MAYO CLINIC LABORATORIES

# Test Definition: PERA

Preeclampsia sFlt-1/PIGF (Soluble fms-Like Tyrosine Kinase 1/ Placental Growth Factor) Ratio, Serum

## Overview

### Useful For

Aiding in risk assessment of patients with clinical signs and symptoms consistent with development of preeclampsia with severe features

This test is **not intended for** making a diagnosis of preeclampsia or preeclampsia with severe features.

This test is **not** a stand-alone test for monitoring of hypertensive disorders of pregnancy or for changing treatment, including medication.

### Highlights

This test aids in risk assessment of pregnant women between 23 and 34 weeks of gestation with clinical signs and symptoms of hypertensive disorders of pregnancy that might develop preeclampsia with severe features.

The sFlt-1/PIGF (soluble fms-like tyrosine kinase 1/placental growth factor) ratio will reported. sFlt-1 and PIGF concentrations will not be individually reported.

### Method Name

Immunofluorescent Assay (IFA)

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Ordering Guidance

The test is indicated for use in pregnant women, with singleton pregnancies (gestational age 23 to 34+6/7 weeks) hospitalized for hypertensive disorders of pregnancy (preeclampsia, chronic hypertension with or without superimposed preeclampsia or gestational hypertension), within 2 weeks of presentation.

### Specimen Required

**Patient Preparation:** For 24 hours before specimen collection, the patient **should not** receive intravenous heparin.
**Supplies:** Sarstedt Aliquot Tube, 5 mL (T914)
**Collection Container/Tube:**
**Preferred:** Serum gel
**Acceptable:** Red top

**Submission Container/Tube**: Plastic vial
**Specimen Volume:** 0.5 mL serum
**Collection Instructions:** Centrifuge and aliquot serum into a plastic vial.

### Specimen Minimum Volume
Serum: 0.3 mL

### Reject Due To

| | |
|---|---|
| Gross hemolysis | OK |
| Gross lipemia | OK |
| Gross icterus | Reject |

### Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---|---|---|---|
| Serum | Frozen (preferred) | 180 days | |
| | Refrigerated | 24 hours | |

## Clinical & Interpretive

### Clinical Information
Preeclampsia (PE) is a complication of pregnancy that affects approximately 5% of women worldwide. PE is a serious hypertensive condition occurring at mid-pregnancy. Clinical signs of PE, such as the onset of hypertension, are typically observed after 20 weeks of gestation. Clinically, PE may vary from mild to severe forms and may require premature delivery. The severe form of PE, which may include symptoms of the life-threatening HELLP (hemolysis, elevated liver enzymes, low platelets) syndrome, occurs in about 20% of women presenting with PE. While early-onset PE (which develops before 34 weeks of gestation) is less prevalent than late-onset PE (which develops at 34 weeks of gestation or later), early onset PE is associated with a greater risk of adverse outcome.

Although the cause of PE remains unclear, the syndrome may be initiated by an imbalance of placental factors that induce endothelial dysfunction. Soluble fms-like tyrosine kinase 1 (sFlt-1) and placental growth factor (PIGF) are both associated with placental dysfunction and risk of PE during pregnancy. Women with PE have been reported to have increased circulating concentrations of sFlt-1, an antiangiogenic protein largely produced in the placenta, which is associated with inhibition of vascular endothelial growth factor and PlGF. During pregnancy, PlGF concentrations typically increase progressively in the first and second trimester and then decrease towards full term. In contrast, in cases of clinical PE, sFlt-1 concentrations are significantly increased versus concentrations observed in normal pregnancies, while concentrations of circulating free PlGF are significantly decreased relative to normal pregnancy.

The use of the sFlt-1/PIGF ratio has been shown to be a useful tool to aid in risk assessment of patients with clinical signs and symptoms consistent with development of PE with severe features (as defined by American College of Obstetricians

and Gynecologists guidelines).(1) Based on the data collected during the PRAECIS clinical study, the prognostic performance of the sFlt-1/PlGF ratio using a ratio cut-off of 40 (where if the ratio is greater than or equal to 40, there is a high risk for progression to PE with severe features), exhibited a sensitivity of 94%, and specificity of 75% for the development of PE with severe features within 2 weeks. The performance of the sFlt-1/PlGF ratio to predict development of PE with severe features within two weeks was statistically higher than the prognostic performance of other commonly used clinical (highest systolic blood pressure, highest diastolic blood pressure) and laboratory (eg, aspartate aminotransferase, alanine aminotransferase, creatinine, and platelets) markers associated with PE.

### Reference Values

<40

### Interpretation

A sFlt-1/PlGF (soluble fms-like tyrosine kinase 1/placental growth factor) ratio will be reported as a unitless whole number. sFlt-1 and PlGF concentrations will not be individually reported.

The sFlt-1/PlGF ratio is indicated to be used as an aid in the management of the patient and are prognostic assays intended to stratify hospitalized patients in two risk groups (low risk and high risk of progression to preeclampsia with severe features within two weeks from presentation).

If the result of the sFlt-1/PlGF ratio is greater than or equal to 40, the pregnant woman is at high risk for progression to preeclampsia with severe features within 2 weeks of presentation.

If the result of the sFlt-1/PlGF ratio is less than 40, the pregnant woman is at low risk for progression to preeclampsia with severe features within 2 weeks of presentation.

The sFlt-1/PlGF ratio results should be used in conjunction with information available from clinical evaluations and other standard of care procedures. The test result is not to be used to replace clinical judgement. The clinical management should be dependent on the patient's healthcare provider's recommendations as inferred from their clinical status. Therefore, the test results should not be used as a deciding factor to change management plans, and especially not for decisions of pregnancy delivery or for patient discharge from hospital.

### Cautions

The B·R·A·H·M·S PlGF (placental growth factor) plus KRYPTOR assay must be run in conjunction with the B·R·A·H·M·S sFlt-1 (soluble fms-like tyrosine kinase 1) KRYPTOR assay and the same patient sample must be used to run both assays. Use of another manufacturer's assays may result in significantly different results.

The sFlt-1/PlGF ratio should not be used for a woman with a multiple pregnancy because the safety and effectiveness of the assay has not been established in women pregnant with multiple fetuses (twins, triplets, etc).

The sFlt-1/PlGF ratio should not be used for a woman receiving intravenous heparin for 24 hours prior to testing because the safety and effectiveness of the assay has not been established in such cases.

The sFlt-1/PlGF ratio should not be used for women receiving exogenous PlGF-2 or PlGF-3 for therapeutic use at

concentrations higher than 100 pg/mL because the safety and effectiveness of the assay has not been established in such cases. However, in samples with equal concentrations of PIGF-1 and PIGF-2, the measurement of PIGF-1 was relatively unaffected.

The results of the test are not intended to inform the healthcare provider whether to change treatment, including medication or hospitalization.

In rare cases, some individuals can develop antibodies to mouse or other animal antibodies (often referred to as human anti-mouse antibodies [HAMA] or heterophile antibodies), which may cause interference in some immunoassays. Caution should be used in interpretation of results, and the laboratory should be alerted if the result does not correlate with the clinical presentation.

### Clinical Reference

1. Gestational Hypertension and Preeclampsia: ACOG Practice Bulletin, Number 222. Obstet Gyneco. 2020;135(6):e237-e260
2. Thadhani R, Lemoine E, Rana S, et al. Circulating angiogenic factor levels in hypertensive disorders of pregnancy. NEJM. 2022;1(12). doi:10.1056/EVIDoa2200161
3. Zeisler H, Llurba E, Chantraine F, et al. Predictive value of the sFlt-1:PlGF ratio in women with suspected preeclampsia. N Engl J Med. 2016;374(1):13-22. doi:10.1056/NEJMoa1414838
4. Dathan-Stumpf A, Rieger A, Verlohren S, Wolf C, Stepan H. sFlt-1/PlGF ratio for prediction of preeclampsia in clinical routine: A pragmatic real-world analysis of healthcare resource utilisation. PLoS One. 2022;17(2):e0263443. Published 2022 Feb 24. doi:10.1371/journal.pone.0263443

## Performance

### Method Description

The B·R·A·H·M·S sFlt-1 (soluble fms-like tyrosine kinase 1) KRYPTOR and B·R·A·H·M·S PlGF (placental growth factor) plus KRYPTOR are homogeneous sandwich immunoassays for detection of sFlt-1 or PIGF, respectively, in human serum. The measuring principle is based on time-resolved amplified cryptate emission (TRACETM) technology, which measures the signal that is emitted from an immunocomplex with time delay. When the sample is excited with a nitrogen laser at 337 nm, the donor (eg, cryptate) emits a long-life fluorescent signal in the millisecond range (eg, at 620 nm), while the acceptor (eg, XL) generates a short-life signal in the nanosecond-range (eg, at 707 nm). When the two components are bound in an immunocomplex, both the signal amplification and the prolongation of the life span of the acceptor signal occur at 707 nm, so that it can be measured over microseconds. Signal detection is delayed by 50 microseconds to isolate the long signal emitted by immunocomplex from short signals of unbound fluorophores. This long-lived signal, which is proportional to the concentration of the analyte of interest is measured by selecting the spectral and temporal information.(Package inserts: BRAHMS sFlt-1 Kryptor. Thermo Fisher Scientific BRAHMS LLC; Version 1.Ous, 05/2023; BRAHMS PlGF PLUS Kryptor. Thermo Fisher Scientific BRAHMS LLC; Version R2.Ous, 09/2023)

### PDF Report

No

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### Day(s) Performed
Monday through Saturday

### Report Available
1 to 3 days

### Specimen Retention Time
2 weeks

### Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

## Fees & Codes

### Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

### Test Classification
This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

### CPT Code Information
0482U

### LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| PERA | Preeclampsia sFlt-1/PlGF Ratio, S | 74757-6 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| PERAT | sFlt-1/PlGF Ratio | 74757-6 |