Human cerebral organoids and fetal brain tissue share proteomic similarities: enabling alternative models to study psychiatric disorders

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Supplementary information

Supplementary Table 1: Protein expression of PSC-derived, 45-day cerebral organoids.

(Excel file)

Supplementary Table 2: Enriched proteins of glutamatergic and dopaminergic synapse

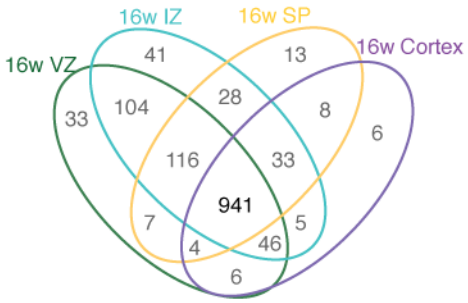
(Excel file)

Supplementary Figure 1, 2 and 3

A

		Organoid correlation	Overlap %
VZ	16w	0.35	40
	18w	0.32	40
	20w	0.36	42
IZ	16w	0.32	37
	18w	0.30	41
	20w	0.29	42
SP	16w	0.31	42
	18w	0.29	41
	20w	0.30	42
Cortex	16w	0.28	33
	18w	0.31	41
	20w	0.34	43

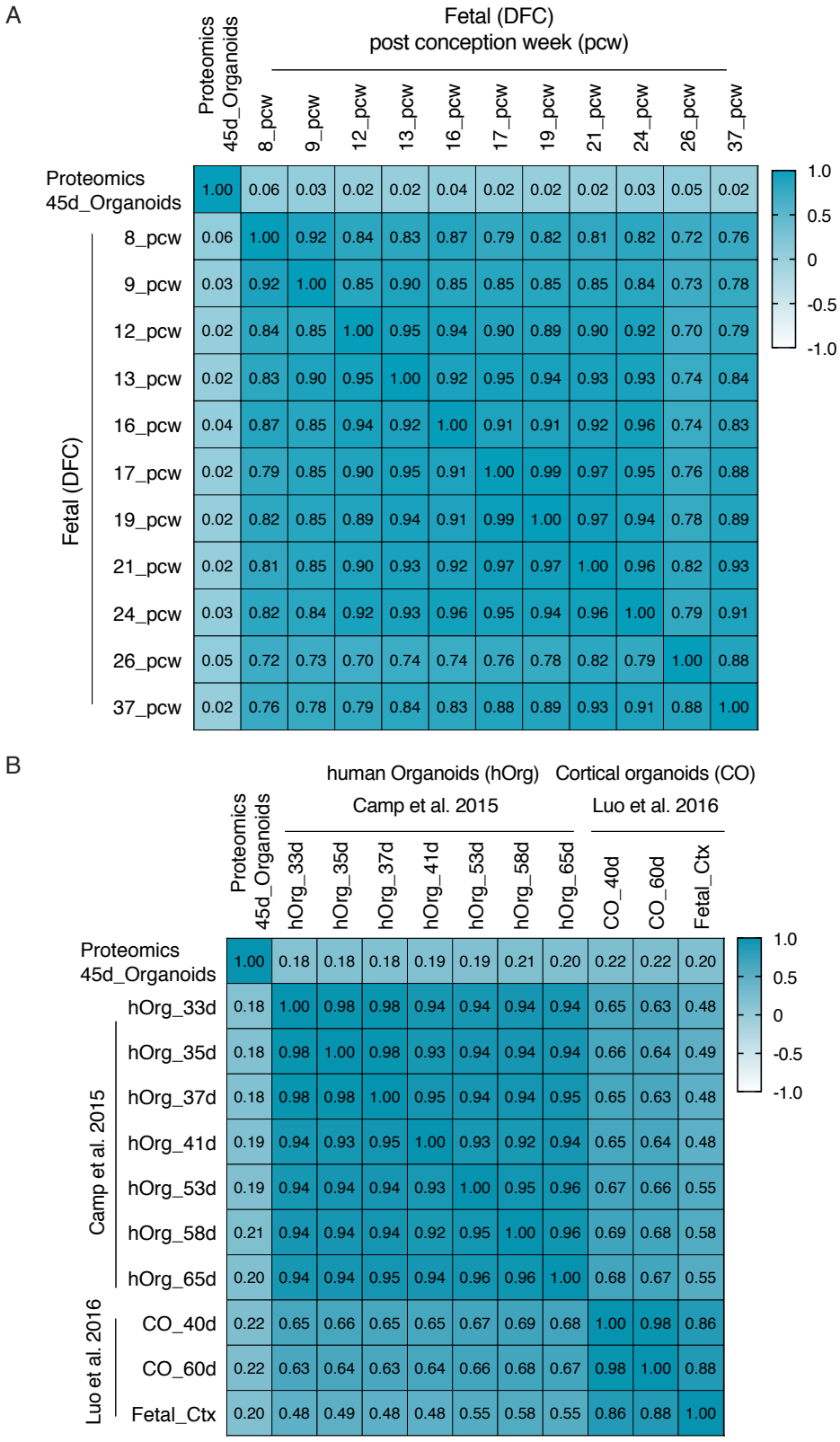
B Common proteins to 45-day organoids



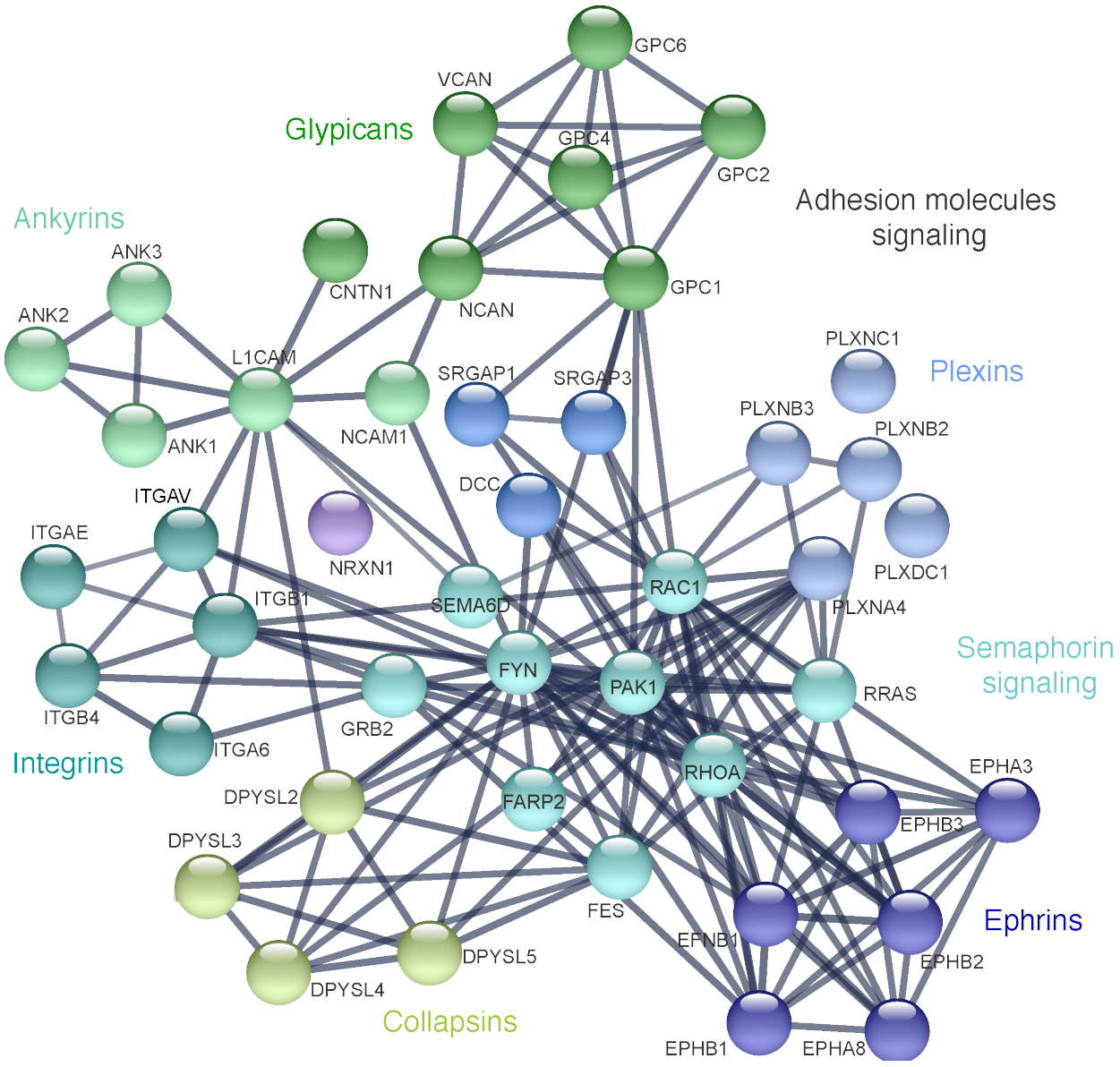
C Common proteins of 16 week VZ, IZ, SP and cortex to organoids

	GO Terms	FDR
Biological Processes	Cell-cell adhesion	1.22E-40
	mRNA splicing	5.84E-28
	Regulation of mRNA stability	9.71E-28
	Translational initiation	2.62E-23
Cellular Compartment	Extracellular exosome	1.48E-162
	Cytosol	3.26E-110
	Myelin sheath	7.03E-68
	Membrane	1.59E-60
Molecular Function	Poly(A) RNA binding	1.69E-109
	Protein binding	1.70E-58
	Cadherin binding involved in cell-cell adhesion	1.17E-45
	RNA binding	1.02E-36

SUPPLEMENTARY FIGURE 1: Comparison of cerebral organoid proteomes with developing brain sub-compartments (ventricular zone, VZ; intermediate zone, IZ; subplate, SP; cortex). **(A)** Spearman correlation of 45-day cerebral organoid proteomes to 16-20 weeks (VZ, IZ, SP, and cortex proteomes). **(B)** Venn diagram of proteins commonly found in 45-day cerebral organoids and 16-week developing human brain areas. **(C)** Gene ontology of the proteins found in common to the 16-week (VZ, IZ, SP, and cortex) proteomes and cerebral organoids proteomes.



SUPPLEMENTARY FIGURE 2: Comparison of cerebral organoid proteomes with transcriptomics of the developing brain and cortical cerebral organoids. Spearman correlation of 45-day cerebral organoid proteome compared to **(A)** human fetal 8-37 post conceptional week, dorsolateral prefrontal cortex (DFC) and **(B)** human cortical organoids of 33 to 65 days *in vitro*.



SUPPLEMENTARY FIGURE 3: Interactive organizational network of proteins from 45-day cerebral organoids. Molecular relationships between proteins found in cerebral organoids from the dataset are based on the STRING database (https://string-db.org/). Groups of proteins are separated by different colors, as indicated.