
Lab Dept: Chemistry

Test Name: CARNITINE, SERUM, TOTAL AND FREE

General Information

Lab Order Codes: CARN

Synonyms: L-Carnitine; Carnitine, S

CPT Codes: 82379 – Carnitine (total and free), quantitative, each specimen

Test Includes: Total carnitine (TC), Free carnitine (FC), Acylcarnitine (AC) Range and AC/FC Ratio

Logistics

Test Indications: Evaluation of patients with a clinical suspicion of a wide range of inborn errors of metabolism, especially organic acidemias and fatty acid oxidation disorders including primary carnitine deficiency.

Lab Testing Sections: Chemistry - Sendouts

Referred to: Mayo Medical Laboratories (MML Test: CARNS)

Phone Numbers: MIN Lab: 612-813-6280

STP Lab: 651-220-6550

Test Availability: Daily, 24 hours

Turnaround Time: 2 - 5 days, performed Monday - Friday

Special Instructions: N/A

Specimen

Specimen Type: Blood

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

Draw Volume: 1.5 mL (Minimum: 0.6 mL) blood

Processed Volume: 0.5 mL (Minimum: 0.2 mL) serum

Collection: Routine blood collection

Special Processing:

Lab Staff: Centrifuge specimen and remove serum aliquot into a screw-capped round bottom plastic vial. Store and ship at frozen temperatures.

Specimen stable frozen (preferred) for 60 days, refrigerated for 21 days, ambient for 7 days.

Patient Preparation:

None

Sample Rejection:

Specimens other than serum, warm specimens; mislabeled or unlabeled specimens

Interpretive

Reference Ranges:

Age	Total Carnitine(TC) Range nmol/mL	Free Carnitine (FC) Range nmol/mL	Acylcarnitine (AC) Range nmol/mL	AC/FC Ratio
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≤1 day	23 – 68	12 – 36	7 – 37	0.4 – 1.7
2 - 7 days	17 – 41	10 – 21	3 – 24	0.2 – 1.4
8 - 31 days	19 – 59	12 – 46	4 – 15	0.1 – 0.7
32 days – 12 months	38 – 68	27 – 49	7 – 19	0.2 – 0.5
13 months – 6 years	35 – 84	24 – 63	4 – 28	0.1 – 0.8
7 - 10 years	28 – 83	22 – 66	3 – 32	0.1 – 0.9
11 - 17 years	34 – 77	22 – 65	4 – 29	0.1 – 0.9
≥18 years	34 – 78	25 – 54	5 – 30	0.1 – 0.8

Table used with permission of Schmidt-Sommerfeld E, Werner E, Penn D: Carnitine plasma concentrations in 353 metabolically healthy children. Eur J Pediatr 147:356-360, 1988 and the European Journal of Pediatrics, Springer-Verlag, New York, Inc., Secaucus, NJ

Interpretation: When abnormal results are detected, a detailed interpretation is given, including an overview of the results and their significance, a correlation to available clinical information, elements of differential diagnosis, recommendations for additional biochemical testing, and a phone number to reach one of the laboratory directors in case the referring physician has additional questions.

Critical Values:

N/A

Limitations:

Determination of urine carnitine concentration concurrently with serum concentration is recommended.

Methodology:

Tandem Flow injection analysis/Tandem Mass Spectrometry (FIA-MS/MS)

References:

[Mayo Clinic Laboratories](#) June 2023

Updates:

10/12/2010: Units change, previously reported as umol/L.
8/22/2016: Tube update.
2/23/2017: Processing update.
6/12/2023: Added Serum to test name, added specimen stability