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**Lab Dept:** Chemistry

**Test Name:** FATTY ACID PROFILE, COMPREHENSIVE

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***General Information***

**Lab Order Codes:** FAPC

**Synonyms:** Fatty Acid Profile, Comprehensive (C8-C26), Serum

**CPT Codes:** 82542 – Column chromatography, includes mass spectrometry, if performed, non-drug analytes, not elsewhere specified, qualitative or quantitative, each specimen

**Test Includes:** See [Reference Range](#)

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***Logistics***

**Test Indications:** Useful for monitoring patients undergoing diet therapy for mitochondrial or peroxisomal disorders (possibly inducing essential fatty acid deficiency (EFAD) in response to restricted fat intake). Monitoring treatment of EFAD. Monitoring the response to provocative tests (fasting tests, loading tests). Complete evaluation of patients enrolled in clinical studies.

**Lab Testing Sections:** Chemistry - Sendouts

**Referred to:** Mayo Medical Laboratories (MML Test: FAPCP)

**Phone Numbers:** MIN Lab: 612-813-6280

STP Lab: 651-220-6550

**Test Availability:** Daily, 24 hours

**Turnaround Time:** 3 - 7 days, test set up Monday - Friday

**Special Instructions:** See [Patient Preparation](#)

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***Specimen***

**Specimen Type:** Blood

**Container:** SST (Marble, gold or red top tube)

**Draw Volume:** 1.5 mL (Minimum: 0.5 mL) blood

<b>Processed Volume:</b>	0.5 mL (Minimum: 0.15 mL) serum
<b>Collection:</b>	Routine venipuncture
<b>Special Processing:</b>	Lab Staff: Centrifuge specimen and aliquot serum into a plastic screw-capped round bottom vial. Store and ship at frozen temperatures. Forward promptly.
<b>Patient Preparation:</b>	Overnight (12-14 hour) fast recommended. Patient must not consume any alcohol for 24 hours before the specimen is drawn.
<b>Sample Rejection:</b>	Specimens other than serum or plasma; anticoagulants other than EDTA or heparin; warm specimens

***Interpretive***

**Reference Range:**

<b>Fatty Acid nmol/mL</b>	<b>&lt;1 year</b>	<b>1 - 17 years</b>	<b>≥18 years</b>
Octanoic Acid, C8:0	7 - 63	9 - 41	8 - 47
Decenoic Acid, C10:1	0.8 - 4.8	1.6 - 6.6	1.8 - 5.0
Decanoic Acid, C10:0	2 - 62	3 - 25	2 - 18
Lauroleic Acid, C12:1	0.6 - 4.8	1.3 - 5.8	1.4 - 6.6
Lauric Acid, C12:0	6 - 190	5 - 80	6 - 90
Tetradecadienoic Acid, C14:2	0.3 - 6.5	0.2 - 5.8	0.8 - 5.0
Myristoleic Acid, C14:1	1 - 46	1 - 31	3 - 64
Myristic Acid, C14:0	30 - 320	40 - 290	30 - 450
Hexadecadienoic Acid, C16:2	4 - 27	3 - 29	10 - 48
Hexadecenoic Acid, C16:1w9	21 - 69	24 - 82	25 - 105

Palmitoleic Acid, C16:1w7	20 - 1020		100 - 670	110 - 1130
Palmitic Acid, C16:0	720 - 3120		960 - 3460	1480 - 3730
$\gamma$ -Linolenic Acid, C18:3w6	6 - 110		9 - 130	16 - 150
$\alpha$ -Linolenic Acid, C18:3w3	10 - 190		20 - 120	50 - 130
Linoleic Acid, C18:2w6	1-31 days	32 days – 11 months	1 - 17 years	$\geq$ 18 years
	350 - 2660	1000 - 3000	1600 - 3500	2270 - 3850
Oleic Acid, C18:1w9	250 - 3500		350 - 3500	650 - 3500
Vaccenic Acid, C18:1w7	140 - 720		320 - 900	280 - 740
Stearic Acid, C18:0	270 - 1140		280 - 1170	590 - 1170
EPA, C20:5w3	2 - 60		8 - 90	14 - 100
Arachidonic Acid, C20:4w6	110 - 1110		350 - 1030	520 - 1490
Mead Acid, C20:0:3w9	1 - 31 days	32 days – 11 months	$\geq$ 1year	
	8 - 60	3 - 24	7 - 30	
h- $\gamma$ -Linolenic Acid, C20:3w6	30 - 170		60 - 220	50 - 250
Arachidic Acid, C20:0	30 - 120		30 - 90	50 - 90
DHA, C22:6w3	10 - 220		30 - 160	30 - 250
DPA, C22:5w6	3 - 70		10 - 50	10 - 70
DPA, C22:5w3	6 - 110		30 - 270	20 - 210

DTA, C22:4w6	2 - 50	10 - 40	10 - 80
Docosenoic Acid, C22:1	<1 year	≥1year	
	2 - 20	4 - 13	
Docosanoic Acid, C22:0	All ages		
	0.0 - 96.3		
Nervonic Acid, C24:1	30 - 150	50 - 130	60 - 100
Tetracosanoic Acid, C24:0	All ages		
	0.0 - 91.4		
Hexacosenoic Acid, C26:1	0.2 - 2.1	≥1year	
		0.3 - 0.7	
Hexacosanoic Acid, C26:0	All ages		
	0.00 - 1.30		
Pristanic Acid, C15:0(CH <sub>3</sub> ) <sub>4</sub>	1 day – 4 months: 0.00 – 0.60nmol/mL 5-8 months: 0.00 – 0.84 nmol/mL 9-12 months: 0.00 – 0.77 nmol/mL 13-23 months: 0.00 – 1.47 nmol/mL > or =2 years: 0.00 – 2.98 nmol/mL		
Phytanic Acid, C16:0(CH <sub>3</sub> ) <sub>4</sub>	1 day – 4 months: 0.00 – 5.28 nmol/mL 5-8 months: 0.00 – 5.70 nmol/mL 9-12 months: 0.00 – 4.40 nmol/mL 13-23 months: 0.00 – 8.62 nmol/mL > or =2 years: 0.00 – 9.88 nmol/mL		
<b>Triene Tetraene Ratio</b>	1 – 31 days	32 days – 17 years	≥18 years
	0.017 - 0.083	0.013 - 0.050	0.010 - 0.038
<b>Values Expressed as mmol/L</b>			

Total Saturated Acid	1.2 - 4.6	1.4 - 4.9	2.5 - 5.5
Total Monounsaturated Acid	0.3 - 4.6	0.5 - 4.4	1.3 - 5.8
Total Polyunsaturated Acid	1.1 - 4.9	1.7 - 5.3	3.2 - 5.8
Total w3	0.0 - 0.4	0.1 - 0.5	0.2 - 0.5
Total w6	0.9 - 4.4	1.6 - 4.7	3.0 - 5.4
Total Fatty Acids	3.3 - 14.0	4.4 - 14.3	7.3 - 16.8
<p>Interpretation: An increased triene/tetraene ration is consistent with essential fatty acid deficiency.</p> <p>Fatty acid oxidation disorders are recognized on the basis of disease-specific patterns that are correlated to the results of other investigations in plasma (carnitine, acylcarnitines) and urine (organic acids, acylglycines).</p> <p>Increased concentrations of serum very long-chain fatty acids (VLCFA) C24:0 and C26:0 are seen in peroxisomal disorders, X-linked adrenoleukodystrophy, adrenomyeloneuropathy, and Zellweger syndrome (cerebrohepatorenal syndrome).</p> <p>Increased concentrations of serum phytanic acid (along with normal pristanic acid concentrations) are seen in Refsum disease (phytanase deficiency). Serum phytanic acid concentration also may be increased in other peroxisomal disorders and, when combined with the VLCFA, pristanic acid and pipercolic acid allow differential diagnosis of peroxisomal disorders.</p>			

**Critical Values:**

N/A

**Limitations:**

For nutritional assessment, a 12-14 hour fast is required; however, infants or persons suspected of having fatty acid oxidation disorder should not fast before testing owing to the possibility of acute metabolic decompensation. Instead, collect the specimen after the longest fast possible, just before feeding. In the case of a patient on total parenteral nutrition (TPN), specimen can be drawn as normal.

**Methodology:**

Gas chromatography/Mass spectrometry (GC-MS), Stable isotope dilution analysis

**References:**

[Mayo Medical Laboratories](#) August 2016

**Updates:**

12/15/2005: Reference range updates.

12/23/2010: Units update

1/26/2016: CPT update

8/3/2016: Tube update