

Overview

We present AICHA (for Atlas of Intrinsic Connectivity of Homotopic Areas), a functional brain ROIs atlas based on resting-state fMRI data acquired in 281 individuals. AICHA ROIs cover the whole cerebrum, each having 1- homogeneity of its constituting voxels intrinsic activity, and 2- a unique homotopic contralateral counterpart with which it has maximal intrinsic connectivity.

The atlas is fully described in the publication.

AICHA : An atlas of intrinsic connectivity of homotopic areas. Joliot M, Jobard G, Naveau M, Delcroix N, Petit L, Zago L, Crivello F, Mellet E, Mazoyer B & Tzourio-Mazoyer N (2015) . *Journal of Neuroscience Methods* 10.1016/j.jneumeth.2015.07.013.

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The AICHA atlas includes 192 couples of homotopic regions for a total of 384 regions. AICHA is provided in the MNI stereotaxic space (MNI ICBM 152, Template sampling size of 2x2x2 mm³ voxels ; bounding box, x = -90 to 90 mm, y = -126 to 91 mm, z = -72 to 109 mm).

Each region get a pseudo-color with odd number for region belong to the left hemisphere and even for the right. Each homotopic pair is labeled with an odd number (Left) and the following even number (Right).

For example : "1 and 2" code for G_Frontal_Sup-1-L and G_Frontal_Sup-1-R respectively, "3 and 4" code for G_Frontal_Sup-2-L and G_Frontal_Sup-2-R, ...

AICHA atlas includes both regions located in the crown of the gyri (named Gyrus, region name beginning by "G_") and regions located in the depth of the sulci (named Sulcus, region name beginning by "S_"). In addition the subcortical nuclei were labeled separately (name Nucleus, region name beginning by "N_"). Different parcels belonging to the same anatomical region were labeled with numbers (starting to 1). For example the precuneus show as 9 subparts labeled from G_Precuneus-1-L to G_Precuneus-9-L.

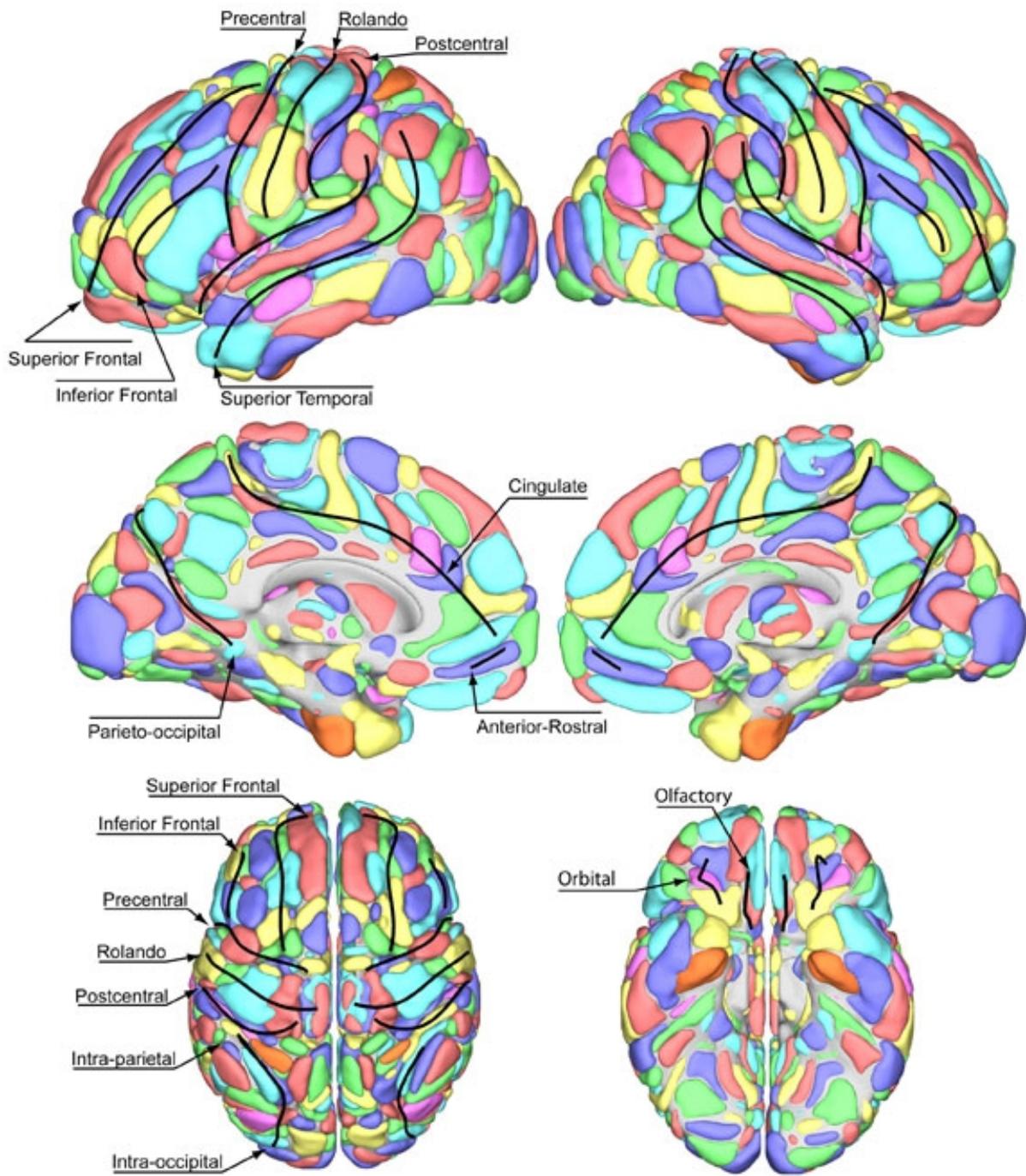


Figure : Rendering of AICHA and the sulci used in the anatomical labeling.

How to install the software

1) Copy the archive to the chosen location (e.g. /usr/local/soft/spm12/toolbox)

```
unix> cp aicha_v1.zip /usr/local/soft/spm12/toolbox
unix> cd /usr/local/soft/spm12/toolbox
```

2) Gunzip and untar the archive will create an aicha directory

```
unix> unzip aicha_v1.zip
```

3) Add this directory to your Matlab path and copy 2 files in your SPM12/atlas directory

```
unix> setenv MATLABPATH $MATLABPATH /usr/local/soft/spm12/toolbox/aal
unix> cp /usr/local/soft/spm12/toolbox/aal/AICHA.nii /usr/local/soft/spm12/atlas
unix> cp /usr/local/soft/spm12/toolbox/aal/AICHA.xml /usr/local/soft/spm12/atlas
```

To install AICHA in mricron software :

```
unix> cp /usr/local/soft/spm12/toolbox/aal/AICHAmc.nii.gz /usr/local/soft/mricron/templates
unix> cp /usr/local/soft/spm12/toolbox/aal/AICHAmc.nii.lut /usr/local/soft/mricron/templates
unix> cp /usr/local/soft/spm12/toolbox/aal/AICHAmc.nii.txt /usr/local/soft/mricron/templates
```

How to use the software

1) Launch Matlab

```
unix> matlab
```

2) **First option** : launch AICHA in AAL toolbox from SPM12 (as described [here](#)).

Select the anatomical parcellation database in /usr/local/soft/spm12/toolbox/aal

File : AICHA.nii

3) **Second option** to get the AICHA labelling :

```
>> spm_fmri
```

Select the desired contrast, mask, probability and extent threshold like in the regular spm_result.

In the SPM12 Results window : Atlas / Label using / AICHA

Then you get the label with a right click on the coordinates in the Graphics window.

peak-level				mm mm mm		
q	FDR_{corr}	T	(Z_{μ})	D_{uncorr}		
0.002	7.23	6.64	0.000	-28	-24	54
0.006	6.66	6.19	0.000	-42	-18	50
0.063	6.03	5.67	0.000	-48	-12	44
0.004	6.90	6.38	0.000	12	-92	18
0.005	6.78	6.28	0.000	56	-3	
0.009	6.54	6.09	0.000	8	1	
0.018	6.34	5.93	0.000	8	-68	52
0.112	5.80	5.47	0.000	-50	0	-4
0.112	5.79	5.47	0.000	-38	-4	10
0.159	5.69	5.38	0.000	26	18	-20
0.194	5.60	5.31	0.000	18	54	24
0.209	5.57	5.28	0.000	-38	-34	-12
0.782	5.23	4.98	0.000	20	-96	2
0.937	5.17	4.93	0.000	32	-90	-4
0.975	5.14	4.91	0.000	2	-82	24

