Overview

Useful For
Identification of markedly decreased CD41 (GPIIb) and CD61 (GPIIIa) expression levels, which are diagnostic for Glanzmann thrombasthenia

Identification of markedly decreased CD42a (GPIX) and CD42b (GPIb-alpha) expression levels, which are diagnostic for Bernard-Soulier syndrome

Identification of decreased GPVI expression, which suggests collagen receptor deficiency

Identification of decreased CD49b (GPla), which suggests collagen receptor deficiency

Highlights
This test serves as a confirmatory test for platelet aggregation studies.

Markedly decreased platelet surface glycoprotein expression levels are diagnostic for various hereditary or acquired platelet disorders.

Special Instructions

Method Name
Immunophenotyping

NY State Available
Yes

Specimen

Specimen Type
Whole Blood ACD

Shipping Instructions
Specimen must be shipped ambient and arrive within 96 hours of draw.

Ship specimen overnight in an Ambient Shipping Box-Critical Specimens Only (T668) following the instructions in the mailer.

Specimen Required

Supplies: Ambient Shipping Box-Critical Specimens Only (T668)

Collection Container/Tube: ACD solution (A or B)

Specimen Volume: 6 mL

Pediatric Volume: 1 mL
Collection Instructions: Do not transfer blood to other containers.

Forms
1. Platelet Esoteric Testing Patient Information in Special Instructions
2. If not ordering electronically, complete, print, and send a Coagulation Test Request (T753) with the specimen.

Specimen Minimum Volume
Adult: 1 mL
Pediatric 200 mcL

Reject Due To
<table>
<thead>
<tr>
<th>Gross hemolysis</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross lipemia</td>
<td>OK</td>
</tr>
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</table>

Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
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<tbody>
<tr>
<td>Whole Blood ACD</td>
<td>Ambient</td>
<td>4 days</td>
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</table>

Clinical and Interpretive

Clinical Information

Platelets have essential roles in primary hemostasis. Exposed collagen at a vascular damage site can activate platelets via collagen receptor GPVI and GPIa and bind shear-stretched multimeric VWF proteins, which subsequently interact with the platelet surface receptor, GPIb-V-IX. Upon full activation, platelets can aggregate by binding to fibrinogen through activated GPIIb-GPIIIa receptors. Deficiency of platelet surface glycoproteins can cause bleeding diathesis.

Platelet flow cytometric analysis is the preferred method to assess hereditary platelet disorders due to quantitative surface glycoprotein (GP) deficiencies. GP expression levels can be measured by using fluorescent-conjugated GP-specific antibodies and their fluorescent intensities can be compared to normal ranges of various glycoproteins.

CD Number | Glycoprotein Name | Integrin Name
---|-------------------|----------------|
CD41      | GPIIb             | Alpha 2b      |
CD42a     | GPIX              | NA            |
CD42b     | GPIIb-alpha       | NA            |
CD49b     | GPIa              | Alpha 2       |
CD61      | GPIIIa            | Beta 3        |
NA        | GPVI              | NA            |

Reference Values
**Test Definition: PLAFL**

Platelet Glycoprotein Flow, B

GPIIb CD41: \( \geq 70.0\% \) (Normal Range-Median)

GPIIIa CD61: \( \geq 70.0\% \) (Normal Range-Median)

GPIX CD42a: \( \geq 70.0\% \) (Normal Range-Median)

GPIb-alpha CD42b: \( \geq 70.0\% \) (Normal Range-Median)

GPIa CD49b: \( \geq 60.0\% \) (Normal Range-Median)

**Interpretation**

<table>
<thead>
<tr>
<th>CD Markers</th>
<th>% Reference Range Median</th>
<th>Comments</th>
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<tbody>
<tr>
<td>CD41 and CD61</td>
<td>50%-69% (Marginally)</td>
<td>Marginally decreased platelet surface receptors CD41 (GPIIb) and CD61 (GPIIIa) are of uncertain clinical significance. This finding could be a laboratory artifact due to suboptimal sample condition, benign polymorphisms, or a heterozygous state of Glanzmann thrombasthenia. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated.</td>
</tr>
<tr>
<td></td>
<td>30%-50%: (Moderately)</td>
<td>Platelet surface expression of CD41 (GPIIb) and CD61 (GPIIIa) are moderately or markedly decreased. This finding is suggestive for a variant of Glanzmann thrombasthenia. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated.</td>
</tr>
<tr>
<td></td>
<td>&lt;30%: (Markedly)</td>
<td></td>
</tr>
<tr>
<td>CD42a and CD42b</td>
<td>50%-69% (Marginally)</td>
<td>Marginally decreased platelet surface receptors CD42a (GPIX) and CD42b (GPIb-alpha) are of uncertain clinical significance. This finding could be a laboratory artifact due to suboptimal sample condition, benign polymorphisms, or a heterozygous state of Bernard-Soulier syndrome. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated.</td>
</tr>
<tr>
<td>Test Definition: PLAFL</td>
<td>Platelet Glycoprotein Flow, B</td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td>30%-50%: (Moderately)</td>
<td>Platelet surface expression of CD42a (GPIX) and CD42b (GPIb-alpha) are moderately or markedly decreased. This finding is suggestive for a variant of Bernard-Soulier syndrome. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated.</td>
<td></td>
</tr>
<tr>
<td>&lt;30%: (Markedly)</td>
<td></td>
<td></td>
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<tr>
<td>30%-59%: (Marginally)</td>
<td>Marginally decreased platelet surface receptor CD49b (GPIa) is of uncertain clinical significance. This finding could be a laboratory artifact due to suboptimal sample condition, a benign polymorphism, or a variant of platelet collagen receptor glycoprotein Ia/IIa deficiency. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated.</td>
<td></td>
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<tr>
<td>10%-30% (moderately)</td>
<td></td>
<td></td>
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<tr>
<td>&lt;10%: (Markedly)</td>
<td>Platelet surface expression of CD49b (GPIa) is moderately or markedly decreased. This finding is suggestive for a variant of a variant of platelet collagen receptor glycoprotein Ia/IIa deficiency. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated.</td>
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</table>
### Test Definition: PLAFL

**Platelet Glycoprotein Flow, B**

<table>
<thead>
<tr>
<th>GPVI</th>
<th>Marginal Decrease</th>
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<tbody>
<tr>
<td>50%-69%</td>
<td>50%-69% (Marginally)</td>
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<tr>
<td></td>
<td>Marginally decreased platelet surface receptor glycoprotein VI (GPVI) is of uncertain clinical significance. This finding could be a laboratory artifact due to suboptimal sample condition, a benign polymorphism or a variant of platelet collagen receptor GPVI deficiency. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated.</td>
</tr>
</tbody>
</table>

| 30%-50% (moderately) | Platelet surface expression of glycoprotein VI (GPVI) is moderately or markedly decreased. This finding is suggestive for a variant of a variant of platelet collagen receptor GPVI deficiency. Recommend correlation with patient's clinical findings and results of platelet functional studies, and consider repeating platelet glycoprotein profile studies by flow cytometry to verify the present finding if clinically indicated. |
| <30% (Markedly)     | |

### Cautions

Suboptimal sample condition due to improper blood draw, transportation or storage may cause fluctuation of platelet surface receptors and consequently influence the results of platelet surface receptor measurement by flow cytometry.

### Supportive Data

Platelet glycoprotein flow cytometry method was established in the Mayo special coagulation laboratory in 2009. Between the years of 2009 to 2014, a total of 155 clinical patients were tested. The flow cytometry results were compared with the final impressions of platelet light transmission aggregation testing. There were 7 samples that had flow cytometric features of Glanzmann thrombasthenia, 2 samples that had flow cytometric features of Bernard-Soulier syndrome, and 3 samples that had flow cytometric features of May-Hegglin anomaly. All flow cytometric results were concordant with platelet light transmission aggregation results and other clinical findings.

### Clinical Reference


Performance

Method Description
Flow cytometric immunophenotyping of peripheral blood platelets is performed using the following antibodies:

Panel: CD41 (IIb), CD42a (IX), CD42b (Ib-alpha), CD49b (GPIa), CD61 (GPIIIa), and GPVI.

For sample quality purposes CD62P is evaluated.

Using whole blood collected in ACD (-A or -B), platelet surface GPIa, Ib-alpha, IIb, IIIa, VI and IX expression levels are measured by flow cytometry method. Platelets in whole blood are stained with various fluorochrome-labeled primary antibodies and fixed. Then the platelet surface fluorescent intensities of various bound antibodies are measured by flow cytometers. Platelets are first gated by forward and side scatter. Mean fluorescent intensities are recorded and converted to percentage of a median fluorescent intensity of a normal donor study of 20 healthy donors. If the percentage of expression of a glycoprotein (GP) is lower than the corresponding normal range, a deficiency of a GP is detected. (Unpublished Mayo Method)

PDF Report
No

Day(s) and Time(s) Test Performed
Specimens are processed Monday through Sunday.

Results reported Monday through Friday.

Analytic Time
1 day

Maximum Laboratory Time
2 days

Specimen Retention Time
14 days

Performing Laboratory Location
Rochester

Fees and 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 Regional Manager. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

**CPT Code Information**

88184-Flow cytometry; first cell surface, cytoplasmic or nuclear marker

88185-Flow cytometry; additional cell surface, cytoplasmic or nuclear marker (each) X5

88187-Flow cytometry interpretation, 2 to 8 markers

**LOINC® Information**

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<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<tr>
<td>PLAFL</td>
<td>Platelet Glycoprotein Flow, B</td>
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<table>
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<tr>
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<tbody>
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<td>GPIIb CD41</td>
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<td>CK112</td>
<td>GPIIIa CD61</td>
<td>93318-4</td>
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<td>GPIX CD42a</td>
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<td>CK115</td>
<td>GPla CD49b</td>
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<td>CK116</td>
<td>GPVI</td>
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<td>CK117</td>
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