

Supplementary Table S1: Group Sample Size by Clinical and Analyte Measure

	Probands (n=554)	Relatives (n=522)	NC (n=333)
PANSS	537	-	-
SFS	427	400	235
BACS	533	498	312
TNF α , sFlt-1, VEGF, CRP, IL1b, IL6, IL8, IL10, IL12, IFNg	107	-	57
IL2	97	-	46
IL4	91	-	46
IL12p70	88	-	46
TGFb	75	-	42

Notes: NC; normal control; PANSS, Positive and Negative Symptoms Scale; SFS, Social Functioning Scale; BACS, Brief Assessment of Cognition in Schizophrenia.

Supplementary Table S2: Sample Characteristics of the Comparisons between Diagnostic Groups

	Diagnostic Groups		
	SZP (n=223)	SADP (n=141)	BPP (n=190)
Age (mean, SD)	35.1 (12.4)	35.5 (11.7)	36.1 (13.1)
Sex (Male/Female) ^a	148/75	61/80	58/132
Race (AA/CA/OT) ^a	106/101/16	59/74/8	41/138/11
Daily CPZ equivalents (mean, SD)	485.3 (365.0)	519.5 (463.4)	326.5 (324.4)
Duration of Illness (years) ^a	15.5 (11.8)	19.4 (11.6)	19.5 (12.7)
Age of onset (years) ^a	19.3 (7.1)	16.2 (8.5)	16.7 (7.5)
PANSS Total Score ^a	66.6 (16.8)	69.2 (15.5)	54.1 (14.4)
ICV mm ³ (mean, SD) ^a	1,474,720 (194,698)	1,386,066 (177,887)	1,427,089 (169,321)

Notes: SD, standard deviation; AA, African American; OT, other; CA, Caucasian; BPP, psychotic bipolar I disorder; SADP, schizoaffective; SZP, schizophrenia; CPZ, chlorpromazine; PANSS, Positive and Negative Symptom Scales; ICV, intracranial volume; ^a, p<0.05.

Supplementary Table 3: Mean Choroid Plexus Volume for Probands, Relatives, Diagnostic Groups and Healthy Controls

	Probands (n=554)		Relatives (n=522)		NC (n=333)	
	Mean	SD	Mean	SD	Mean	SD
Left Choroid Plexus	548.2	171.1	519.2	173.2	503.1	168.8
Right Choroid Plexus	580.3	168.1	551.2	163.8	539.1	158.4
	SZP (n=223)		SADP (n=141)		BPP (n=190)	
	Mean	SD	Mean	SD	Mean	SD
Total Choroid Plexus	1155.0	335.3	1108.5	313.3	1117.6	323.3

Notes: SD, standard deviation; NC, healthy control; BPP, psychotic bipolar I disorder; SADP, schizoaffective; SZP, schizophrenia.

Supplementary Table S4: Pairwise Contrasts for Choroid Plexus Volume Across Psychosis Probands, Relatives, Diagnostic Groups, and Healthy Controls

Imaging Covariate (Volume, mm ³)	Region	Probands vs NC		Probands vs Relatives		Relatives vs NC	
		q-value	Cohen's d	q-value	Cohen's d	q-value	Cohen's d
ICV	Left Choroid Plexus	<0.001	0.335	<0.001	0.226	0.142	0.114
ICV	Right Choroid Plexus	<0.001	0.301	<0.001	0.205	0.195	0.099
LV	Left Choroid Plexus	0.026	0.193	0.189	0.093	0.189	0.103
LV	Right Choroid Plexus	0.049	0.162	0.189	0.083	0.262	0.082
LV and GMV	Left Choroid Plexus	0.021	0.188	0.184	0.089	0.186	0.103
LV and GMV	Right Choroid Plexus	0.021	0.181	0.155	0.101	0.267	0.082
	Region	SZP vs NC		SADP vs NC		BPP vs NC	
		q-value	Cohen's d	q-value	Cohen's d	q-value	Cohen's d
ICV	Total Choroid Plexus	<0.001	0.315	0.001	0.322	<0.001	0.386
LV	Total Choroid Plexus	0.028	0.192	0.2	0.124	0.021	0.252
LV and GM	Total Choroid Plexus	0.021	0.198	0.148	0.136	0.016	0.259

Notes: NC, healthy control; BPP, psychotic bipolar I disorder; SADP, schizoaffective; SZP, schizophrenia; ICV, Total Intracranial Volume; LV, Lateral Ventricle; Gray Matter Volume, GMV. Covaried for age, sex, race, and site; q-value indicates FDR corrected p-values.

Supplementary Table S5: Analyses for Choroid Plexus Volume in Axis II Relatives

Group Contrasts				
Region	Probands vs Axis IIR		Axis IIR vs NC	
	q-value	Cohen's d	q-value	Cohen's d
Left Choroid Plexus	0.256	0.254	0.712	0.091
Right Choroid Plexus	0.712	0.053	0.256	0.246

Partial Correlations with Choroid Plexus Volume in Axis IIR		
Measure	r-value	q-value
Total Gray Matter	0.066	0.687
Lateral Ventricle	0.429	0.028
Cerebellum Cortex	-0.146	0.687
Hippocampus	-0.102	0.687
Amygdala	-0.064	0.687
Caudate	0.398	0.028
SFS Total	0.143	0.629
BACS Composite Score	-0.079	0.629

Notes: Covaried for age, sex, race, site, and total intracranial volume; q-value indicates FDR corrected pvalue. Axis IIR, Axis II Relatives; NC, normal controls; SFS, Social Functioning Scale; BACS, Brief Assessment of Cognition in Schizophrenia.

Supplementary Table S6: Structural Covariance Between Total Choroid Plexus Volume and Clinical Variables in Probands.

Measure	Probands	
	r-value	q-value
PANSS Negative Total	0.025	0.557
PANSS Positive Total	0.068	0.452
Age of Onset	0.035	0.557
Daily CPZ Equivalents	0.053	0.557

Notes: All data adjusted for age, sex, race, and site. Choroid plexus also adjusted for total intracranial volume. P values were FDR corrected for multiple comparisons. PANSS, Positive and Negative Symptom Scale. CPZ, chlorpromazine.

Supplementary Table S7: Structural Covariance Between Total Choroid Plexus Volume and Social Functioning and Cognition in Probands, Relatives and Controls

Measure	Probands		Relatives		NC	
	r-value	q-value	r-value	q-value	r-value	q-value
SFS Total	-0.075	0.122	-0.026	0.841	-0.047	0.933
BACS Total	-0.110	0.022	0.009	0.841	0.005	0.933
BACS Verbal Memory	-0.046	0.284	0.040	0.990	0.028	0.760
BACS Digit Sequencing	-0.084	0.106	-0.013	0.990	0.016	0.781
BACS Token Motor	-0.061	0.197	-0.059	0.990	-0.036	0.760
BACS Verbal Fluency	-0.132	0.013	-0.005	0.990	0.042	0.760
BACS Symbol Coding	-0.109	0.034	-0.002	0.990	-0.028	0.760
BACS Tower of London	-0.068	0.177	-0.001	0.990	-0.027	0.760

Notes: All data adjusted for age, sex, race, and site. Choroid plexus also adjusted for total intracranial volume. NC, Normal Controls; SFS, Social Functioning Scale; BACS, Brief Assessment of Cognition. q values FDR corrected for multiple comparisons (q-value).

Supplementary Table S8: Structural Covariance Between Total Choroid Plexus Volume and Brain Structure in Probands, Relatives and Controls

Region (Volume)	Probands		Relatives		NC	
	r-value	q-value	r-value	q-value	r-value	q-value
Total Gray Matter	-0.152	<0.001	-0.202	<0.001	-0.113	0.078
Lateral Ventricle	0.549	<0.001	0.566	<0.001	0.606	<0.001
Cerebellum Cortex	0.051	0.227	-0.070	0.112	0.012	0.821
Hippocampus	-0.050	0.243	-0.094	0.049	0.057	0.360
Amygdala	-0.143	0.001	-0.149	0.001	-0.087	0.171
Caudate	0.051	0.229	0.070	0.112	0.140	0.032

Notes: NC, Normal Controls. All data adjusted for age, sex, race, site and total intracranial volume.

Supplementary Table S9: Analyte Correlations with Choroid Plexus Volume by Group and Coefficient of Variation for All Subjects

	Units	Probands		SZP		SADP		BPP		NC		CV All Subjects	
		r	p	r	p	r	p	r	p	r	p	Mean (SD)	Range
TNFa	(pg/mL)	-0.045	0.642	-0.188	0.271	-0.114	0.604	0.059	0.690	0.078	0.562	2.7 (2.5)	0-16
sFlt1	(pg/mL)	-0.054	0.581	0.050	0.772	-0.147	0.501	-0.187	0.202	0.073	0.590	2.9 (3.6)	0.1-34
VEGF	(pg/mL)	-0.006	0.951	-0.057	0.739	-0.257	0.236	0.016	0.916	0.207	0.122	2.0 (2.9)	0-33
CRP	(ng/mL)	0.003	0.979	-0.133	0.439	-0.112	0.611	0.117	0.429	0.098	0.468	2.1 (1.9)	0.1-9
TGFb	(pg/mL)	-0.083	0.479	-0.267	0.170	-0.156	0.564	0.077	0.679	0.055	0.727	2.9 (3.6)	0-32
IL8	(pg/mL)	0.126	0.197	0.237	0.163	-0.242	0.264	0.028	0.850	-0.091	0.499	1.8 (1.8)	0-12
IL2	(pg/mL)	0.058	0.569	-0.122	0.490	0.014	0.957	0.147	0.341	-0.062	0.680	30.7 (29.5)	0-129
IL4	(pg/mL)	0.131	0.215	0.265	0.157	0.223	0.344	-0.040	0.803	-0.300	0.043	34.1 (30.3)	0-141
IL12	(pg/mL)	0.120	0.220	-0.037	0.829	0.068	0.757	-0.048	0.743	0.016	0.906	2.2 (2)	0-15
IL1b	(pg/mL)	0.062	0.527	0.172	0.313	0.341	0.112	-0.225	0.125	0.108	0.423	27.6 (29.7)	0.5-140
IL6	(pg/mL)	0.206	0.033	0.238	0.162	-0.133	0.542	0.305	0.036	0.070	0.603	6.5 (7.1)	0-41
IFNg	(pg/mL)	0.119	0.223	0.127	0.459	-0.013	0.955	0.054	0.716	0.062	0.643	5.6 (5.8)	0-40
IL10	(pg/mL)	0.129	0.186	-0.092	0.594	-0.071	0.747	0.355	0.014	0.090	0.503	10.5 (11.8)	0-114
IL12p70	(pg/mL)	-0.063	0.557	-0.139	0.496	0.049	0.843	-0.185	0.234	-0.010	0.946	35.9 (30)	0-139

Notes: BPP, psychotic bipolar I disorder; SADP, schizoaffective; SZP, schizophrenia; NC, Normal Controls; CV, Coefficient of Variation; SD, standard deviation. Analyte data adjusted for age, sex, race, and storage days. CP volume adjusted for age, sex, race, and total intracranial volume. The bolded values stand for significant uncorrected p values (p<0.05)

Supplementary Figure S1: Choroid plexus volume correlations with BACS subscale scores in probands, first-degree relatives and healthy controls (NC). Partial correlations were adjusted for age, sex, race, site. Imaging data was additionally adjusted for total intracranial volume. FDR corrected q-values.

Covariance Analysis Between Total Choroid Plexus Volume & BACS Subscores

