## **Supplementary Material for**

Temporal Changes in the Brain Lipidome During Neurodevelopment of Smith-Lemli-Opitz Syndrome Mice

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Table S1 (excel) – Raw HILIC-IM-MS datasets for positive (1<sup>st</sup> tab) and negative (2<sup>nd</sup> tab) ionization modes, with all features detected in Progenesis, and their mass-to-charge (Da), retention time (min), collision cross section values (Å<sup>2</sup>), and intensities for each sample.

Table S2 (excel) – Tissue weights and C12 sphingosyl-PE IS abundances used for normalization of lipid intensities.

Table S3 (excel) – Lipid identifications from *pred\_mz\_rt\_ccs* matching in *LiPydomics* and after manual filtering of annotations, in positive (1<sup>st</sup> tab), negative (2<sup>nd</sup> tab), and both ionization modes (3<sup>rd</sup> tab).

Table S4 (excel) – Significantly altered lipids (FDR < 0.05) from ANOVA analysis for each time point, with logCPM (average log abundance), logFC (log fold change), adjusted p value, and average log abundances for WT and KO groups.

Table S5 (excel) – Results of enriched KEGG pathways from LIPEA pathway analysis of significantly altered lipids.

Figure S1 – Average tissue weights of mouse brains

Figure S2 – IM-MS CCS conformational plots

Figure S3 – Principal component analysis (PCA) plots

Figure S4 – Bar plots of two significantly altered oxysterol compounds

Supplementary Figure 1.



**Figure S1.** Frozen weights of brain tissue samples after dissection; four biological replicates per age group and genotype.

Supplementary Figure 2.



**Figure S2.** IM-MS conformational plot for CCS measurements of lipid species detected in **A.** positive and **B.** negative ionization modes. Colors differentiate the lipid categories, while point shapes differentiate the lipid classes. Individual CCS plots for PC, PE, and PG lipids to distinguish acyl-, plasmenyl/plasmenyl-, and lyso- subclasses in **C.** positive and **D.** negative ionization modes.

Supplementary Figure 3.



## Supplementary Figure 4.



Figure S4. Bar plots comparing relative amounts of two oxysterol species (denoted by its compound number, retention time and m/z value) in WT and *Dhcr7*-KO samples.