

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Legends

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Table S1. Concomitant medications of participants with fragile X syndrome (FXS) from the Institute for Neurodegenerative Disorders (IND)

Medication: 0 = absent, 1 = present

N: Number

FXS: Fragile X syndrome

FXS-M: Fragile X syndrome mosaicism

TD: Typical development

. (period) = Missing data

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Table S2. Demographic and clinical characteristics of participants from the Institute for Neurodegenerative Disorders (IND)

All participant are non-Hispanic.

AA: African American

Age: Age in years

BMI: Basal metabolic index

C: Caucasian

Dx: Diagnosis

FXS: Fragile X syndrome

FXS-M: Fragile X syndrome mosaicism

Ht: Height in inches

ID: Identification

SD: Standard deviation

TD: Typical development

Wt: Weight in pounds

. (period) = Missing data

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Table S3. Demographic and clinical data of participants from Johns Hopkins University (JHU)

A: Asian

AA: African American

Age: Age in years

ASD: Autism spectrum disorder

BMI: Basal metabolic index

C: Caucasian

Dx: Diagnosis

FXS = Fragile X syndrome

Hispanic: 0 = not Hispanic, 1 = Hispanic

Ht: Height in inches

Male: 0 = female, 1 = male

Race: A = Asian, AA = African American, C = Caucasian

SD: Standard deviation

TD: Typical development

Wt: Weight in pounds

. (period): Missing data

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Table S4. Genetic and psychological assessments of participants from the Institute for Neurodegenerative Disorders (IND)

AGG: Adenosine guanine guanine

CGG: Cytosine guanine guanine

DNA: Deoxyribonucleic acid

DSQIID; Dementia Screening Questionnaire for Individuals with Intellectual Disabilities (Deb S et al., 2007)

Dx: Diagnosis

FMRP: Fragile X Mental Retardation Protein

FXS: Fragile X syndrome

FXS-M: Fragile X syndrome mosaicism

kb: Kilobase

MMSE: Mini-Mental State Examination (Folstein MF et al., 1975)

N: Number

ng: Nanogram

TD: Typical development

. (period) = Missing data

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Table S5. Genetic and psychological assessments of participants with fragile X syndrome and family members from Johns Hopkins University

ADOS-2: Autism Diagnostic Observation Schedule, 2nd Edition (Lord C et al., 2012)

CANTAB IED: Cambridge Neuropsychological Test Automated Battery Intra/Extra Dimensional Set Shift (Cambridge Cognition Ltd., 2020)

CANTAB OTS = Cambridge Neuropsychological Test Automated Battery One Touch Stockings of Cambridge (Cambridge Cognition Ltd., 2020)

DNA: Deoxyribonucleic acid

FMR1: Fragile X Mental Retardation 1

FMRP: Fragile X Mental Retardation Protein

FXS: Fragile X syndrome

FXS-M: Fragile X syndrome mosaicism

HVLT: Hopkins Verbal Learning Test–Revised™ (Benedict RHB et al., 1998; Brandt J et al., 1998; Shapiro AM et al., 1999)

IQ: Intelligence quotient

mRNA: Messenger ribonucleic acid

RRB: Restricted and repetitive behaviors

SA: Social affect

SB-5: Stanford-Binet Intelligence Scales, Fifth Edition (Roid GH, 2003)

Std Sc: Standard scale

TD: Typical development

TDPM: Typical development premutation

Vineland-3: Vineland Adaptive Behavior Scales, Third Edition (Sparrow SS et al., 2020)

. (period) = Missing data

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Table S6. Positron emission tomography (PET) data and analyses for participants from the Institute for Neurodegenerative Disorders

Statistical Parametric Mapping (SPM) (Wellcome Centre for Human Neuroimaging, 2020) was applied to PET frames to obtain regional time (radioactivity) curves (TACs) on an ECAT EXACT HR+ PET (Wienhard K et al., 1994) after an intravenous bolus injection of 185 MBqs (5 mCi) [¹⁸F]FPEB (Wong DF et al. 2013) for participants with FXS and TD. Ratios of uptake in the regions of interest (ROIs) to the uptake in the cerebellum, a reference region with minimal [¹⁸F]FPEB uptake (Sullivan J et al., 2012; Sullivan JM et al., 2013) were calculated.

INDTD30 underwent a second testing identified as 2INDTD30.

[¹⁸F]FPEB: 3-[¹⁸F]fluoro-5-(2-pyridinylethynyl)benzonitrile

FXS: fragile X syndrome

FXS-M: fragile X syndrome mosaicism

mCi: Millicurie

MBq: Megabequerel

N: Number

PET: Positron emission tomography

ROI: Region of interest

TD: Typical development

. (period) = Missing data

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

Table S7. Positron emission tomography (PET) data and analysis of participants from Johns Hopkins University.

Nondisplaceable binding potentials (BP_{NDs}) (Innis RB et al., 2007) for both reference tissue graphical analysis (RTGA) (Logan J et al., 1996, 2011) and the multi-linear reference tissue method with two parameters (MRTM2) (Ichise M et al., 2002) for cerebral volumes of interest by positron emission tomography (PET) for 90 min after intravenous bolus injections of 185 megabecquerels (MBq) [5 mCi] [^{18}F]FPEB (Wong DF et al., 2013) to participants with FXS and ASD and ID (N = 2), ASD (N=7) (Fatemi SH et al., 2018) and typical development (TD) (N=7) (Fatemi SH et al., 2018). BP_{NDs} for participants with TD and ASD were performed at different times with different analytical techniques. Therefore, there are inconsistencies in the procedures used to generate the results for TD and ASD.

[^{18}F]FPEB: 3-[^{18}F]fluoro-5-(2-pyridinylethynyl)benzotrile (Wong, D.F., et al., 2013)

Am: Amygdala

aFr: Anterior frontal cortex

ASD: Autism spectrum disorder

aTp: Anterior temporal cortex

BP_{ND} : Nondisplaceable binding potential (Innis RB et al., 2007)

cAC: Caudal anterior cingulate

Cb: Cerebellum

Cg: Cingulate

CN: Caudate nucleus

Cu: Cuneus

dpTp: Dorsal posterior temporal cortex

ER: Entorhinal area

FO: Frontal operculum

Fr: Frontal cortex

Fs: Fusiform gurus

FXS: Fragile X syndrome

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

GP: Globus pallidus

Hp: Hippocampus

IC: Isthmus/cingulate

In: Insula

iPa: Inferior parietal cortex

iTp : Inferior temporal cortex

IOc: Lateral occipital cortex

IOG: Lateral orbital gyrus

LG: Lingual gyrus

MBq: Megabecquerel

mCi: Millicurie

mdOG: Medial orbital gyrus

mFr: Middle frontal cortex

MRTM2: Multilinear reference tissue method with two parameters (Ichise M et al., 2002)

mTp: Middle temporal cortex

N: Number

Oc: Occipital cortex

OO: Orbital operculum

Pa: Parietal cortex

paC: Paracentral

pC: Pericalcarine cortex

pCg: Posterior cingulate

PET: Positron emission tomography

PH: Parahippocampus

Pr: Precuneus

Prc: Precentral gyrus

PS: Postcentral gyrus

PT: Pars triangularis

Pu: Putamen

rAC: Rostral anterior cingulate

Cerebral expression of metabotropic glutamate receptor subtype 5 in idiopathic autism spectrum disorder and fragile X syndrome: A pilot study

rFr: Rostral frontal cortex

ROI: Region of interest

RTGA: Reference tissue graphical analysis (Logan J et al., 1996, 2011)

sFr: Superior frontal cortex

SM: Supramarginal

sPa: Superior parietal cortex

sTp: Superior temporal cortex

TD: Typical development

Th: Thalamus

Tp: Temporal lobe

tT: Transverse temporal

vS: Ventral striatum

. (period) = Missing data