AVISE SLE Monitor

Order ID 668573
Provider Exagen Provider MD

Specimen
Collected 01/15/2022
Received 01/16/2022

Test Order
Created 01/16/2022
Reported 01/20/2022

Patient
Sample, Susan
Gender - DOB Female - 01/01/1996
Identifier Received
Exagen ID 541163

AVISE SLE Monitor Test Report

	Value	Interpretation	Reference Range
Complement Component			
+ EC4d - Erythrocyte-bound C4d	20 Net MFI	POSITIVE	FACS: <15 - Negative | ≥15 - Positive
Complement C3	105.120 mg/dL	Normal	Turbidimetry: 81 - 157 - Normal
Complement C4	25.025 mg/dL	Normal	Turbidimetry: 13 - 39 - Normal
Antibody Component			
+ Anti-dsDNA IgG	60.0 IU/mL	POSITIVE	CIA: <27 - Negative | 27 - 35 - Indeterminate | >35 - Positive
+ Anti-C1q IgG	30.0 Units	POSITIVE	ELISA: <20 - Negative | ≥20 - Positive
Thrombosis-associated Marker			
+ PC4d - Platelet-bound C4d	30 Net MFI	POSITIVE	FACS: <20 – Negative | ≥20 – Positive
Therapy Monitoring			
Hydroxychloroquine	800 ng/mL	Sub-therapeutic	

Analyte Descriptions

EC4d

Erythrocyte-bound C4d (EC4d) measured by flow cytometry has been shown to significantly correlate with disease activity as measured by clinical SELENA-SLEDAI [1,2]. Furthermore, reductions in EC4d levels have been shown to correlate with improvements in SF-36 score and BILAG-2004 index [2].

Complement C3/C4

Normalization of complement C3 and C4 proteins has been shown to correlate with disease improvements in SLE [1-3].

Anti-dsDNA IgG

Anti-dsDNA is quantified using a bead-based chemiluminescence immunoassay method. Relative to other methods, values produced by this method have superior correlation with disease activity [3,4].

Anti-C1q IgG

Autoantibodies to C1q have been shown to significantly correlate with clinical SELENA-SLEDAI values and are superior to 3 other biomarkers in their association with lupus nephritis and proteinuria [2,3,5].

PC4d

Elevated (positive) platelet-bound C4d (PC4d) levels have been associated with a history of thrombosis in lupus [6,7,8]. Patients with persistent elevated PC4d have been shown to have significant association with thrombosis [6,9].

Test Method Description

The disease monitoring panel consists of C4d bound to erythrocytes or platelets (determined by flow cytometry), soluble complement C3c and C4 proteins (determined by immunoturbidimetry), and SLE auto-antibodies (anti-double stranded DNA and anti-C1q IgG, all determined by immunoassays). Changes in EC4d, anti-dsDNA, anti-C1q and complement proteins have been shown to correlate with change in SLE disease activity, as defined by clinical SELENA-SLEDAI, BILAG index score and proteinuria [1-3].

References

1. Kao A, et al. Erythrocyte C3d and C4d for Monitoring Disease Activity in Systemic Lupus Erythematosus. Arthritis and Rheumatism 62[3], 837-844. 2010
2. Buyon J, et al. Reduction in Erythrocyte Bound Complement Activation Products and Titers of Anti-C1q antibodies associate with clinical improvement in systemic lupus erythematosus. Lupus Science & Medicine 2016
3. Merrill J, et al. Erythrocyte-bound C4d in combination with complement and autoantibody status for the monitoring of SLE. Lupus Sci Med. 2018;5(1):e000263
4. Mahler M, et al. Performance Characteristics of Different Anti-Double-Stranded DNA Antibody Assays in the Monitoring of Systemic Lupus Erythematosus. J Immunol Res. 2017;2017:1720902.
5. Orbai A, et al. Anti-C1q Antibodies in Systemic Lupus Erythematosus. Lupus. 2015 January; 24(1): 42–49
6. Kao A, et al. Relation of platelet C4d with all-cause mortality and ischemic stroke in patients with systemic lupus erythematosus. Transl Stroke Res. 2014 Aug;5(4):510-8
7. Petri M, et al. Complement C4d Split Products in Combination with Lupus Anticoagulant and Low Complement Associate with Thrombosis in Systemic Lupus Erythematosus [abstract]. Arthritis Rheumatol. 2018; 70 (suppl 10).
8. Lood C et al. Platelet activation and anti-phospholipid antibodies collaborate in the activation of the complement system on platelets in systemic lupus erythematosus. PLoS One. 2014; doi: 10.1371/journal.pone.0099386. eCollection 2014.
9. Data on file - Exagen Diagnostics, Inc.

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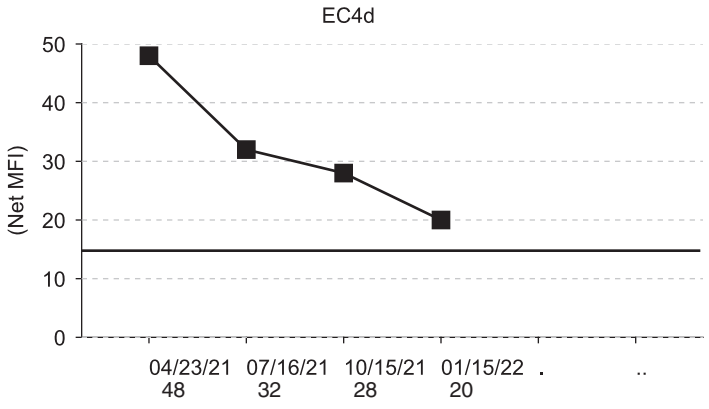
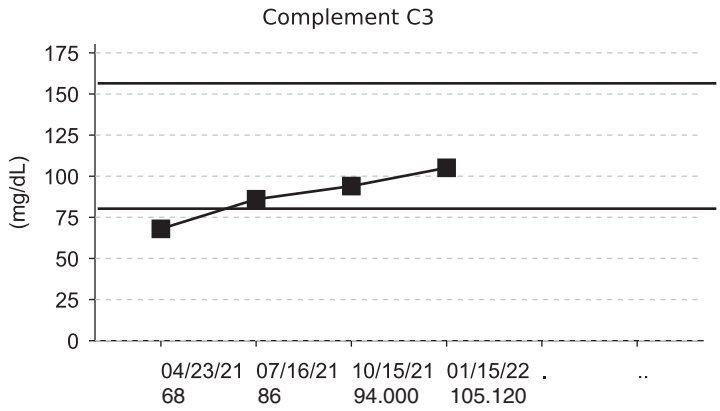
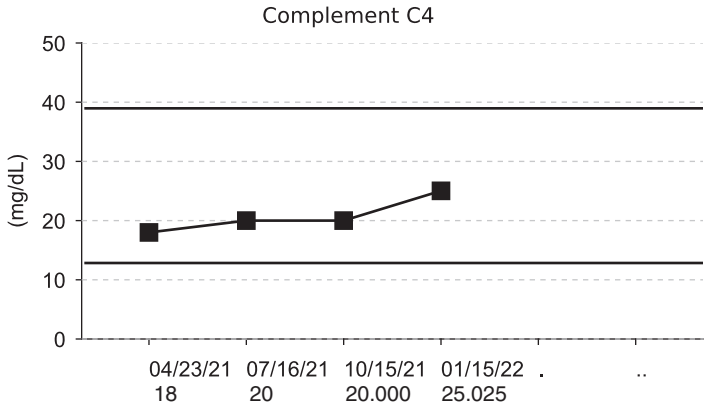
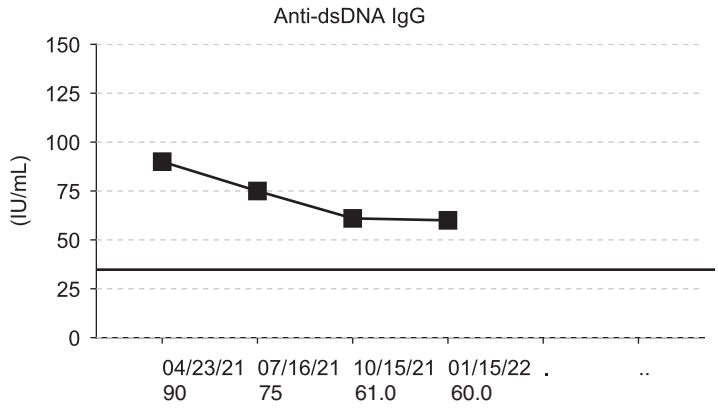
Complement Component

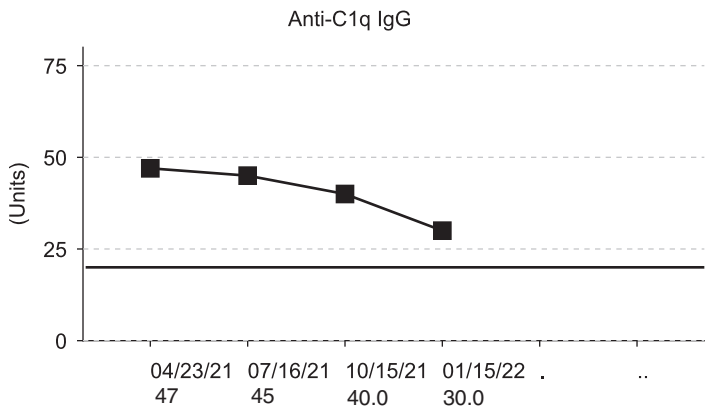




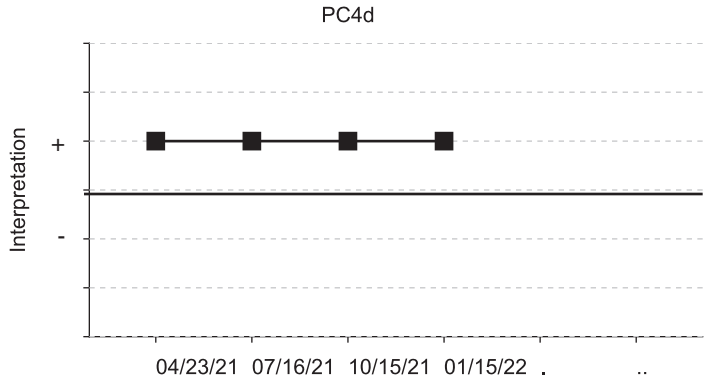


Antibody Component





Thrombosis-associated Marker



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Laboratory Directors:
Richard Safrin, MD
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Provider Relations: 888.452.1522

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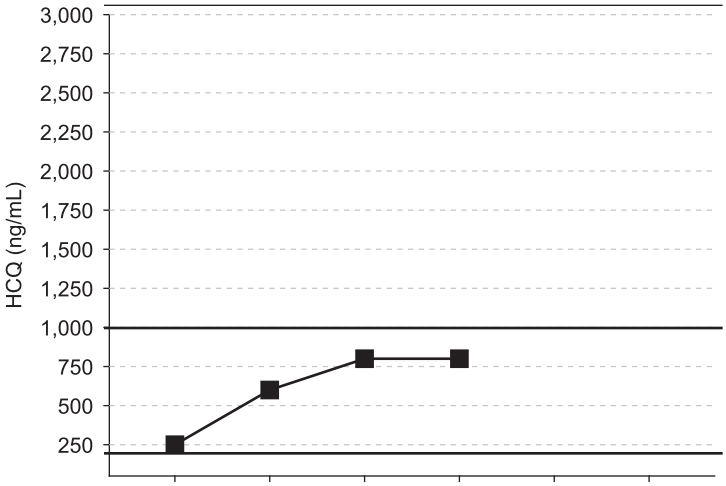
Avise HCQ Test Report

Current Hydroxychloroquine (HCQ) Level:

800 ng/mL - Sub-therapeutic

HCQ Dose (mg/day)

Current and Prior 5 HCQ Levels



Date	04/23/21	07/16/21	10/15/21	01/15/22	.	..
Level (ng/mL)	250	600	800	800		
Dose (mg/day)						

HCQ Level	*Interpretation & Consideration*
Therapeutic (>1000 ng/mL)	Level associated with clinical efficacy. HCQ is likely absorbed effectively
Sub-therapeutic (200-1000 ng/mL)	Patient could be partially adherent to therapy. Patients with HCQ lower than 1000 ng/mL can be at greater risk for disease flare
Underexposed (<200 ng/mL)	Patient is likely non-adherent to HCQ therapy

Test Method Description

HCQ concentration is determined by liquid chromatography coupled with mass spectrometry (LC/MS/MS).
This test has not been validated in pediatric populations. The HCQ blood level should be evaluated after 6 months of HCQ therapy - it has not been validated in patients treated for less than 6 months. This test cannot be used to assess the risk of HCQ toxicity.

References

1. Costedoat-Chalumeau N, et al. Low blood concentration of hydroxychloroquine is a marker for and predictor of disease exacerbations in patients with systemic lupus erythematosus. Arthritis Rheum. 2006 Oct;54(10):3284-90.
2. Costedoat-Chalumeau N, et al. Very low blood hydroxychloroquine concentration as an objective marker of poor adherence to treatment of systemic lupus erythematosus. Ann Rheum Dis. 2007 Jun;66(6):821-4.
3. Costedoat-Chalumeau N, et al. (2013a) Hydroxychloroquine in Systemic Lupus Erythematosus: Results of a French Multicentre Controlled Trial (PLUS Study). Ann Rheum Dis 72:1786-1792.
4. Costedoat-Chalumeau N, et al. (2013b) Adherence to Treatment in Systemic Lupus Erythematosus Patients. Best Pract Res Clin Rheumatol 27:329-340.
5. Frances C, et al. Low blood concentration of hydroxychloroquine in patients with refractory cutaneous lupus erythematosus: a French multicenter prospective study. Arch Dermatol. 2012 Apr;148(4):479-84.
6. Exagen Diagnostics, Inc. Data on File.

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