| | | | |
|---|---|---|---|
| *Order ID* 200123 | ***Specimen*** | ***Patient*** | **Smith, Mary L** |
| *Provider* Example Provider MD | *Collected* 09/28/2018 | | |
| | *Received* 09/29/2018 | *Gender - DOB* | Female - 01/12/1970 |
| | ***Test Order*** | *Identifier Received* | |
| | *Created* 09/29/2018 | | |
| | *Reported* 09/30/2018 | *Exagen ID* | 300955 |

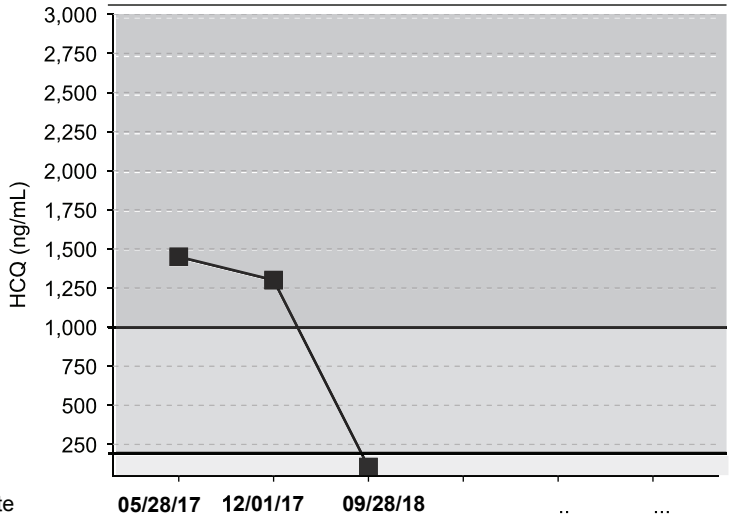
# AVISE HCQ Test Report

## Current Hydroxychloroquine (HCQ) Level:

**105 ng/mL - Underexposed**

| Hours elapsed between last dose and sample collection | HCQ Dose (mg/day) | Date HCQ Dose Initiated |
|---|---|---|
| 5 | 400 | 4/1/17 |

*Current and Prior 5 HCQ Levels*




| Date | 05/28/17 | 12/01/17 | 09/28/18 | .. | ... |
|---|---|---|---|---|---|
| Level (ng/mL) | 1450 | 1301 | 105 | | |
| Dose (mg/day) | 400 | 400 | 400 | | |

| *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, Inc. Date on File.



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CAP# 7201051 | PFI# 8369

*Laboratory Directors:*
Richard Safrin, MD
Thierry Dervieux, PhD, DABCC

Provider Relations: 888.452.1522

| | | | |
|---|---|---|---|
| *Order ID* 203283 | ***Specimen*** | ***Patient*** | **Sandra, Clark** |
| *Provider* Exagen, Inc. | *Collected* 01/06/2018 | | **170104.1** |
| | *Received* 01/07/2018 | *Gender - DOB* | Male - 01/04/1984 |
| | ***Test Order*** | *Identifier Received* | |
| | *Created* 01/12/2018 | | |
| | *Reported* 01/12/2018 | *Exagen ID* | 302243 |

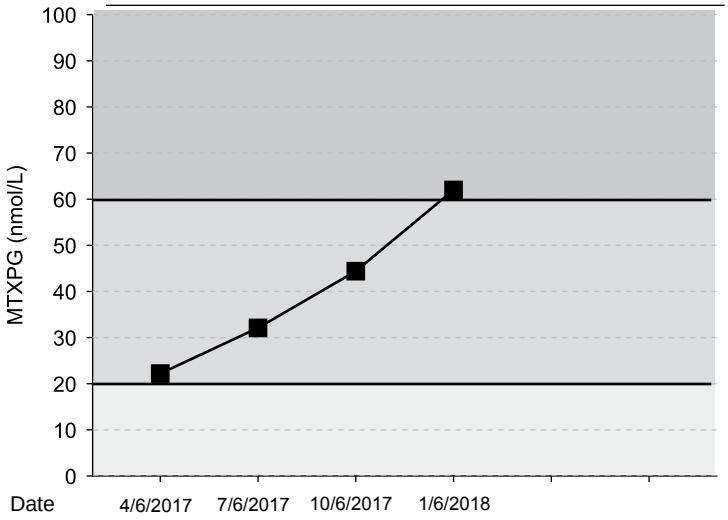
# AVISE MTX Test Report

## Current Methotrexate Polyglutamate (MTXPG) Level:

**62.0 nmol/L RBC equivalent - Therapeutic**

| Date Current Dose Initiated | Current Dose | Date MTX Initiated |
|---|---|---|
| 1/6/2018 | 10 | 8/8/2014 |

*Current and Prior 5 MTXPG Levels*




| Date | 4/6/2017 | 7/6/2017 | 10/6/2017 | 1/6/2018 |
|---|---|---|---|---|
| Level | 22.2 † | 32.1 ‡ | 44.4 † | 62.0 ‡ |
| Dose | 10 | 10 | 10 | 10 |

| *MTXPG Level* | *Interpretation & Consideration* |
|---|---|
| Therapeutic (>60 nmol/L) | Patient is metabolizing MTX effectively. Level is consistent with clinical efficacy |
| Intermediate (20-60 nmol/L) | Patient may need more exposure to MTX |
| Sub-therapeutic (<20 nmol/L) | Patient may not be metabolizing MTX effectively or patient may be non-compliant with therapy |

†nmol/L RBC
‡nmol/L RBC equivalent

## Test Method Description

AVISE MTX measures red blood cell methotrexate polyglutamates, the active metabolites of methotrexate as an aid in optimizing methotrexate dose and therapeutic efficacy in the treatment of rheumatoid arthritis. In a cohort of 256 rheumatoid arthritis patients taking methotrexate (range 5-25 mg/wk, median 15 mg/wk) for more than 3 months, those with a MTXPG level below 20 nmol/L were 3-fold more likely to have a poor response to methotrexate vs. those with level >=20 nmol/L (OR =2.9; 95% CI:1.4-5.9). Those with a MTXPG level above 60 nmol/L were 5-fold more likely to have a good response to methotrexate vs. those with level <=60 nmol/L (OR=5.5; 95% CI:2.5-12.0).

The MTXPG level is obtained by a liquid chromatographic method coupled with tandem mass spectrometry. The concentration from venous blood is expressed as nmol/L packed red blood cells (RBC). The concentration determined from whole capillary blood is expressed as nmol/L RBC equivalent. Studies supporting the clinical utility of this test are based on patients receiving methotrexate for at least 3 months. Caution should be used in interpreting results for patients on therapy for less than three months.

## References


1. Dervieux T, Furst D, et al. Polyglutamation of Methotrexate With Common Polymorphisms in Reduced Folate Carrier, Aminoimidazole Carboxamide Ribonucleotide Transformylase, and Thymidylate Synthase Are Associated With Methotrexate Effects in Rheumatoid Arthritis, Arthritis Rheum. 2004; 50(9):2766-2774.
2. Dervieux T, Furst D, et al. Pharmacogenetic and metabolite measurements are associated with clinical status in patients with rheumatoid arthritis treated with methotrexate: results of a multicentered cross sectional observational study, Ann Rheum Dis 2005;64(8):1180-1185.
3. Dervieux T, Greenstein N, et al. Pharmacogenomic and Metabolic Biomarkers in the Folate Pathway and Their Association With Methotrexate Effects During Dosage Escalation in Rheumatoid Arthritis, Arthritis Rheum. 2006;54(10):3095-3103.
4. Kremer J, Toward a Better Understanding of Methotrexate, Arthritis Rheum. 2004;50(5):1370-1382.



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