

Regional map of Macaque cortex in CoCoMac

Notes:

- Macaque brain maps are denoted as W40, BP89, etc. as described in Kötter et al. (2004) and the CoCoMac data entry manual available for download from www.cocomac.org
- The abbreviations I, S, L, O refer to the Relation Codes as described in Stephan et al. (2000)

Frontal cortex

- PFCdm = dorsomedial prefrontal cortex:

Medial part of prefrontal cortex rostral to the medial premotor cortex and above the cingulate sulcus.

Human parcellation by Brodmann: 8, 9 (O)

- ⇒ **W40**: 8B, 9 (O)
- ⇒ **BP89**: 9 (L)
- ⇒ **PG91a**: 8Bm, 9m (S)
- ⇒ **CP94**: 9 (L)
- ⇒ **PP84**: 9 (L)
- ⇒ **PP99**: 8B, 9 (O)

- PFCdl = dorsolateral prefrontal cortex

Includes dorsal 1/3 of lateral prefrontal cortex (except prefrontal pole), ends at the rim of the hemisphere. Caudally bordered by dorsolateral premotor cortex.

Human parcellation by Brodmann: 8, 9 (O)

- ⇒ **W40**: 8B, 9 (O)
- ⇒ **BP89**: 9 (L)
- ⇒ **PG91a**: 8Bd, 9d (S)
- ⇒ **CP94**: 9 (L)
- ⇒ **PP84**: 9 (L)
- ⇒ **PP99**: 8B, 9 (O)

- PFCd = dorsal (dorsomedial + dorsolateral) prefrontal cortex:

Combination of dorsomedial and dorsolateral regions as defined above.

- ⇒ **W40**: 8B, 9 (S)
- ⇒ **BP89**: 9 (I)
- ⇒ **PG91a**: 8Bd, 8Bm, 9d, 9m (S)
- ⇒ **CP94**: 9 (I)
- ⇒ **PP84**: 9 (I)
- ⇒ **PP99**: 8B, 9 (S)

- PFCcl = centrolateral prefrontal cortex

Central 1/3 of lateral prefrontal cortex (except prefrontal pole). Caudally bordered by the frontal eye field, rostrally bordered by the prefrontal pole.

Human parcellation by Brodmann: 46, 9 (O)

- ⇒ **W40**: 46 (I)
- ⇒ **BP89**: 46 (I)
- ⇒ **PG91a**: 46d, 46dr, 46v, 46vr (S)

- ⇒ **CP94**: 46 (I)
- ⇒ **PP99**: 9/46, 46 (S)

- **PFCvl = Ventrolateral prefrontal cortex:**

Ventral 1/3 of lateral prefrontal cortex (except prefrontal pole). Caudally bordered by ventrolateral premotor cortex.

Human parcellation by Brodmann: 44, 45, 47 (S); 11, 46 (O)

- ⇒ **W40**: 45 (S); 12 (O)
- ⇒ **BP89**: L12, V8 (S)
- ⇒ **PG91a**: 12vl, 45 (S)
- ⇒ **CP94**: 12l, 12r, 8 (O); 45 (S)
- ⇒ **PP99**: 47/12, 45A, 45B, 8Av (S)

- **PFCorb = orbitofrontal cortex:**

Orbital portion of the prefrontal cortex, ends at the lateral and medial convexities of the hemisphere, respectively. Caudally bordered by the anterior insular region. Further divided into PFCol, PFCoi, PFCom.

Human parcellation by Brodmann: 11 (L), 12 (S)

- ⇒ **W40**: 12, 10 (O); 11, 13, 14 (S)
- ⇒ **BP89**: 14, 25 (O); 11, O12, 13 (S)
- ⇒ **CP94**: 12r, 12l, 14r, 14c (O); 12o, 12m, 11l, 11m, 13m, 13l, 13a, 13b (S)
- ⇒ **PG91a**: 12orb, 11, 13L, 14A, 14L, 14M (S)

- **PFCol = orbitolateral prefrontal cortex:**

Lateral orbital portion of the prefrontal cortex, borders the lateral convexity of the hemisphere and the lateral orbital sulcus, respectively. Caudally bordered by the anterior insular region.

Human parcellation by Brodmann: 11 (L)

- ⇒ **W40**: 12, 10 (O)
- ⇒ **BP89**: 14 (O)
- ⇒ **CP94**: 12r, 12l (O); 12o, 12m (S)
- ⇒ **PG91a**: 12orb (S)

- **PFCoi = intermediate orbitofrontal cortex:**

Intermediate orbital portion of the prefrontal cortex, ends at the lateral and medial orbital sulci, respectively. Caudally bordered by the anterior insular region.

Human parcellation by Brodmann: 11 (L)

- ⇒ **W40**: 10 (O); 11, 13 (S)
- ⇒ **BP89**: 14, 25 (O); 11, O12, 13 (S)
- ⇒ **CP94**: 11l, 11m, 13m, 13l, 13a, 13b (S)
- ⇒ **PG91a**: 11, 13L (S)

- **PFCom = orbitomedial prefrontal cortex:**

Medial orbital portion of the prefrontal cortex, ends at the medial convexity of the hemisphere and the medial orbital sulcus, respectively. Caudally bordered by the subgenual region of the cingulate cortex.

Human parcellation by Brodmann: 11 (L)

- ⇒ **W40**: 10 (O); 14 (S)
- ⇒ **BP89**: 14, 25 (O)
- ⇒ **CP94**: 14r, 14c (O)
- ⇒ **PG91a**: 14A, 14L, 14M (S)

- **PFCpol** = prefrontal pole:

Cortex of prefrontal pole. Forms the anterior border of dorsolateral, centrolateral and ventrolateral prefrontal cortex on the lateral side of the hemisphere, as well as of dorsomedial and medial prefrontal cortex on the medial side of the hemisphere, and orbitomedial, orbitointermediate and orbitolateral prefrontal cortex on the ventral side of the hemisphere.

Human parcellation by Brodmann: 10 (I)

- ⇒ **W40**: 10 (I)
- ⇒ **BP89**: 10 (I)
- ⇒ **PG91a**: 10 (I)
- ⇒ **CP94**: 10o, 10m (S)
- ⇒ **PP99**: 10 (I)

- **PFCm** = medial prefrontal cortex:

Cortex surrounding the gyrus cinguli from the subgenual to the dorsal prefrontal region. This excludes more posterior “paracingulate” cortex, e.g. the cingulate motor areas. Rostral of the genu corporis callosi, below the rostral tip (or the rostral extension) of the cingulate sulcus. Stretches ventralwards towards the orbitofrontal cortex while being bordered caudally by the anterior cingulate and subgenual region.

Human parcellation (paracingulate cortex) by Brodmann: 32 (L)

- ⇒ **VPR87**: 32 (I)
- ⇒ **BP89**: 32 (I)
- ⇒ **CP94**: 32 (I)
- ⇒ **PP99**: 32 (I)
- ⇒ **B09**: 32 (I)
- ⇒ **PHT00**: 8/32, 9/32, 32 (S)
- ⇒ **W40**: 25 (I)

- **FEF** = frontal eye field:

Macaque: Caudal part of central prefrontal cortex. Caudally bordered by premotor cortex.

Human parcellation by Brodmann: ?

- ⇒ **W40**: 8A (I)

- **PMCvl** = ventrolateral premotor cortex:

Ventral half of lateral premotor cortex (lack of layer 4, lack of giant Betz cells).

Human parcellation by Brodmann: 6 (L)

- ⇒ **B09**: 6 (L)
- ⇒ **BB47**: FCBm, FBA (S)
- ⇒ **MLR85**: F4, F5 (S)
- ⇒ **BP87**: 6Va, 6Vb (S)
- ⇒ **PG91a**: 6Va, 6Vb (S)

- **PMCdl** = dorsolateral premotor cortex:

Dorsal half of lateral premotor cortex (lack of layer 4, lack of giant Betz cells).

Human parcellation by Brodmann: 6 (L)

- ⇒ **B09**: 6 (L)
- ⇒ **BB47**: FB (L)
- ⇒ **BP87**: 6DR (S); 6DC (O)
- ⇒ **MLR91**: F2, F7 (S)
- ⇒ **PG91a**: 6D, 6Ds (S)

▪ **PMCm** = medial (supplementary) premotor cortex:

Medial part of premotor cortex (lack of layer 4, lack of giant Betz cells).

Human parcellation by Brodmann: 6 (L)

- ⇒ **B09**: 6 (L)
- ⇒ **BB47**: FB (L)
- ⇒ **BP87**: MII (S); 6DC (O)
- ⇒ **MLR91**: F3 (S), F6 (S)
- ⇒ **PG91a**: 6M (I)
- ⇒ **PHT00-6M**, 6/32 (S)

▪ **MI** = primary motor cortex:

Precentral cortex (lack of layer 4, giant Betz cells).

Human parcellation by Brodmann: 4 (I)

- ⇒ **B09**: 4 (I)
- ⇒ **BB47**: FA (I)
- ⇒ **BP87**: 4 (I)
- ⇒ **CG89b-MI** (I)
- ⇒ **MLR91**: F1 (I)
- ⇒ **PG91a**: M1 (I)
- ⇒ **PHT00-4** (I)
- ⇒ **TTNI97-MI** (I)

Cingulate cortex

▪ **CCs** = Subgenual cingulate cortex:

Cortex between the genu corporis callosi and the ventral border of the hemisphere.

Human parcellation by Brodmann: 25 (S); 11, 32 (O)

- ⇒ **B09**: 24 (L)
- ⇒ **W40**: 24 (L)
- ⇒ **BB47**: FL (I)
- ⇒ **PHT00-25** (I)
- ⇒ **VPR87**: 25 (I)

▪ **CCa** = Anterior cingulate cortex:

Anterior half of the cingulate gyrus, stretching from the middle of the cingulate gyrus around the curvature of the genu corporis callosi. This includes Brent Vogt's midcingulate cortex (area 24')

Human parcellation by Brodmann: 24, 33 (S)

- ⇒ **B09**: 24 (L)
- ⇒ **W40**: 24 (L)
- ⇒ **BB47**: LA (I)
- ⇒ **VPR87**: 24 (I)
- ⇒ **CP94**: 24a, 24b, 24c (S)

▪ **CCp** = Posterior cingulate cortex:

Posterior half of the cingulate gyrus, stretching from the middle of the cingulate gyrus around the curvature of the splenum corporis callosi, but sparing the retrosplenial region.

Human parcellation by Brodmann: 23, 31 (S)

- ⇒ **B09**: 23 (I)
- ⇒ **BB47**: LC (L)
- ⇒ **VPR87**: 23 (I)

▪ **CCr** = Retrosplenial cingulate cortex

Cortex directly caudal to the splenum corporis callosi.

Human parcellation by Brodmann: 26, 29, 30 (S)

- ⇒ **B09**: 26 (I)
- ⇒ **BB47**: LC (L)
- ⇒ **VPR87**: 29, 30 (S)

Parietal cortex

▪ **S1** = primary somatosensory cortex:

Postcentral primary somatosensory cortex.

Human parcellation by Brodmann: 3, 1, 2 (S)

- ⇒ **B09**: 3, 1, 2 (S)
- ⇒ **BB47**: PA, PB, PC (S)
- ⇒ **JB76**: 3b, 1, 2 (S)

▪ **S2** = secondary somatosensory cortex:

Secondary somatosensory cortex within the anterior parietal operculum at the caudoventral border of the primary sensory cortex.

Human parcellation by Brodmann: 43 (I)

- ⇒ **BB47**: PCop (I)
- ⇒ **RA63**: SSII (I)
- ⇒ **JB76**: SII (I)
- ⇒ **MM82a**: SII (I)

▪ **PCi** = inferior posterior parietal cortex (inferior parietal lobule):

Inferior lateral parietal cortex (caudal of the primary somatosensory cortex and below the sulcus intraparietalis). Caudally bordered by the secondary visual cortex.

Human parcellation by Brodmann: 39, 40 (S)

- ⇒ **B09**: 7 (L)
- ⇒ **BB47**: PG, PF (S)
- ⇒ **PS82**: PF, PFG, PG, Opt, POa (S)
- ⇒ **CG89a**: 7a, 7b, 7ip (S)
- ⇒ **PG91b**: 7b, 7a-l, 7a-m (S)

▪ **PCip** = cortex of the intraparietal sulcus:

Dorsal and ventral banks of the intraparietal sulcus. Caudal border: parieto-occipital sulcus.

Human parcellation by Brodmann: - (border between 7, 40, 39)

- ⇒ **CG89a**: 7ip (S)
- ⇒ **FV91**: LIP, MIP, PIP, VIP (S)
- ⇒ **PG91b**: AIP, LIP, VIP (S)
- ⇒ **PHT00**: DIP, LIP, PEa, POa, VIP (S)
- ⇒ **PS82**: PEa, POa (S)

▪ **PCs** = dorsal parietal cortex (superior parietal lobule):

Parietal cortex caudal of the primary somatosensory cortex and above the sulcus intraparietalis, excluding medial parietal cortex. Caudal border: parieto-occipital sulcus.

Human parcellation by Brodmann: 5, 7 (O)

- ⇒ **PHT00**: PE, PEC (S)
- ⇒ **PS82**: PE, PEc (S)

▪ **PCd** = dorsal (dorsolateral + medial) posterior parietal cortex (superior parietal lobule + precuneus):

Parietal cortex caudal of the primary somatosensory cortex and above the sulcus intraparietalis, including medial parietal cortex. Caudal border: parieto-occipital sulcus.

Human parcellation by Brodmann: 5, 7 (S)

- ⇒ **B09**: 5 (S), 7 (O)
- ⇒ **BB47**: PEm, PEp (S)
- ⇒ **PS82**: PEa, PE, PEc, PGm (S)
- ⇒ **PG91b**: 5, 7m, 31 (S)

▪ **PCm** = medial posterior parietal cortex (precuneus):

Medial parietal cortex caudal of the primary somatosensory cortex. Caudal border: parieto-occipital sulcus.

Human parcellation by Brodmann: 5, 7 (S)

- ⇒ **FV91**: MDP (S)
- ⇒ **PHT00**: PGM, PECg (S)
- ⇒ **PS82**: PGm (I)
- ⇒ **PG91b**: 7m, 31 (S)

Temporal cortex

▪ **A1 = primary auditory cortex:**

Auditory koniocortex on the supratemporal plane delineated based on afferents from MGN (not based on electrophysiological responses to acoustic stimuli).

Human parcellation by Brodmann: 41 (I)

- ⇒ **B09:** 22 (L)
- ⇒ **BB47:** TC (I)
- ⇒ **GP83:** KA, paAr (S)
- ⇒ **HSK98a:** core (I); AI, R, RT (S)
- ⇒ **MB73:** A1 (I)
- ⇒ **PS73:** Kam, Kalt, paAr (S)

▪ **A2 = secondary auditory cortex:**

There exist two distinct but overlapping concepts of secondary auditory cortex: 1) Belt of auditory cortex surrounding A1 on the supratemporal plane; 2) alternatively: caudally located secondary auditory cortex and sensory convergence region. Here we use the former, which is somewhat in conflict with previous concepts of areas called A2.

Human parcellation by Brodmann: 42 (I)

- ⇒ **B09:** 22 (L)
- ⇒ **BB47:** TB (I)
- ⇒ **GP83:** paAlt, reit, paAc, Tpt, Ts3 (O); proA, pal (S)
- ⇒ **HSK98a:** belt (I)
- ⇒ **MB73:** CM, L, RL (S); a, b (O)

▪ **TCs = superior temporal cortex (excl. STS and primary + secondary auditory cortex):**

Superior temporal cortex excluding the superior temporal sulcus and the auditory cortex on the supratemporal plane. Rostrally bordered by the temporopolar region, caudally bordered by the inferior parietal lobule.

Human parcellation by Brodmann: 22, 52 (S)

- ⇒ **B09:** 22 (L)
- ⇒ **BB47:** TA (S)
- ⇒ **MB73:** a, b, (O); c (S)
- ⇒ **GP83:** paAlt, reIt, paAc, Tpt, Ts3 (O); Pro, Ts2, Ts1 (S)

▪ **TCc = central temporal cortex (in the STS and partially on the convexity below):**

Not well defined region in between the superior and inferior temporal gyri. Rostrally bordered by the temporopolar region, caudally bordered by the inferior parietal lobule.

Human parcellation by Brodmann: 21 (O)

- ⇒ **B09:** 21 (O)
- ⇒ **FV91:** AITd, CITd, PITd, FST, STP (S)
- ⇒ **SP78:** IPa, OAa, PGa, TAA, TEa, TEm, TPO (S)

▪ **TCi = inferotemporal cortex:**

Inferior temporal cortex. Below the superior temporal sulcus and bordering the lateral occipito-temporal cortex.. Rostrally bordered by the temporopolar region, caudally bordered by the temporo-occipital transition region.

Human parcellation by Brodmann: 20 (O)

- ⇒ **B09**: 20 (O)
- ⇒ **BB47**: TE (L)
- ⇒ **SP78**: TE1, TE2, TE3 (S)
- ⇒ **FV91**: AIT_v, CIT_v, PIT_v (S)

▪ **TCpol** = temporal pole:

Temporopolar cortex, caudally bordered by superior and inferior temporal cortex (on the lateral side of the hemisphere) and by the entorhinal and parahippocampal cortex (on the medial side of the hemisphere).

Human parcellation by Brodmann: 38 (I)

- ⇒ **B09**: 20, 21, 22 (O)
- ⇒ **BB47**: TG (I)
- ⇒ **PS73**: Ts1, Ts2, Pro (S)
- ⇒ **MM82a**: TP (I)
- ⇒ **MMM87**: TPa-p, TPdg, TPg (S)

▪ **TCv** = ventral temporal cortex:

Corresponds to the anterior half of lateral occipitotemporal (=fusiform) gyrus. Is bordered medially by the parahippocampal cortex, laterally by the inferotemporal cortex, rostrally by the temporal pole and caudally by the temporo-occipital transition cortex.

Human parcellation by Brodmann: 19 (O); 34, 35, 36 (S)

- ⇒ **BB47**: TF (S)
- ⇒ **B09**: 35 (S); 19, 20, 21 (O)
- ⇒ **VP75**: 35 (S)
- ⇒ **AIC87**: 35, 36 (S)

▪ **PHC** = parahippocampal cortex:

Includes the entorhinal cortex (medial to the rhinal sulcus) and the subicular complex. Is bordered laterally by the lateral occipitotemporal cortex, medially by the hippocampus, rostrally by the temporal pole and caudally by the retrosplenial and anterior visual cortex.

Human parcellation by Brodmann: 27, 28, 34, 35, 36 (S)

- ⇒ **BB47**: A, TH (S)
- ⇒ **B09**: 27, 28 (S)
- ⇒ **RV87**: 28L, 28M, 28S, ParaS, PreS, ProS, Sub (S)
- ⇒ **VP75**: 27, 28, 49, pr, pam (S)
- ⇒ **AIC87**: E, PaS, PrS, S (S)

▪ **HC** = Hippocampus:

comprises the hippocampus proper (CA1-CA4, dentate gyrus)

- ⇒ **RV87**: CA1, CA1', CA2, CA3, CA4, DG, h (S)
- ⇒ **WVA89**: Hip (I)

▪ **Amyg** = Amygdala

comprises the amygdala and the periamygdaloid cortex

- ⇒ **A85**: amg (I)
- ⇒ **RV87**: amyg (I)

Insular cortex

- **Ia = anterior insula (= agranular+dysgranular insular cortex):**

Anterior (agranular / dysgranular) part of insular cortex.

Human parcellation by Brodmann: 14, 15, 16 (S)

- ⇒ **B09**: 14, 15, 16 (S)
- ⇒ **BB47**: IA (I)
- ⇒ **RA63**: InsA, InsD (S)
- ⇒ **JB76**: Ia, Id (S)
- ⇒ **MM82a**: Ia-p, Idg (S)
- ⇒ **CP94**: Iai, Ial, Iam, Iapl, Iapm (S)

- **Ip = posterior insula (= granular insular cortex):**

Posterior (granular) part of insular cortex.

Human parcellation by Brodmann: 13 (I)

- ⇒ **B09**: 13 (I)
- ⇒ **BB47**: IB (I)
- ⇒ **RA63**: InsG (I)
- ⇒ **JB76**: Ig (I)
- ⇒ **MM82a**: Ig (I)

Occipital cortex

- **V1 = primary visual cortex:**

Primary visual cortex as histologically / functionally defined.

Human parcellation by Brodmann: 17 (I)

- ⇒ **B09**: 17 (I)
- ⇒ **BB47**: OC (I)
- ⇒ **FV91**: V1 (I)

- **V2 = secondary visual cortex:**

Secondary visual cortex as histologically / functionally defined. While most authors appear to agree in their definitions, Felleman & Van Essen (1991) state that Brodmann 1905 used a different partitioning scheme showing an anteriorly more restricted area 18.

Human parcellation by Brodmann: 18 (S), 19 (O)

- ⇒ **B09**: 18 (S); 19 (O)
- ⇒ **BB47**: OB (S); OA (O)

⇒ **FV91**: V2 (I); V2_v, V2_d (S)

▪ VAC = Anterior visual cortex:

A large and heterogeneous region between the occipital visual areas and the parietal and temporal cortices, which comprises many complex visual areas. Ventrally it is a transitional region between inferotemporal and ventral occipital cortex. Medially, it forms the caudal border of the parahippocampal, ventral temporal and medial parietal cortex. The rostro-dorsal border on the lateral side of the hemisphere is the superior temporal sulcus. In addition to the convexity, significant component areas are located in the lunate and parieto-occipital sulcus.

Human parcellation by Brodmann: 19, 20, 21 (O), 37 (S)

⇒ **B09**: 19, 20, 21 (O)

⇒ **BB47**: TEO (S), OA (O)

⇒ **FV91**: V3, VP, V3A, V4, VOT, DP, PO (S)

▪ VAC_d = Dorsal part of anterior visual cortex:

▪ VAC_v = Ventral part of anterior visual cortex: