Supplemental Information for:

Hepatic cytochrome P450 activity, abundance, and expression throughout human development

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Running Title: **Ontogeny of hepatic cytochrome P450 enzymes**

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Supplemental Table 1. List of human P450 oligonucleotide premade QuantiTect primer assays from Qiagen.

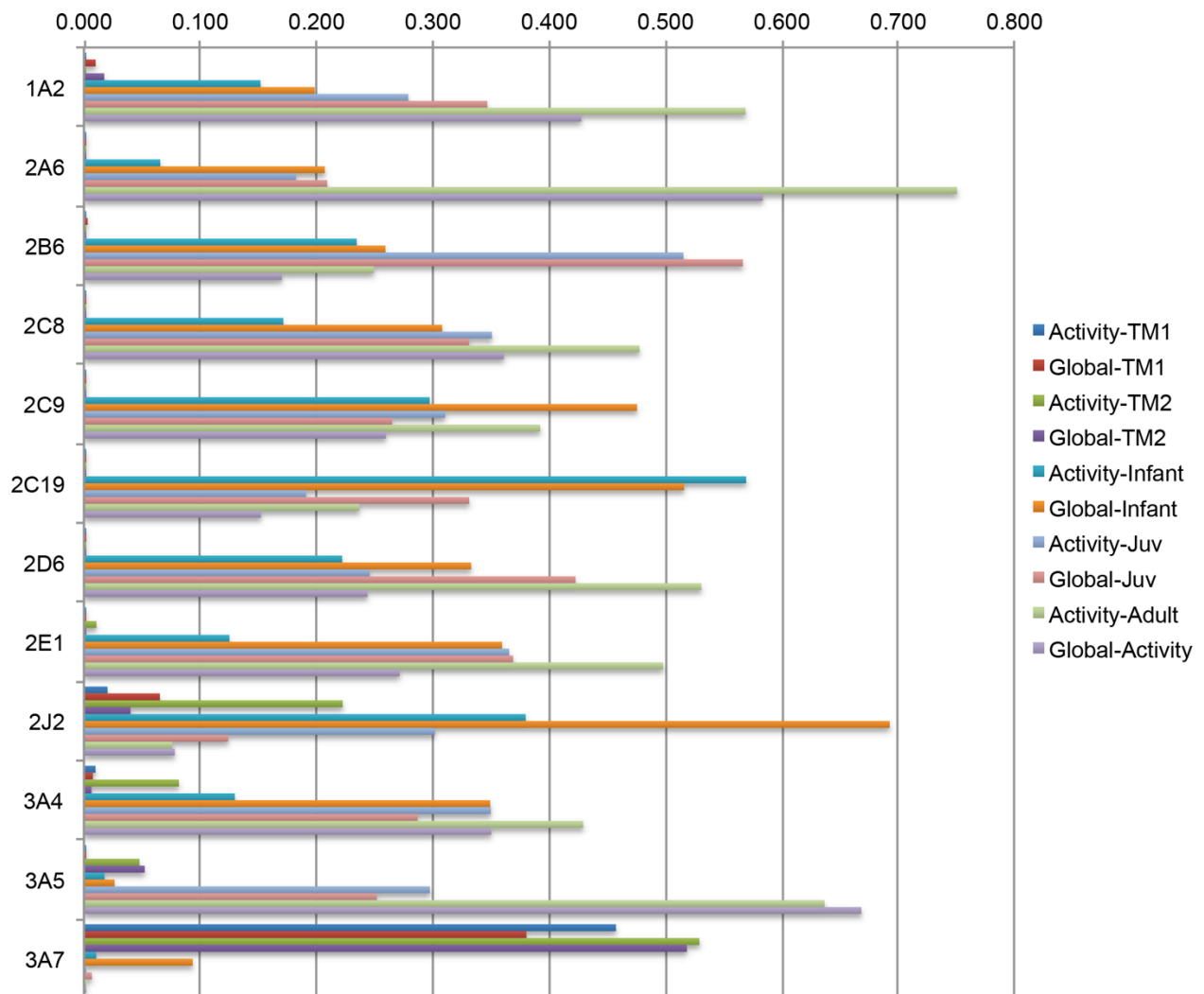| Name	GeneBank accession	Unigene accession	QuantiTect Primer Assays
CYP1A1	NM_000499	Hs.72912	Hs_CYP1A1_1_SG
CYP2W1	NM_017781	Hs.272795	Hs_CYP2W1_1_SG
CYP2J2	NM_000775	Hs.152096	Hs_CYP2J2_1_SG
CYP1B1	NM_000104	Hs.154654	Hs_CYP1B1_1_SG
CYP19A1	NM_031226	Hs.260074	HS_CYP19A1_1_SG
CYP7B1	NM_004820	Hs.667720	HS_CYP7B1_1_SG
CYP2S1	NM_030622	HS.98370	HS_CYP2S1_1_SG
CYP2C9	NM_000771	Hs.282624	HS_CYP2C9_1_SG
CYP3A4	NM_017460	Hs.728751	HS_CYP3A4_1_SG
CYP2D6	NM_000106	Hs.648256	HS_CYP2D6_1_SG
CYP4A11	NM_000778	Hs.1645	HS_CYP4A11_1_SG
CYP2E1	NM_000773	Hs.12907	HS_CYP2E1_1_SG
CYP20A1	NM_177538	Hs.446065	HS_CYP20A1_1_SG
CYP2C19	NM_000769	Hs.282409	HS_CYP2C19_1_SG
CYP8B1	NM_004391	Hs.447793	HS_CYP8B1_1_SG
CYP3A7	NM_000765	Hs.111944	HS_CYP3A7_1_SG

Supplemental Table 2. Significant proteins in the global subset

Protein	Direction	G-test Corrected P-value	% Present TM1 & TM2	% Present Neonate/Infant & Juvenile & Adult	T-test Corrected P-value	Log2 Fold Change
4F11	Increase	<1E015	0	100		
2A6	Increase	1.1E-13	3.6	100		
2C19	Increase	6.8E-7	3.6	73.9		
3A5	Increase	2.2E-3	60.7	100		
4V2	Increase	2.2E-3	60.7	100		
4F22	*Increase*	*0.10(p=3.0E-3)*	*0*	*21.7*		
2C8	Increase	1.1E-13	3.6	100	5.7E-4	7.84
2C9	Increase	1.8E-12	7.1	100	1.6E-13	10.02
2B6	Increase	5.3E-9	21.4	100	0.02	4.23
2E1	Increase	4.1E-7	32.1	100	2.3E-19	10.19
2D6	Increase	3.4E-4	53.6	100	2.7E-17	8.87
4F2	Increase				2.4E-11	4.21
1A2	Increase				3.1E-11	3.64
3A4	Increase				2.3E-10	4.81
27A1	Increase				3.7E-9	3.51
8B1	Increase				4.3E-9	2.89
20A1	Increase				0.03	1.55
2J2	Increase				0.04	2.12
4F3	*Increase*				*0.21(p=9.2E-3)*	*0.96*
4F12	*Increase*				*0.86(p=0.04)*	*1.03*
7B1	*Decrease*				*0.29(p=0.01)*	*-1.14*
3A7	Decrease				7.3E-10	-6.85
51A1	Decrease				7.4E-14	-3.66
19A1	Decrease	1.1e-13	96.4	0		

Supplemental Table 3. Significant proteins in the ABPP subset

Protein	Direction	G-test Corrected P-value	% Present TM1 & TM2	% Present Neonate/Infant & Juvenile & Adult	T-test Corrected P-value	Log2 Fold Change
2C9	Increase	<1E015	0	100		
2C8	Increase	8.8E-14	3.6	100		
1A2	Increase	1.4E-8	3.6	82.6		
2D6	Increase	1.9E-7	10.7	87.0		
2A6	Increase	2.6E-5	0	52.2		
2C19	Increase	2.6E-5	0	52.2		
2E1	Increase	4.7E-5	35.7	95.7		
2B6	Increase	3.2E-4	0	43.5		
3A5	Increase	1.7E-4	10.7	65.2		
4F11	Increase	1.7E-4	3.6	52.3		
27A1	Increase	2.9E-3	35.7	87.0		
4V2	*Increase*	*0.15 (p=6.5E-3)*	*3.6*	*30.4*		
2J2	*Increase*	*0.32 (p=0.01)*	*50.0*	*82.6*		
4F12	*Decrease*	*0.27(p=0.01)*	*17.9*	*0*		
4A11	*Decrease*				*0.06(p=4E-3)*	*-3.17*
51A1	Decrease				2.7E-4	-4.59
3A7	Decrease				6.4E-6	-5.73
19A1	Decrease	2.8E-4	46.4	0		

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Supplemental Figure 1. Comparison of P450 protein abundance to ABPP measured functional activity. Activity and protein expression values are averaged by life stage, and normalized on a 0-1 scale for each individual P450. Thereby, points of highest expression or activity for each P450 are observed as increasingly red. TM1 – fetal first trimester; TM2 – fetal second trimester. See also Figure 5 in the manuscript.

Supplemental Dataset Descriptions

Dataset 1. Sample metadata. Availability of sample information is quite disparate.

Dataset 2. Global proteomics statistics values as determined by approaches described in the Materials and Methods section of the manuscript.

Dataset 3. Activity-based protein profiling proteomics statistics values as determined by approaches described in the Materials and Methods section of the manuscript.

Dataset 4. Transformed qRT-PCR values showing the fold-change of expression to an internal housekeeping gene, GAPDH. Data corresponds with Figure 2 in the manuscript. Gest. day = gestational day.

Dataset 5. Raw qRT-PCR values.

Dataset 6. Transformed qRT-PCR values showing the fold-change of expression to an internal housekeeping gene, beta-actin. Gest. day = gestational day.

Dataset 7. Global proteomics accurate mass and time (AMT) tag abundance values for P450 protein expression. Missing values are imputed as one-half the minimum measured value. TM – trimester, FL – fetal, AL – adult.

Dataset 8. Individual peptide AMT tag values for P450 protein expression. TM – trimester, FL – fetal, AL – adult.

Dataset 9. AMT tag abundance values for P450 functional activity as determined by activity-based protein profiling (ABPP). Missing values are imputed as one-half the minimum measured value. TM – trimester, FL – fetal, AL – adult.

Dataset 10. Individual peptide AMT tag values for ABPP determined abundance. TM – trimester, FL – fetal, AL – adult.