Table 5: MRI Sequences

MRI scan
Gradient echo fieldmap for rs-fMRI distortion correction
Spin echo EPI with reversed phase encoding for rs-fMRI distortion correction
Resting-state fMRI (T2*-weighted gradient-echo EPI BOLD)
Magnetization Prepared 2 Rapid Acquisition Gradient Echoes (MP2RAGE)
T2-weighted
Fluid-attenuated inversion recovery (FLAIR) 2D (scanned in first 112 participants)
3D SPACE sequence with fluid-attenuated inversion-recovery preparation (introduced after first 112 participants)
Diffusion-weighted Imaging (DWI, scanned in first 112 participants)
Spin echo images with reversed phase encoding for DWI distortion correction (scanned in first 112 participants)

Diffusion-weighted Imaging (DWI, new version introduced after first 112 participants)
Spin echo images with reversed phase encoding for DWI distortion correction (new version introduced after first 112 participants)
Susceptibility-weighted Imaging (SWI) (scanned in first 112 participants)
T2* Susceptibility-weighted Imaging (SWI) for QSM (introduced after first 112 participants)

LEMON MRI Sequences

MRI scan	Sequence parameters
Gradient echo fieldmap for rs-fMRI distortion correction	voxel size = 2.3 mm isotropic, FOV = 202 mm, imaging matrix = 88 x 88, 64 slices with 2.3 mm thickness, TR= 680 ms, TE1 = 5.19 ms, TE2 = 7.65 ms, flip angle = 60°, bandwidth = 389 Hz/pixel, prescan normalization, no partial fourier, duration = 2 min 3 s
Spin echo EPI with reversed phase encoding for rs-fMRI distortion correction	voxel size = 2.3 mm isotropic, FOV = 202 mm, imaging matrix = 88 x 88, 64 slices with 2.3 mm thickness, TR = 2200 ms, TE = 50 ms, flip angle = 90°, echo spacing = 0.67ms, phase encoding = A>>P / P>>A, bandwidth = 1776 Hz/pixel, partial fourier 6/8, no pre-scan normalization, duration = 29 s each
Resting-state fMRI (T2*-weighted gradient-echo EPI BOLD)	Axial acquisition orientation, phase encoding = A>>P, voxel size = 2.3 mm isotropic, FOV = 202 mm, imaging matrix = 88 x 88, 64 slices with 2.3 mm thickness, TR = 1400 ms, TE = 30 ms, flip angle = 69°, echo spacing = 0.67 ms, bandwidth = 1776 Hz/pixel, partial fourier 7/8, no pre-scan normalization, multiband acceleration factor = 4, 657 volumes, slice order = interleaved, duration = 15 min 30 s
Magnetization Prepared 2 Rapid Acquisition Gradient Echoes (MP2RAGE)	Sagittal acquisition orientation, one 3D volume with 176 slices, TR = 5000 ms, TE = 2.92 ms, TI1 = 700 ms, TI2 = 2500 ms, FA1 = 4°, FA2 = 5°, pre-scan normalization, echo spacing = 6.9 ms, bandwidth = 240 Hz/pixel, FOV = 256 mm, voxel size= 1 mm isotropic, GRAPPA acceleration factor 3, slice order = interleaved, duration = 8 min 22 s
T2-weighted	Sagittal acquisition orientation, one 3D volume with 176 slices, TR = 3200 ms, TE = 409 ms, FA = variable, pre-scan normalization, echo spacing = 3.42 ms, bandwidth = 751 Hz/pixel, FOV = 256 mm, voxel size = 1 mm isotropic, GRAPPA acceleration factor 2, duration = 4 min 43 s
Fluid-attenuated inversion recovery (FLAIR) 2D (scanned in first 112 participants)	Axial acquisition orientation, 28 slices, TR = 10000 ms, TE = 90 ms, TI = 2500 ms, FA = 180°, pre-scan normalization, echo spacing = 9.98 ms, bandwidth = 199 Hz/pixel, FOV = 220 mm, voxel size = 0.9 x 0.9 x 4.0 mm³, slice order = interleaved, duration = 4 min 42 s
3D SPACE sequence with fluid-attenuated inversion-recovery preparation (introduced after first 112 participants)	Sagittal acquisition orientation, one 3D volume with 192 slices, TR = 5000 ms, TE = 395 ms, TI = 1800 ms, FA = variable, pre-scan normalization, echo spacing = 3.36 ms, bandwidth = 781 Hz/pixel, FOV = 250 mm, voxel size = 1 mm isotropic, GRAPPA acceleration factor 2, duration = 7 min 2 s
Diffusion-weighted Imaging (DWI, scanned in first 112 participants)	88 axial slices, voxel size = 1.7 mm isotropic, 60 diffusion-encoding gradient directions, b-value of 1000 s/mm², 7 non-diffusion-weighted b0 distributed in the sequence, TR = 7000 ms, TE = 80 ms, FA = 90°, bandwidth = 1502 Hz/pixel, echo spacing = 0.78 ms, FOV = 220 mm, voxel dimension = 1.7 mm isotropic, imaging matrix = 128 x 128, acquired with ⅞ partial Fourier encoding and GRAPPA (acceleration factor 2, 32 ref. lines), 60 diffusion-encoding gradient directions, b-value = 1000 s/mm², 7 b0 images, raw data filter, fat suppression (strong), advanced shim mode, no prescan normalization, interleaved acquisition, CMRR sequence, monopolar diffusion scheme, SENSE coil combine, multiband acceleration factor 2, phase encoding A>>P, duration = 9 min 27 s
Spin echo images with reversed phase encoding for DWI distortion correction (scanned in first 112 participants)	Two volumes with A>>P and P>>A phase encoding, voxel size = 1.7 mm isotropic, 88 axial slices, TR = 7000 ms, TE = 80 ms, FA = 90°, bandwidth = 1502 Hz/pixel, echo spacing 0.78 ms, FOV = 220 mm, voxel dimension = 1.7 mm isotropic, imaging matrix = 128 x 128, acquired with ⅞ partial Fourier encoding and GRAPPA (acceleration factor 2, 32 ref. lines), fat suppression (strong), advanced shim mode, no prescan normalization, interleaved acquisition, CMRR sequence, SENSE coil combine, multiband acceleration factor 2, duration = 1 min 59 s each
Diffusion-weighted Imaging (DWI, new version introduced after first 112 participants)	88 axial slices, voxel size = 1.7 mm isotropic, 60 diffusion-encoding gradient directions, b-value of 1000 s/mm², 7 non-diffusion-weighted b0 distributed in the sequence, TR = 7000 ms, TE = 80 ms, FA = 90°, bandwidth = 1502 Hz/pixel, echo spacing = 0.78 ms, FOV = 220 mm, voxel dimension = 1.7 mm isotropic, imaging matrix = 128 x 128, acquired with ⅞ partial Fourier encoding and GRAPPA (acceleration factor 2, 32 ref. lines), 60 diffusion-encoding gradient directions, b-value = 1000 s/mm², 7 b0 images, raw data filter, fat suppression, advanced shim mode, no prescan normalization, interleaved acquisition, CMRR sequence, monopolar diffusion scheme, SENSE coil combine, multiband acceleration factor 2, phase encoding A>>P, duration = 8 min 38 s
Spin echo images with reversed phase encoding for DWI distortion correction (new version introduced after first 112 participants)	Two volumes with A>>P and P>>A phase encoding, voxel size = 1.7 mm isotropic, 88 axial slices, TR = 7000 ms, TE = 80 ms, FA = 90°, bandwidth = 1502 Hz/pixel, echo spacing 0.78 ms, FOV = 220 mm, voxel dimension = 1.7 mm isotropic, imaging matrix = 128 x 128, acquired with ⅞ partial Fourier encoding and GRAPPA (acceleration factor 2, 32 ref. lines), fat suppression, advanced shim mode, no prescan normalization, interleaved acquisition, CMRR sequence, SENSE coil combine, multiband acceleration factor 2, duration = 1 min 10 s each
Susceptibility-weighted Imaging (SWI) (scanned in first 112 participants)	Axial acquisition orientation, one 3D volume with 128 slices, TR = 43 ms, TE1 = 9.84 ms, TE2 = 17.22 ms, TE3 = 24.60 ms, TE4 = 31.98 ms, FA = 15°, bandwidths 1-4 = 220 Hz/pixel, FOV = 256 mm, acquired with ⅞ slice partial Fourier and GRAPPA (acceleration factor 2, 24 ref. lines), prescan normalization, interleaved acquisition, voxel size = 1.0 mm isotropic, duration = 9 min 40 s
T2* Susceptibility-weighted Imaging (SWI) for QSM (introduced after first 112 participants)	Axial acquisition orientation, one 3D volume with 160 slices, TR = 30 ms, TE = 17.3 ms, FA = 13°, bandwidth = 150 Hz/pixel, FOV = 205 mm, acquired with 6/8 phase partial Fourier and GRAPPA (acceleration factor 2, 24 ref. lines), no prescan normalization, interleaved acquisition, voxel size = 0.8 mm isotropic, duration = 7 min 50 s