.

134 Gurdjian 1927.

135 For the sake of consistency (see notes 128, 131, 134, and 137) we have applied this name to what Gurdjian (1927) referred to as the dorsal part of the posterior periventricular nucleus.

136 Krieg 1932; Everitt et al. 1986.

137 Ingram et al. 1932; Christ 1969. Since this region appears to contain few neurons that project to the median eminence (see Wiegand and Price 1980; Sawchenko and Swanson 1990), it has been separated from the arcuate nucleus.

138 This zone contains a series of well-defined nuclei that divide the hypothalamus into preoptic, anterior, tuberal, and mammillary levels.

139 Simerly et al. 1984.

140 Simerly et al. 1984. The septohypothalamic nucleus of Bleier et al. (1979) includes the ADP and the LSv (see note 54); however, these two cell groups do not merge, and are cytoarchitectonically distinct (Simerly et al. 1984).

141 Simerly et al. 1984.

142 Simerly et al. 1984.

143 Simerly et al. 1984.

144 Krieg 1932; Watts et al. 1987.

145 Watts and Swanson 1987; Watts 1991.

146 Krieg 1932. The AHA includes scattered neurons around the more condensed AHN.

147 Gurdjian 1927; Krieg 1932.

148 Saper et al. 1978.

149 Saper et al. 1978.

150 Saper et al. 1978.

151 This cell group, which Bleier et al. (1979) called the dorsal tuberal nucleus, is clearly part of the AHN.

152 Swanson and Kuypers 1980. These scattered neurons form part of the undifferentiated medial zone gray matter, between the AHN and VMH, and lie among the fibers of the supraoptic commissures; they were called the nucleus supraopticus diffusus by Gurdjian (1927).

153 Swanson 1987. This area includes the undifferentiated, cell-sparse zone or "shell" around the ventromedial nucleus.

154 Gurdjian (1927) and Saper et al. (1976a) recognized dorsomedial and ventrolateral cell condensations separated by a relatively cell-sparse central region; Van Houten and Brawer (1978) also recognized a distinct anterior component.

155 Gurdjian 1927; Krieg 1932.

156 Gurdjian (1927) referred to this poorly defined cell group as the dorsal part of the DMH.

157 Gurdjian (1927) referred to this dense group of cells as the ventral part of the DMH.

158 A variety of architectonic features indicate that this region differs from the anterior and posterior parts (R. Thompson, N.C. Canteras, and L.W. Swanson, in preparation).

159 Gurdjian 1927; Krieg 1932; Canteras et al. 1992b.

160 Köhler et al. 1985.

161 Swanson 1982.

162 Canteras and Swanson 1992a.

163 Gurdjian 1927; Krieg 1932; Allen and Hopkins 1988.

164 Gurdjian 1927; Krieg 1932; Allen and Hopkins 1988.

165 Gurdjian 1927; Krieg 1932.

166 This very heterogeneous, poorly understood region is often thought of as an interstitial nucleus of the medial forebrain bundle, and the rostral extension of the brainstem reticular formation.

167 Gurdjian 1927; Swanson 1976a.

168 Gurdjian 1927; Krieg 1932. Several attempts have been made to parcellate this area, but there is little agreement among authors, and parcellations based on histochemistry combined with pathway tracing methods are needed.

169 Braekevelt and Hollenberg 1970; Morest 1970; Perry 1981; Ehinger and Dowling 1987.

170 Kanaseki and Sprague 1974; Bickford and Hall 1989.

171 Tokunaga and Otani 1978; Harting et al. 1991b.

172 Scalia 1972.

173 Campbell and Lieberman 1985; Gregory 1985.

174 Giolli et al. 1985; Gregory 1985.

175 Gregory 1985.

176 Kanaseki and Sprague 1974.

177 Scalia 1972.

178 Siminoff et al. 1968; Kanaseki and Sprague 1974.

179 Hayhow et al. 1960; Giolli et al. 1989.

180 Hayhow et al. 1960; Terubayashi and Fujisawa 1984; Giolli et al. 1985.

181 Hayhow et al. 1960; Terubayashi and Fujisawa 1984; Giolli et al. 1985.

182 Gregg and Dixon 1973; Schneider et al. 1981; Hirsch (1765) named this ganglion after his professor, J.L. Gasser.

183 Rokx et al. 1986a; Luo et al. 1991.

184 Torvik 1957; Emmers 1988.

185 Olszewski 1950.

186 Falls et al. 1985; Jacquin and Rhoades 1990.

187 Phelan and Falls 1989a.

188 Nord 1967; Gobel et al. 1977; Kruger 1979.

189 Chan-Palay 1978; Phelan and Falls 1989b.

190 Torvik 1956; Nord 1967.

191 Gulley 1973; Cliffer and Giesler 1989; Maslany et al. 1991.

192 Kemplay and Webster 1989.

193 Cliffer and Giesler 1989; Maslany et al. 1991.

194 Low et al. 1986.

195 Campbell et al. 1974.

196 Harrison and Feldman 1970; Osen et al. 1984; Webster 1985.

197 Harrison and Feldman 1970; Osen et al. 1984; Webster 1985.

198 Harrison and Feldman 1970; Osen et al. 1984; Webster 1985.

199 Mugnaini et al. 1980.

200 Mugnaini et al. 1980.

201 Harrison and Feldman 1970; Merchan et al. 1988.

202 Harrison and Feldman 1970; Osen et al. 1984; Fay-Lund 1986; Bledsoe et al. 1990. This cell group is sometimes referred to as the medial nucleus of the trapezoid body (see note 206).

203 Harrison and Feldman 1970; Osen et al. 1984; Webster 1985; Fay-Lund 1986.

204 Osen et al. 1984; Webster 1985; Fay-Lund 1986.

205 Harrison and Feldman 1970; Osen et al. 1984; Webster 1985; Fay-Lund 1986.

206 There is general agreement that the medial and lateral parts of the superior olive are surrounded by a ring of periolivary gray matter, with a superior (e.g., Harrison and Feldman 1970) or dorsomedial (e.g., Morest 1973) periolivary "nucleus" that is particularly obvious. There is, however, little agreement about parcellating this ring of gray matter (some parts have been referred to as components of the nucleus of the trapezoid body). Since we could not clearly distinguish separate cell groups in this region, it has been referred to simply as the periolivary region (see Osen et al. 1984).

207 While it is common to divide this nucleus into dorsal and ventral parts, or into dorsal, intermediate, and ventral parts, the architecture and connections of this cell group have not been examined in any detail in the rat; where this has been done, it is obvious that the NLL is an extremely complex region

(see Covey and Casseday 1986). We have not attempted to parcellate the NLL.

208 Fay-Lund and Osen 1985.

209 Berman 1968.

210 Berman 1968; Andrezik and Beitz 1985; Henkel and Shneiderman 1988.

211 Mehler and Rubertone 1985.

212 Brodal 1952, 1983; McCrea and Baker 1985.

213 Meessen and Olszewski 1949; Brodal 1952.

214 Torvik 1956.

215 Meessen and Olszewski 1949; Torvik 1956; Valverde 1962.

216 Mehler and Rubertone 1985.

217 Mehler and Rubertone 1985.

218 Fredrickson and Trune 1986.

219 Fredrickson and Trune 1986.

220 Hamilton and Norgren 1984.

221 Torvik 1956; Contreras et al. 1982.

222 Ross et al. 1985; Cunningham et al. 1991.

223 Torvik 1956.

224 Leslie et al. 1982; Shapiro and Miselis 1985b.

225 Berman 1968.

226 Berman 1968; Contreras et al. 1982.

227 Shapiro and Miselis 1985a.

228 Fulwiler and Saper 1984.

229 This region appears to us to be a ventral extension of the PBmm (of Fulwiler and Saper 1984).

230 Glicksman 1980.

231 Leichnetz 1982; Gonzalo-Ruiz et al. 1990.

232 Glicksman 1980.

233 Glicksman 1980.

234 Székely and Matesz 1982.

235 Mizuno et al. 1975; Jacquin et al. 1983.

236 Spangler et al. 1982.

237 Martin et al. 1977; Watson et al. 1982; Friauf and Herbert 1985; Friauf 1986.

238 Székely and Matesz 1982.

239 White and Warr 1983; Vetter et al. 1991; Vetter and Mugnaini 1992.

240 Strutz 1982.

241 Bieger and Hopkins 1987; Patrickson et al. 1991.

242 Brichta et al. 1987.

243 Krammer et al. 1979; Jacquin et al. 1983; Kitamura et al. 1983.

244 Loewy et al. 1978; Martin and Dolivo 1983.

245 Contreras et al. 1980; Senba et al. 1987; Spencer et al. 1990.

246 Contreras et al. 1980.

247 Fox and Powley 1985; Norgren and Smith 1988; Altschuler et al. 1991.

248 Bieger and Hopkins 1987. This region is characterized by preganglionic neurons that contribute to thoracic branches of the vagus nerve, although other cell types may be present.

249 While a lateral part of the SN has been mentioned in the literature (see Gillilan 1943; Hanaway et al. 1970), more recent work has provided little reason to separate it from the compact part (see Björklund and Lindvall 1984).

250 Danner and Pfister 1982; Björklund and Lindvall 1984.

251 Grofova et al. 1982.

252 Phillipson 1979; Swanson 1982; Björklund and Lindvall 1984.

253 Mihailoff et al. 1981, 1989; Wiesendanger and Wiesendanger 1982.

254 Torigoe et al. 1986.

255 Azizi and Woodward 1987; Nelson and Mugnaini 1988; Bourrat and Sotelo 1991.

256 Kapogianis et al. 1982a,b.

257 Watson and Switzer 1978. Based on connections (Watson and Switzer 1978), cytology, and topology,

these cells are reminiscent of a bridge of LRN cells over the rostral end of the nucleus ambiguus.

258 Mehler 1969; Somana and Walberg 1978; Andrezik and Beitz 1985.

259 Allen 1923; Walberg et al. 1962; Low et al. 1986.

260 While small neurons predominate rostrally and large neurons caudally (Reid et al. 1975; Strominger et al. 1987), it is difficult to draw a boundary between parvicellular and magnocellular parts in the rat.

261 Larsell 1952.

262 Korneliussen 1968; Voogd et al. 1985.

263 Larsell 1952, 1970; Palay and Chan-Palay 1974; Voogd et al. 1985. The cerebellar cortex has three layers: molecular (CBXm), Purkinje (CBXp), and granule cell (CBXg). The surface map provided by Campbell and Armstrong (1983) was particularly useful in constructing FIG. 7. Note that the brain used for this atlas had one apparently unusual feature in the cerebellum (not illustrated in the above references): a very large fissure that we have called the pyramidal fissure (Atlas Levels 64-70).

264 There is no generally accepted definition of the reticular core, which essentially consists of those regions that have not been assigned to particular sensory and motor systems. We consider that the reticular core extends into the forebrain to include the lateral zone of the hypothalamus, the ventral thalamus and epithalamus, and the substantia innominata. It plays a major role in controlling behavioral state, and in polymodal integration.

265 It is often thought that this region is continuous with periventricular parts of the diencephalon (see Krieg 1932; Sutin 1966).

266 Beitz 1985. Functional subdivisions of this very heterogeneous region are still poorly understood.

267 Rutherford and Gwyn 1982.

268 Gillilan 1943; Rutherford et al. 1989.

269 Cowan et al. 1964; Hayakawa and Zyo 1983.

270 Cowan et al. 1964; Hayakawa and Zyo 1983.

271 Paxinos and Butcher 1985.

272 Gillilan 1943; Cornwall et al. 1990.

273 Swanson et al. 1984 (see also Gillilan 1943).

274 Swanson 1976b.

275 This term has assumed a variety of connotations since the introduction of histochemical methods for localizing biogenic amines; it is used here as the equivalent of Meessen and Olszewski's (1949) nucleus subcoerulus α.

276 Imaki et al. 1991.

277 Meessen and Olszewski 1949; Andrezik and Beitz 1985.

278 This is simply the caudal extension of the periaqueductal gray.

279 Olszewski and Baxter 1954; Taber et al. 1960; Steinbusch and Nieuwenhuys 1983.

280 Berman 1968; Phillipson 1979.

281 Castaldi 1923; Brown 1943; Swanson 1982.

282 Castaldi 1923; Brown 1943 (intermediate linear nucleus); Swanson 1982.

283 Bechterew 1899; Taber et al. 1960; Valverde 1962. A superior central nucleus with medial and lateral zones has long been recognized. König and Klippel (1963) referred to the nucleus medianus raphés, which may correspond to the medial part, where serotonergic neurons are apparently concentrated (Dahlström and Fuxe 1964).

284 Brown 1943; Valverde 1962; Descarries et al. 1982; Park 1987.

285 Streeter 1903; Castaldi 1923; Berman 1968; Wyss et al. 1979.

286 Brown 1943; Valverde 1962.

287 Meessen and Olszewski 1949; Valverde 1962; Mason et al. 1990.

288 Olszewski and Baxter 1954; Valverde 1962.

289 Olszewski and Baxter 1954; Valverde 1962; Bowker and Abbott 1990.

290 Groenewegen et al. 1986.

291 Wada et al. 1989.

292 Wada et al. 1989.

293 While there is some confusion in the literature about the various parts of the reticular formation, virtually all modern accounts are based on the pioneering work of Olszewski and his colleagues (Meessen and Olszewski 1949; Olszewski and Baxter 1954), which was modified by Brodal (1957)

for the cat and by Valverde (1962) for the rat.

294 Brodal 1957.

295 Berman 1968. This region is characterized by scattered dopamine cells, caudal and dorsal to the ventral tegmental area (see Swanson 1982; Björklund and Lindvall 1984).

296 Jacobsohn 1909; Olszewski and Baxter 1954; Rye et al. 1987. Rye et al. (1987) regard the subpopulation of cholinergic neurons in this region as the pedunculopontine "nucleus" (see note 66); the region outlined here contains all of the cells identified earlier

in the PPN (Jacobsohn 1909; Olszewski and Baxter 1954), although cholinergic neurons provide a very useful guide to its borders and seem to predominate numerically.

297 Castaldi 1926; Olszewski and Baxter 1954; Swanson et al. 1984.

298 Meessen and Olszewski 1949.

299 The A5 noradrenergic group (Dahlström and Fuxe 1964) and associated depressor region (see Loewy et al. 1986), appears to be centered in ventrolateral regions of the PRNc, including the region of the rubrospinal tract, although a few cells also appear to extend into the periolivary region (see Westlund et al. 1983; Byrum et al. 1984). Most of the cells appear to lie adjacent to the superior salivatory nucleus (see note 304).

300 Often referred to as the oral part (Meessen and Olszewski 1949).

301 Meessen and Olszewski 1949.

302 Olszewski and Baxter 1954.

303 Taber 1961; Newman 1985a.

304 Andrezik et al. 1981. Although this problem has not been addressed in detail, it seems likely from published maps (see Dahlström and Fuxe 1964; Hökfelt et al. 1984; Sawchenko et al. 1985; Giuliano et al. 1989; Ellenberger et al. 1990) that the C1 adrenergic group, the A1 noradrenergic group, the ventrolateral medulla, and the rostral ventrolateral medulla are centered in (though not necessarily confined strictly to) the PGRNl, with relatively minor possible involvement of the ventral division of the nucleus ambiguus (see note 299).

305 Berman 1968; Newman 1985a,b. This is essentially a ventromedial subdivision of the gigantocellular

reticular nucleus.

306 Lorente de Nó 1922; Torvik 1956; Rokx et al. 1986b.

307 Meessen and Olszewski 1949; Mehler 1983; ter Horst et al. 1991.

308 Meessen and Olszewski 1949; Valverde 1962.

309 Villanueva et al. 1988.

310 Since the Atlas does not extend into the spinal cord, the following is not an exhaustive account of cell groups within this division of the CNS. For a general account of the rat spinal cord, see Waibl (1973) and Altman and Bayer (1984); for attempts to impose a laminar organization on the spinal cord, see Rexed (1952, 1954) and Brichta and Grant (1985).

311 The basic division of the dorsal horn used by Cajal (1909/1911) has been adopted here. Cajal divided the base of the dorsal horn into medial and lateral basal nuclei (together called the BDG here), whereas Cajal's head and neck (center) of the dorsal horn has come to be referred to as the nucleus proprius (see Carpenter and Sutin 1983); the reticular nucleus (process) is found lateral to the nucleus proprius (see Rexed 1952).

312 Lima and Coimbra 1986; Holstege 1988.

313 Willis and Coggeshall 1991; Light and Kavookjian 1988; Rustioni and Weinberg 1989; Cruz et al. 1991.

314 Todd 1989.

315 Rexed 1952.

316 Cajal 1909/1911.

317 Baker and Giesler 1984; Giesler et al. 1988; Broman and Blomqvist 1989.

318 Giesler and Elde 1985; Burstein et al. 1987; Broman and Blomqvist 1989.

319 Cajal (1909/1911) essentially divided the intermediate gray into medial, intermediate, and lateral parts (the commissural nucleus, intermediate nucleus, and nucleus of the lateral funiculus, respectively).

320 Matsushita and Hosoya 1979; Matsushita et al. 1991.

321 Matsushita and Hosoya 1979.

322 Edgley and Grant 1991.

323 Petras and Cummings 1972; Molander et al. 1984; Brichta and Grant 1985; Molander et al. 1989.

324 Rubin and Purves 1980; Mawe et al. 1986; Strack et al. 1988; Anderson et al. 1989; Barber et al. 1991; Hosoya et al. 1991.

325 Hancock and Peveto 1979.

326 Petras and Cummings 1972; Barber et al. 1991.

327 Nahin et al. 1983.

328 Brichta and Grant 1985.

329 Sasaki and Arnold 1991.

330 Kuzuhara et al. 1980.

331 Kuzuhara and Chou 1980.